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CHAMBERS'S

ENCYCLOPÆDIA

A DICTIONARY

OF UNIVERSAL KNOWLEDGE FOR THE PEOPLE

WITH MAPS AND NUMEROUS WOOD ENGRAVINGS

REVISED EDITION

UNALTERED AND UNABRIDGED

VOLUME I.

NEW YORK
COLLIER, Publisher
1888.

PREFACE TO REVISED EDITION OF 1874.

Ever since the completion of CHAMBERS'S ENCYCLOPÆDIA in 1868, alterations have been made from time to time in the successive reprints of sheets, so as to meet the more important changes taking place. But within the last eighteen months, the whole of the articles have undergone thorough revision, and have been brought up to the present time; not a few of them having been entirely re-written. The present re-issue is thus virtually a *New Edition*, and will, it is hoped, be found to represent the actual state of things. It is proper to add, that the revision has been effected under the careful superintendence of ANDREW FINDLATER, LL.D., who has throughout taken charge of the work, and imparted to it that practically useful character which has rendered it so universally acceptable.

W. & R. CHAMBERS.

EDINBURGH, *November 1874*

CONCLUDING NOTICE.

THE design of this work, as explained in the Notice prefixed to the first volume, is that of a DICTIONARY OF UNIVERSAL KNOWLEDGE FOR THE PEOPLE—not a mere collection of elaborate treatises in alphabetic order, but a work to be readily consulted as a DICTIONARY on every subject on which people generally require some distinct information—no article being longer than was absolutely necessary. Commenced in 1859, the work is now brought to a close in 1868, and the Editors confidently point to the Ten volumes of which it is composed, as forming the most COMPREHENSIVE—as it certainly is the CHEAPEST—ENCYCLOPÆDIA ever issued in the United Kingdom.

The original plan, as exemplified in the first volume, has been strictly adhered to throughout; and if, as the work proceeded, there has been any change in the method or quality of the execution, it may at least be affirmed that the change has not been for the worse. After some experience, it became easier to find the person specially qualified to write a particular kind of article, and thus the circle of contributors became widened, and the distribution of the work more specialized. It was also seen to be desirable, in regard to certain classes of subjects, to admit a rather ampler selection of heads. This has been effected without increasing the scale of the work, not so much by less full treatment of the subjects, as by increased care in condensing the statements and omitting everything superfluous.

It will be observed that in the earlier volumes there are fewer notices of *places* than in the later. These and other deficiencies in the Geographical department, have, as far as possible, been remedied in the SUPPLEMENT*; so that the ENCYCLOPÆDIA forms a complete Gazetteer. The minuteness of a special geographical dictionary is, of course, not to be expected: with regard to towns, for instance, it may be well to state, in order to prevent disappointment, that, as a rule, no place with a population under 3000 in the United Kingdom, or under 5000 in other parts of the world, need be looked for under its own name, unless it be historically or otherwise noteworthy. But towns, rivers, &c. of secondary importance mentioned anywhere in the work find a place in the Index, and thus a clue is given to some information regarding them, were it only their whereabouts on the map.

In like manner, in the department of Biography, the limited scale of the work made it necessary to exclude many names which would be deserving of record in an exhaustive biographical dictionary. The intention has been to include only the more prominent actors and thinkers, dead and living, especially such as have attained extensive celebrity. The difficulty of making such a selection is known only to those who have tried it; and the Editors were prepared to have the judiciousness of their choice frequently questioned. In settling relative claims to distinction, the judgment depends much on the special pursuits or sphere of thought of the judge. Of the omitted names to which attention has been kindly called by correspondents, several have, on reconsideration, been introduced into the SUPPLEMENT.*

Natural History has been copiously treated. Without any attempt at embracing a complete exhibition of the three kingdoms of nature, the aim has been to give some account of every class of objects having a general interest, more especially such as are in any way of use in the economy of life.

The articles descriptive of the structure and functions of the human body have been selected and treated mainly with a view to illustrate the laws of health. The subject of Health and Disease has received more

attention relatively than is usual in such works; and the articles of this class will form a pretty complete Dictionary of Domestic Medicine. How important it is that some knowledge on these matters should be widely diffused, is becoming more and more recognized. The directions given in regard to treatment are chiefly meant for those cases of sudden illness or injury where lay practice is necessitated by the absence of professional assistance. But prevention is better than cure; and the chief advantage of a generally diffused knowledge of the nature and causes of diseases is, that it teaches people how to avoid them. A review of what has been done in recent years for the preservation of the health of communities, is given at some length in the SUPPLEMENT,* under the head of SANITARY SCIENCE.

Of the Sciences, the least adapted to encyclopædic treatment is Mathematics. All terms of common occurrence, however, have been introduced, and a brief exposition of the subjects given, so far as could be done in an elementary way.

Natural Philosophy has received ample attention, and all the leading doctrines and facts of general interest will be found under their appropriate heads, treated in a popular way and divested as far as possible of the technicalities of mathematics.

Chemistry, some knowledge of which is becoming daily more indispensable in all departments of life, receives a comparatively large space. Prominence has been given to those points of the subject that have either a direct practical bearing or a special scientific interest. During the progress of the work, several changes in the nomenclature and notation of the science have come into general use; but it was thought better to preserve uniformity in the use of terms and symbols to the end, and to give an account of the changes in the SUPPLEMENT.*

A distinctive feature of this ENCYCLOPÆDIA, it is believed, will be found to lie in the number of articles devoted to religious beliefs and speculative opinions, and in the way in which these topics are handled. The principle followed has been, not to pronounce an opinion for or against a particular doctrine, but to give a true and unprejudiced account of it. To do this, however, in regard to matters of still living controversy, on which almost every one has more or less of a personal feeling, is next to impossible; and therefore the plan has been adopted of giving the opposing views, wherever it was practicable, as stated by their respective adherents. Thus, the articles on the doctrines and rites of the Roman Catholic Church are written by a Roman Catholic scholar; the Unitarian scheme of doctrine by a Unitarian; and the Secularists have been allowed to state their own case. In carrying out this principle, it has sometimes been necessary to employ two writers on one article. The account of the REFORMATION, for instance, is naturally written by a Protestant; but our conception of the movement is not complete until we know how the same events are looked upon by intelligent adherents of the Church of Rome; and accordingly, a paragraph is added written from the Roman Catholic point of view. Similarly, in the article BISHOP, the Episcopal and Presbyterian theories of the origin and nature of that office are from different pens. The principle of getting an account of a system or doctrine from a believer in it has not been confined to religion; it has been acted on in regard to HOMŒOPATHY, HYDROPATHY, and many other subjects. The Editors feel confident that in thus securing the most favorable representation of both sides of a controversy, they were doing the best in their power for the ultimate prevalence of the truth. We are not in a position to judge rightly between two opinions until we know exactly what they are; and this we can do only by having both before us in the light in which they appear to those that hold them.

The great world of thought of the East, with its hundreds of millions of subtle intellects and prolific imaginations, has remained hitherto almost a sealed book in the West, except to a few oriental scholars. Yet the British public might be expected to feel some interest in inquiring what kind of thoughts and fancies actuate the vast multitudes of their fellow-subjects in Hindustan—what gods they worship, and with what rites; what things seem good to them, and what evil; how, in short, they interpret the riddle of this world, and the part they play in it. The means of gratifying this curiosity, is now made more generally accessible than it has heretofore been, by the numerous articles, drawn from original sources on the religious and philosophic systems of India. (See the articles INDIA, section on *Religion;* PURANA, VEDA, VISHNU, VEDANTA, TRANSMIGRATION, BUDDHISM, LAMAISM, NIRVANA, &c.) Attention is also called to the original articles on Mohammedanism, and on its various schools, sects, and heresies (see MOHAMMEDANISM, KORAN, SUNNA, SHIITES, and others in the ENCYCLOPÆDIA proper, and particularly the articles MOHAMMEDAN SECTS, MOTAZALITES, ISMAILIS, SINCERE BRETHREN, &c. in the SUPPLEMENT*). The reader who has been accustomed to think of the Old Testament Scripture as the whole of Hebrew literature, will be able, from the articles on the TALMUD, HAGGADA, HALACHA, ESSENES, and others, to form some notion of the rich treasures of Jewish thought and learning that lie buried in the Talmudic writings and have only recently begun to attract attention.

True to its projected plan as a DICTIONARY OF UNIVERSAL KNOWLEDGE FOR THE PEOPLE, CHAMBERS'S ENCYCLOPÆDIA will be found to be especially rich in notices of miscellaneous matters. Some of the subjects introduced might perhaps be considered beneath the dignity of a book aspiring to a more severely scientific character; but all of them are, if not instructive, at least curious or entertaining, and likely to occur in the

course of reading or conversation. During the progress of the work, the Editors have received numerous assurances from parents how highly it was prized, even though only partly issued, in households with young people at school, as a repertory of the kind of things they are constantly in search of and often puzzling their elders about. This use of the ENCYCLOPÆDIA has been steadily kept in view; and it is gratifying to learn that it is found efficiently to serve the purpose intended. The numerous wood-cuts and maps will, it is hoped, enhance its value in this respect.

To meet the more important of the changes that have taken place since the publication of the ENCYCLOPÆDIA began, as well as to remedy some deficiencies, a SUPPLEMENT* of 409 pages has been added. It consists of: (1) Subjects that have only recently risen into importance, or that had been overlooked; (2) Subjects already noticed in the body of the work, but which have since undergone important changes, or from other causes seemed to require to be treated anew.

In the introductory Notice, it was stated that the plan of the work was contrived with a special view to render it *easy of consultation*. This end will be still further served by the INDEX of subordinate subjects at the end of this volume. Prefixed to the Index is a paragraph explaining its nature and use.

That in a work extending to 8320 pages, and consisting of upwards of 27,000 distinct articles, in the production of which more than a hundred writers have taken greater or less part—that in such a work, notwithstanding all vigilance to the contrary, there should be not a few oversights, errors, and inconsistencies, is a matter of course. Yet, in spite of such inevitable blemishes, the Editors feel confident that, in substantial accuracy and trustworthiness, this ENCYCLOPÆDIA will bear comparison with any book of the kind. To the numerous correspondents who have favored them by pointing out faults, or making other suggestions, they beg leave, once for all, to return their best thanks for the uniform courtesy with which their criticisms have been offered. Some of the complaints of omission have been attended to in the SUPPLEMENT*; others proceeded on mistaken ideas as to what the ENCYCLOPÆDIA was intended for.

A list of the chief Contributors is given on a subsequent page. To this able staff, to whose special knowledge of their subjects the ENCYCLOPÆDIA owes its chief value, the Editors have to express their acknowledgments, and to thank them for the patience with which they have submitted to the limits as to space and other trammels incident to the nature of the publication, which often rendered the satisfactory treatment of their subjects extremely difficult. The list does not include the numerous friends to whom the Editors are indebted for single contributions on local or other matters coming within their personal knowledge.

Finally, it is right that the public should recognize, in ANDREW FINDLATER, LL.D., the ACTING EDITOR, who has borne the great burden of the immediate superintendence of this work during its progress from beginning to end. Where a man of learning has given ten years of his life to a task which confessedly he has performed with skill, taste, and unflagging perseverance, it seems to the Editors that, in simple justice to him, his name should be made honorably and gratefully known.

W. & R. CHAMBERS.

Postscript.—Since the foregoing Notice was written in 1868, CHAMBERS'S ENCYCLOPÆDIA has undergone various revisions, to meet the more important changes that have taken place. In the present re-issue, so many have been the alterations, that it is virtually a *New Edition*—the whole effected under the immediate care of Dr. FINDLATER, to whom the Editors have again to express their obligations.

W. & R. CHAMBERS.

CONTINUED REVISION.

The process of revising CHAMBERS'S ENCYCLOPÆDIA is constantly carried on, thus keeping up the information to the latest possible date, 1886.

**In the present edition, the articles of this* SUPPLEMENT *have been inserted in alphabetical order in the body of the work.*

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A is the first letter in almost all alphabets; the only exceptions, perhaps, are the Ethiopian, where it stands thirteenth, and the Runic, in which the order is altogether different (see RUNES). It has in English at least four distinct sounds, as heard in *ale, man, father, all.* Of these, the third may be considered its primitive and proper sound; it is its name-sound in perhaps all languages except English, and is that which is assigned to it in comparative grammar. This sound is the purest and fullest in human speech; it is that which the child learns first and most easily to produce, and its sign stands as if by right at the head of the alphabet. In the oldest languages it is the predominating vowel, and gives them their peculiar fulness and strength. Philologists consider it the *heavicst* of the three fundamental vowels; the other two, *i* and *u* (whose primitive and proper sounds are heard in *me* and *do*) seem to have arisen out of *a*, by lightening or weakening it (Lat. *cadence—incidence, calco—inculco*). By combining with these, *a* gives rise to *ai, au*, which in their turn coalesce into *ē* and *ō*.—In the Phœnician alphabet, the letter A bears the name of *aleph;* i. e., 'ox,' with reference to its most ancient form, which rudely represented an ox's head. From this came the Greek name *alpha.* For engraving or tracing on stone or other hard materials, characters composed of straight lines are best adapted, and such was naturally the earliest form of A and the other letters. It is easy to trace the growth of our small a or *a* out of the monumental A. In Greek and Roman inscriptions executed hastily or carelessly, the form is often found; and this, written with a flexible reed, became rounded into .—For A and the other letters as abbreviations, see ABBREVIATIONS.

A, as a note in Music, is the major sixth of the scale of C, major. When perfectly in tune to C, it stands in the proportion of $\frac{5}{3}$ of 1. But in this state it would not be a fifth to D, the second note of the scale of C, being a comma too flat, which difference is as 80 to 81. The ear being sensibly offended with this deficiency, the note A is therefore made the least degree higher than perfect—namely, $\frac{26}{1\,6\,1}$, by which the advantage is gained, that A is a fifth above D ($\frac{1\,0\,8}{1\,6\,4}$), or only deficient in the proportion of $\frac{1\,6\,1}{1\,6\,2}$—a deficiency so trifling that the ear accepts the fifth, D, A, and the sixth, C, A, as perfect, although, mathematically calculated, the one is too great and the other too small.—For A Major and A Minor, see KEY.

A 1, a symbol by which first-class vessels are known in Lloyd's Register of British and Foreign Shipping (q. v.), and by which the operations of shippers of goods and insurers are governed. Surveyors appointed by the society examine all vessels in course of building, with a view to ascertaining their character and inscribing them accordingly in the register. A designates the character of the hull of the vessel; the figure 1, the efficient state of her anchors, cables and stores; when these are insufficient, in quantity or quality, the figure 2 is used. The character A is assigned to a new ship for a certain number of years, varying from four to fifteen, according to the material and mode of building, but on condition of the vessel being statedly surveyed, to see that the efficiency is maintained. A vessel built under a roof is allowed an additional year on that account. An additional period of one year, and, in certain cases, of two years, is also allowed to vessels whose decks, outside planking, &c., are fastened in a specified way. After the original period has elapsed, the character A may be '*continued*' or '*restored*' for a time (1—8 years), on condition of certain specified repairs.—When a vessel has passed the age for the character A, but is still found fit for conveying perishable goods to all parts of the world, it is registered A in red. (The symbol for this class was formerly Æ asterisk in red).—Ships Æ in black form the third class, and consist of such as are still found, on survey, fit to carry perishable goods on *shorter voyages.*—Classes E and I comprise ships sufficient to convey goods not liable to sea-damage; the one class, for voyages of any length, the other, for shorter voyages.

A CAPELLA, or A LA CAPELLA, in Mus., means, in the church style; it is equivalent to Alla Breve (q. v.), a time-signature which frequently appears in church-music. It also denotes that the instruments are to play in unison with the voices, or that one part is to be played by a number of instruments.

AA, the name of a number of rivers and streams in the north of France, Holland, Germany and Switzerland. As many as forty have been enumerated. The word is said to be of Celtic origin, but it is allied to the Old German *aha*, Gothic *ahva*, identical with the Latin *aqua*, 'water.' Ach or Aach is another form of the same word. Four streams of the name of Ach fall into the Lake of Constance. The word, in both forms, occurs as final syllable in many names of places, as, Fulda (formerly Fuldaha), Biberach, Biberich, &c. In the plural, it is Aachen (waters, springs), which is the German name of Aix-la-chapelle (q. v.) Aix, the French name of so many places connected with springs, is derived from Lat. *Aquæ*, which became in old French, *Aigues*, and then Aix. Compare the Celtic Esk, Ex, Axe, Ouse.

AALBORG (Eel-town), a seaport in the north of Jutland, with considerable trade; pop. (1880) 14,152.

AAR, next to the Rhine and Rhone, the largest river in Switzerland, rises in the glaciers near the Grimsel in Berne, forms the Falls of Handeck, 200 feet high, flows through Lakes Brienz and Thun, and passing the towns of Interlaken, Thun, Berne, Solothurn, Aarau, Brugg and Klingenau, joins the Rhine at the village of Coblenz, in Aargau, after a course of nearly 200 miles. It is a beautiful crystal stream, and, though rapid, is navigable for small-craft from Lake Thun. There are several small rivers of the same name in Germany.

AARGAU (ARGOVIE), a canton of Switzerland, on the lower course of the Aar, and having the Rhine for its north boundary.

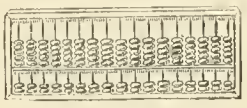
Its surface is diversified with hills and valleys, is well wooded, and generally fertile. The area is about 530 square miles, and the population in 1880 was 198,645, rather more than half being Protestants. Besides agriculture, considerable manufacturing industry in cotton and silk is carried on both in the towns and country, and the prosperity of the population has of late markedly increased. In this canton is the castle of Habsburg or Hapsburg, the original seat of the Imperial family of Austria. The chief town is AARAU, situated on the Aar; pop. (1880) 5944.

AARHUUS, a seaport on the east coast of Jutland, and seat of a bishop; pop. (1880) 24,831.

AARON, the elder brother of Moses, was appointed his assistant and spokesman, and at the giving of the Mosaic law received for himself and his descendants the hereditary dignity of the priesthood. Aaron assisted his brother in the administration of public affairs. He died in the 123d year of his age, on Mount Hor, on the borders of Idumea His third son, Eleazar, succeeded him in the office of high-priest.

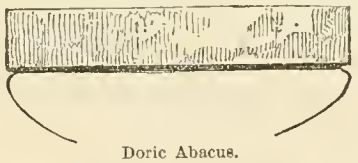
ABACA, or MANILLA HEMP, is the fibre of a species of plantain or banana (*Musa troglodytarum*), a native of the Philippine Isles, where it is extensively cultivated. The leaf-stalks are split into long stripes, and the fibrous part is then separated from the fleshy pulp. A laborer can in this way produce daily 50lbs. of hemp. Before 1825, the quantity produced was insignificant, but now it amounts to nearly 31,000 tons annually. In Manilla there is a steam rope-work for making ropes of it for naval purposes. They are very durable, but not very flexible.—The fibre of a number of species of *Musa* is used in tropical countries.

A'BACUS, an instrument seldom seen except in infant-schools,



Chinese Abacus.

where it is used to make the elementary operations of arithmetic palpable. It consists of a frame with a number of parallel wires, on which beads or counters are strung. In ancient times, it was used in practical reckoning, and is said to be so still in China and elsewhere.—*Abacus Pythagoricus* meant the multiplication-table. ABACUS, in arch., is a square or oblong level tablet on the capital of a column, and supporting the entablature. In the Doric, old Ionic, and Tuscan orders, the abacus is a regular oblong; but in



Doric Abacus.

the new Ionic, Corinthian, and Roman orders, the abacus has concave sides, with truncated angles. Square marble tablets let

Corinthian Abacus.

into walls, and fields with figures in them inserted in mosaic floors, were also included under the term abacus in ancient architecture.

ABAD (allied both in etymology and meaning to the Eng. *abode*), an affix to names of Persian origin, as Hyder*abad*, the 'dwelling' or city of Hyder.

ABAISSÉ (lowered), a term used in Heraldry. When the fesse, or any other armorial figure is depressed, or situated below the centre of the shield, it is said to be *abaisse*. *Adossé* (back to back), *affronté* or *confronté* (facing or fronting one another), *aiguissé* (sharpened at the point), *ailé* (winged), are other heraldic terms borrowed, like *abaissé*, from the French, and used by English heralds in senses not differing essentially from their ordinary significations in that language.

ABANDON (Abandoning, Abandonment). This term, in its different grammatical and etymological forms, has various applications in legal phraseology, but all more or less corresponding to its popular meaning. The following are examples:

ABANDONING AN ACTION is a technical expression in Scotch legal procedure, signifying the act by which a plaintiff—or 'pursuer,' as he is called in Scotland—abandons or withdraws from his action on the payment of the cost incurred, and with the approval of the judge before whom the action had previously been conducted. The same purpose is effected in England by the plaintiff in a Court of Common Law either entering a *Nolle Prosequi*, or at the trial *withdrawing the record*. In the Courts of Equity, the plaintiff may move the *dismissal* of his own bill, or the defendant may move to dismiss the suit for *want of prosecution by the plaintiff*. Suits may also *abate* by the death or supervening incapacity of the parties. See ACTION.

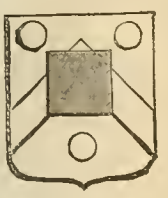
ABANDONMENT, in Marine Insurance, signifies the relinquishment to the insurer or underwriter of goods or property saved from a shipwreck, and of all interest in the same, previous to the owners' demanding payment in terms of the policy. See INSURANCE.

ABANDONMENT OF RAILWAYS. By the act of parliament 13 and 14 Vict. c. 83, facilities are afforded for the A. of railways, and the dissolution of railway companies by consent of the holders of three-fifths of the shares or stock, and by warrant of the 'Commissioners of Railways,' or, as it now is by the 14 and 15 Vict. c. 64, by warrant of the Board of Trade, who, in this respect, as well as in other matters regarding the regulation of railways, have superseded the former body. See RAILWAY.

ABANDONING or deserting seamen, by masters of merchant-vessels, is, by 9 Geo. IV. c. 31, s. 30, a misdemeanor, and punishable by imprisonment. See SEAMEN.

ABATEMENT. This is a term used in various senses in the law of England, as follows: 1. A. of *Freehold*, where a stranger without right enters and gets possession. See FREEHOLD. 2. A. of *Nuisances*, which is a remedy against injury by nuisance. See NUISANCE. 3. *Plea* in A. by means of which a defendant, on some formal and technical ground, seeks to abate or quash the action. See ACTION. 4. A. of *Legacies and Debts*, where the estate is insufficient for payment in full. See LEGACY. 5. A. by the death of parties to actions at law and suits in equity, which are in consequence stopped till revived. The marriage of a plaintiff, the change or loss of interest and right, and other similar considerations, have also the effect of abating legal proceedings. See ACTION. 6. A. or discount, in Commercial Law. See MERCANTILE LAW. 7. A. or deduction of duties levied by the Custom-house. See CUSTOMS DUTIES.

ABATEMENT, in Heraldry, is a mark placed over a portion of the paternal coat-of-arms of a family, significative of some base or ungentleman-like act on the part of the bearer. The coat is then said to be abated, or lowered in dignity. Guillim gives nine such marks, all of which are of either one or the other of the two disgraceful colors, tenné (tawney) and sanguine. Such are the delf tenné, assigned to him who revokes his challenge; the escutcheon reversed sanguine, proper to him who offends the chastity of virgin, wife, or widow, or flies from his sovereign's banner; the point-dexter tenné, due to him who overmuch boasteth himself of his martial acts; and the like. Marks of abatement are generally repudiated by the best heraldic authorities. Menestrier calls them *sottises Anglaises*, and Montagu is of opinion, that we shall seek in vain for a more appropriate designation. Abatements are carefully to be distinguished from such subtractive alterations in coats-of-arms as signify juniority of birth, or removal from the principal house or senior branch of the family. These are commonly called marks of cadency, distinctions, differences or brisures. The latter term is generally applied to marks of bastardy, which might with less impropriety be classed with abatements.



Abatement.

ABATTIS, a species of intrenchment, and one of the oldest. It consists of trees felled (*abattu*), and laid side by side, with the branches directed towards the enemy, the softer twigs being cut off. It thus forms a breastwork to fire over, and is very useful in field-works and in the out-work of regular fortifications, for retarding the enemy's advance.

ABATTOIR (Fr. *abattre*, to fell or destroy), a slaughter-house. The use of this term has passed into England from France, where the example was first given of public establishments for the slaughter of animals used for food, on such a scale and with such sanitary arrangements as to obviate the injurious effects that are found to result from the existence of private slaughter-houses in the midst of a crowded population. This great public improvement originated with Napoleon, who passed a decree in 1807 for the erection of public *abattoirs*. The extensive works connected with

this design were nearly completed before the fall of the Empire; but it was not till the close of 1818, that the Parisian butchers ceased to slaughter in their private establishments. There are now a number of these abattoirs in Paris, which, both in architectural propriety and completeness of internal arrangement, may be regarded as models of their kind. The charge per head is, for an ox 6 francs, a cow 4 fr., a calf 2 fr., and a sheep 50 centimes. Other towns in France have similar abattoirs; and so have Mantua and Brussels. Owing to the large export trade in live, dead, and preserved meat from the United States, the slaughter-houses of Chicago, St. Louis, and New York are large and perfectly equipped, and are usually provided with cold storage chambers for meat.

The erection of similar establishments in Britain is of a comparatively recent date. Public slaughter-houses formed part of the plan in the establishment of the new cattle-market in the Metropolis in Copenhagen Fields. Those built are well arranged; and such of the old slaughter-houses as remain are placed under sanitary inspection. The increased use of country-killed meat obviates the necessity for further abattoirs. In Edinburgh, an excellent A. was erected by the town-council in 1851.

A BATTUTA (Ital.), in Music, in strict or measured time.

ABAUZIT, FIRMIN, a French savant, was borne at Uzès, in Languedoc, 1679, and died at Geneva 1767. His parents were Protestant, and at the revocation of the Edict of Nantes, being only six years of age, he escaped with difficulty, by his mother's contrivance, from the hands of the authorities who wished to educate him into Catholicism, and was sent to Geneva. Here he prosecuted his studies with such intense ardor and diligence, that he became versed in almost all the sciences. He traveled in England and Holland in 1698, where he made the acquaintance of Newton, Bayle, and other eminent writers. Newton, in sending him one of his controversial works, paid him the distinguished compliment of saying: 'You are worthy to decide between Leibnitz and me.' King William wished to retain him permanently in England, and to that end made him several advantageous offers; but his affection for his mother induced him to return to Geneva. He translated the New Testament into French in 1726; and for his lucid investigations into the ancient history of Geneva, he received from its authorities the rights of citizenship. He likewise wrote numerous theological and archæological treatises, besides leaving one or two scientific and artistic dissertations in manuscript, but the greater portion of these were burned by his heirs, who were Catholics. His orthodoxy has been disputed. From some of his works we gain the impression that he was a Unitarian. His personal qualities secured him universal esteem. Rousseau, who could not bear to praise a contemporary, penned his solitary panegyric on A.

ABBADIE, ANTOINE and ARNOULD-MICHEL D', two brothers, French travelers, known for their researches in Abyssinia, from 1837 to 1845. According to their own account, their objects were purely ethnological and geographical; but they were regarded by certain English travelers and missionaries as agents employed by the French government for religous and political purposes; amongst the results of their travels are a catalogue of Ethiopian MSS., an Ethiopic version of the *Pastor* of Hermas, and the *Géodesie de l'Ethiopie.* Antoine issued in 1881, a Dictionary of the Amarinna (Amharic) language. Arnould published, in 1868, his *Douze Ans dans la Haute-Ethiopie;* and he has also distinguished himself by his study of the Basque language.

ABBANDONAMENTÉ (Ital.), in Music, with self-abandonment, despondingly.

ABBAS, the uncle of Mohammed, the Arabian prophet, and the chief promoter of his religion (d. 652), was the founder of the family of the ABBASIDES, who ruled as califs of Bagdad from 749 to 1258, and afterwards exercised the spiritual functions of the califate in Egypt, under the protection of the Mamelukes, till 1517, when that dignity passed to the Turkish sultan. Descendants of this family still live in Turkey and India.—The ABBASIDES in Persia were descended from the race of the Sofi, who ascribed their origin to the calif Ali. This race acquired dominion in 1500, and became extinct in 1736. Among them, Abbas I., surnamed the Great, was the most eminent ruler. He came to the throne 1586, and died 1628. His reign was marked by a series of victories over the Turks. In alliance with England, he destroyed in 1621, the Portuguese colony at Ormuz.

ABBAS-MIRZA, a Persian prince, well known by his wars against Russia, was the Son of the Shah Feth-Ali, and was born in 1783. Abbas possessed great talents and acquirements, and a love for the manners and culture of the West. When he was yet young, his father made him governor of the province Azerbijan, where, by the help of English officers, he applied himself to the reform of the army. When Persia, in 1811, influenced by France, declared war against Russia, Abbas was commander-in-chief of the main body of the Persian army, but was unsuccessful. Persia lost, at the peace of Gulistan, in 1813, its remaining possessions in the Caucasus, and was forced to ackowledge the flag of Russia on the Caspian Sea. At the instigation of Abbas, a new war broke out in 1826, between Feth-Ali and Russia. The prince fought a second time with extraordinary bravery at the head of the army, but was again obliged to yield to the superiority of the Russian arms, and to conclude a peace, on February 22, 1828 at Turkmantschai, by which Persia lost all share in Armenia. In this treaty, Russia had guaranteed to Abbas the succession to the Persian throne, the consequence of which was that he became dependent on Russia, and was obliged to give up his connection with England. When, in 1829, the Russian ambassador at Teheran was murdered in a popular tumult, which he had provoked by imprudence, Abbas went in person to St. Petersburg, to prevent any ill consequences, and to maintain the peace. He was received by the emperor with kindness, and went back to Persia loaded with presents. He died in 1833. His death was a great loss to his country, although he could not have prevented the encroachments of Russia. His eldest son, Mohammed Mirza, mounted the throne in 1834, on the death of Feth-Ali, under the united protection of England and Russia.

ABBATE, NICCOLO DELL, or NICCOLO ABATI, was born at Modena in 1509 or 1512, and died at Paris in 1571. He was an able and skilful artist in fresco-painting, and was a follower both of Raphael and Correggio; yet he rather blent the two styles in one than imitated either separately. His influence is traceable in the art which prevailed during the second half of the 16th century. His earlier works are to be seen at Modena; his later ones at Bologna, among which is his 'Adoration of the Shepherds,' considered his finest; but he is best known by the frescoes which he executed for the Castle of Fontainbleau, from the designs of Primaticcio. These, however, with the exception of the tableaux representing the history of Alexander the Great, were unfortunately destroyed in 1738, at the barbarous suggestion of an architect who wished to enlarge the building.

ABBÉ, the French name for an Abbot (q. v.), but often used in the general sense of a priest or clergyman. By a concordat between Pope Leo X. and Francis I. (1516), the French king had a right to nominate upwards of 200 *Abbés Commendataires*, who, without having any duty to perform, drew a considerable proportion of the revenues of the convents. The hope of obtaining one of those sinecures led MULTITUDES of young men, many of them of noble birth, to enter the clerical career, who, however, seldom went further than taking the inferior orders (see ORDERS, HOLY); and it became customary to call all such aspirants abbés —jocularly, Abbés of St. Hope. They formed a considerable and influential class in society; and an abbé, distinguished by a short black or violet-colored frock, and a peculiar style of wearing the hair, was found as friend or ghostly adviser in almost every family of consequence. When a candidate obtained an abbey, he was enjoined to take holy orders; but many procured dispensation, and continued to draw the revenues as secular or lay abbots.

ABBESS, the superior of a religious community of women, corresponding in rank and authority to an abbot (q. v.), except in not being allowed to exercise the spiritual functions of the priesthood—such as preaching, confession, &c.

ABBEVILLE, a fortified town of France, in the dep. of Somme, stands on the river Somme, about 12 miles from its mouth, and 90 miles N.-by-W. of Paris. It is built partly on an island, and partly on the banks of the river; the streets are narrow and ill-paved, and the houses built mostly of brick and wood. The building most worthy of notice is the Church of St. Wolfran, commenced in the reign of Louis XII., whose façade is a splendid example of the Flamboyant style, being pierced by three deep portals, and surmounted by three high Gothic towers. The chief manufactures of A. are velvets, serges, cottons, linens, sacking, hosiery, jewelry, soap, glass-wares, glue, paper, &c. It is a station on the Railway du Nord, and is connected by canals with Amiens, Paris, Lille, and Belgium. Vessels of between 150 and 200 tons can sail up the Somme as far as Abbeville. Pop. (1876) 19,328.

ABBEY. See MONASTERY.

ABBEY is used in a legal sense in Scotland, and signifies the sanctuary or protection to a debtor against legal process afforded by the A. of Holyrood. This privilege has, of course, its origin in the fact that churches used to be regarded as a sanctuary and shelter for all who sought refuge within their walls. The first instance known of a debtor seeking refuge in Holyrood Abbey—that of John Scott, 1531 A.D.—is recorded by George Buchanan. See SANCTUARY.

ABBIATE-GRASSO, a town of Italy, in the province of Milan, 14 miles west-south-west from Milan city, on the Canal di Bereguardo. It has silk manufactures. Pop. 5200.

ABBOT ('father'). This name, originally given to an aged

monk, was afterwards more strictly applied to the superior of a monastery or abbey. Since the 6th c., abbots have belonged to the clerical orders, but at first they were not necessarily priests. After the second Nicene Council (787), abbots were empowered to consecrate monks for the lower sacred orders; but they remained in subordination under their diocesan bishops until the 11th c. As abbeys became wealthy, abbots increased in power and influence; many received episcopal titles; and all were ranked as prelates of the church next to the bishops, and had the right of voting in church-councils. Even abbesses contended for the same honors and privileges, but without success. In the 8th and 9th c., abbeys began to come into the hands of laymen, as rewards for military service. In the 10th c., many of the chief abbeys in Christendom were under lay-abbots (*Abbates Milites*, or *Abba comites*), while subordinate deans or priors had the spiritual oversight. The members of the royal household received grants of abbeys as their maintenance, and the king kept the richest for himself. Thus, Hugo Capet of France was lay-abbot of St. Denis, near Paris. Sometimes convents of nuns were granted to men, and monasteries to women of rank. These abuses were, in a great measure, reformed during the 10th c. After the reformation of the order of Benedictines, monasteries arose that were dependent upon the mother-monastery of Clugny and without abbots, being presided over by *priors* or *pro-abbates*. Of the orders founded after the 11th c., only some named the superiors of their convents abbots; most, from humility or other cause, used the titles of prior, major, guardian, rector. Abbesses have almost always remained under the jurisdiction of their diocesan bishop; but the abbots of independent or liberated abbeys acknowledged no lord but the pope. In the middle ages, the so-called *Abbates Mitrati* frequently enjoyed episcopal titles, but only a few had dioceses. Before the period of secularisation in Germany, several of the abbots in that country had princely titles and powers. In England there were a considerable number of *Mitred Abbots* who sat and voted in the House of Lords. The election of an abbot belongs, as a rule, to the chapter or assembly of the monks, and is afterwards confirmed by the pope or by the bishop, according as the monastery is independent or under episcopal jurisdiction. But from early times, the pope in Italy has claimed the right of conferring abbacies, and the concordat of 1516 gave that right to the king of France. Non-monastic clergy who possessed monasteries were styled *Secular Abbots;* while their vicars, who discharged the duties, as well as all abbots who belonged to the monastic order, were styled *Regular Abbots*. In France, the abuse of appointing secular abbots was carried to a great extent previous to the time of the Revolution. (See ABBÉ.) Often monasteries themselves chose some powerful person as their secular abbot, with a view of 'commending' or committing their abbey to his protection (*Abbés Commendataires*). In countries which joined in the Reformation, the possessions of abbeys were mostly confiscated by the crown; but in Hanover, Brunswick, and Würtemberg, several monasteries and convents were retained as educational establishments. In the Greek Church, the superiors of convents are called *Hegumeni* or *Mandrites*, and general abbots, *Archimandrites*.

ABBOT, GEORGE, an English prelate under the Stuarts—chiefly remarkable for the position he held, and the part he acted, as the opponent of the policy of Laud and a despotic court—was the son of a cloth-manufacturer in Guildford, and was born 1562. After studying at Oxford, he was appointed chaplain to the Earl of Dunbar (1608), with whom he went to Scotland. This appointment was the basis of A.'s subsequent promotion. For a short time he held the see of Lichfield and Coventry, and in 1610 was made Archbishop of Canterbury. As a learned and able man, but more especially as a friend of toleration, he gained the esteem of all parties in an age of religious animosities. James I. employed the advice of A. in the most important affairs of state, and the prelate often opposed the arbitrary principles of the king. A.'s intolerance of Arminian doctrines was an exception to his general rule of conduct. His independent and liberal spirit incurred the displeasure of Charles I. A. was employed on the authorized translation of the Bible under James I. His other literary productions are not important. He died at Croydon, 1633, and a monument was erected to his memory in his native town, Guildford.—His brother, ROBERT A., bishop of Salisbury (b. 1560—d. 1617), was a learned theologian, and the author of a treatise *De Suprema Potestate Regia* (1616), written to controvert the doctrines of Bellarmine and Suarez.

ABBOTSFORD, the seat of Sir Walter Scott, is situated on the south bank of the Tweed, a little above its confluence with the Gala, and about three miles from the town of Melrose. Before it became, in 1811, the property of Sir Walter, the site of the house and grounds of A. formed a small farm known by the name of *Clarty Hole*. The new name was the invention of the poet, who loved thus to connect himself with the days when Melrose abbots passed over the fords of the Tweed. On this spot, a sloping bank overhanging the river, with the Selkirk Hills behind, he built at first a small villa, now the western wing of the castle. Afterwards, as his fortune increased, he added the remaining portions of the building, on no uniform plan, but with the desire of combining in it some of the features (and even actual remains) of those ancient works of Scottish architecture which he most venerated. The result was that singularly picturesque and irregular pile, which has been aptly characterized as 'a romance in stone and lime.' The present proprietor of A. is the Hon. Joseph Constable Maxwell, son of Lord Herries, who, in 1873, married a great-granddaughter of the novelist, and assumed the name of Scott. A. is visited annually by thousands of people of every nationality.

ABBOTT, CHARLES. See TENTERDEN, LORD.

ABBOTT, REV. JACOB, a native of Maine, U. S., was born in 1803, and from 1825 to 1829 was a professor in Amherst College. In 1838 he began writing those simple and popular works, mainly for the young, by which his name was so widely known. He died Nov. 4, 1879. His works numbered 300 vols.; but it is perhaps not too much to say, that of all works intended for the juvenile mind, his are the best in the English language. So thoughtful an instructor of youth even as Dr. Arnold, speaks in high terms of *The Way to do Good*. Nearly all his books have been repeatedly republished in England, and some have been translated into various European and Asiatic languages. His most popular work is *The Young Christian*. Besides this, he has written *The Franconia Stories; Histories of Celebrated Persons*, 30 vols.; *Harper's Story-books*, 36 vols.; &c.

ABBREVIATIONS are contrivances in writing for saving time and space. They are of two kinds, consisting either in the omission of some letters, or words, or in the substitution of some arbitrary sign. In the earliest times, when uncial or lapidary characters were used, abbreviations by omission prevailed, such as we find on the inscriptions on monuments, coins, &c. In these, the initial letter is often put instead of the whole word, as M. for Marcus, F. for Filius. It was after the small Greek and Roman letters had been invented by transcribers for facilitating their work, that signs of abbreviation, or characters representing double consonants, syllables, and whole words, came into use. Greek manuscripts abound with such signs, and often only one that has expressly studied Greek palæography can make them out. From the manuscripts, they passed into the early printed editions of Greek books, and it is only recently that they have quite disappeared. Among the Romans, signs of abbreviation were called *notæ*, and professed scribes who employed them were *notarii*. To such an extent was the system carried, that L. Annæus Seneca collected and classified 5000 abbreviations. The same practice has prevailed in all languages, but nowhere more than in the Rabbinical writings.—The abbreviations used by the ancient Romans were continued and increased in the middle ages. They occur in inscriptions, manuscripts, and legal documents; and the practice continued in these last long after the invention of printing had made it unnecessary in books. An Act of parliament was passed in the reign of George II., forbidding the use of abbreviations in legal documents. Owing to these abbreviations, the deciphering of old writings requires special study and training, and forms a separate science called Diplomatics (q.v.), on which numerous treatises have been written. Tassin's *Nouveau Traité de Diplomatique* (6 vols., Par. 1750–65) contains, in the third volume an exposition of Roman abbreviations. Other works on the subject are—Gatterer's *Abriss der Diplomatik* (2 vols., Gott. 1798); Pertz's *Schrifttafeln* (4 Nos., Hannov. 1846); and Kopp's *Palæographica Critica* (4 vols., Manh. 1817–29).—In ordinary writing and printing, few abbreviations are now employed. The sign &, originally an abbreviation for the Lat. *et*, 'and,' is perhaps the only one of the arbitrary kind still to be met with. It does not stand properly for a *word*, for it is used in different languages, but for an idea, and is as much a symbol as +. The abbreviations by using the initials of Latin words that are still in use, are chiefly confined to titles, dates, and a few phrases; as, M.A. (*magister artium*), Master of Arts; A.D. (*anno domini*), in the year of our Lord; *e.g.* (*exempli gratiâ*), for example. Many are now formed from English words in the same way; as, F.G.S., Fellow of the Geological Society; B.C., before Christ.—Most of the sciences and arts have sets of signs of abbreviation, or symbols, peculiar to themselves. These are of great use both for brevity and clearness. See CHEMICAL SYMBOLS, &c.

The following is a list of the more important Abbreviations in general use:

Abp., Archbishop.
A C. (*Ante Christum*). Before Christ.
A.D. (*Anno Domini*), In the year of our Lord.
A.H. (*Anno Hegiræ*), In the year of the Hegira.

A.M. (*Ante Meridiem*), Before noon; (*Anno Mundi*), In the year of the world.
A.R.A., Associate of the Royal Academy (London).
A.R.S.A., Associate of the Royal Scottish Academy.
A.U.C. (*Ab Urbe Condita*), From the building of the city—that is, Rome.
B.A. or A.B. (*Artium Baccalaureus*), Bachelor of Arts.
Bart. or Bt., Baronet.
B.C., Before Christ.
B.C.L., Bachelor of Civil Law.
B.D., Bachelor of Divinity.
B.M., Bachelor of Medicine.
Bp., Bishop.
C. (*Centum*), a hundred; chapter; c., century.
C.A., Chartered Accountant.
Cantab. (*Cantabrigiensis*), of Cambridge.
C.B., Companion of the Bath.
C.E., Civil Engineer.
cf. or cp., confer, compare.
C.M.G., Companion of the Order of St. Michael and St. George.
Cr., Creditor.
Crim. Con., Criminal conversation.
cwt., hundredweight.
D.C.L., Doctor of Civil Law.
D.D., Doctor of Divinity; *Dono dedit*.
D.G., (*Dei Gratiâ*), By the grace of God.
Do. (Ital *ditto*, 'said'), The said; the same.
Dr. Doctor, or Debtor.
D.V. (*Deo Volente*), God willing.
dwt., penny-weight.
e.g., or ex. gr. (*Exempli Gratiâ*), For example.
Etc. (*Et cætera*), And the rest; and so on.
F.B.S., Fellow of the Botanical Society.
F.D. (*Fidei Defensor*), Defender of the Faith.
ff., following.
F.G.S., Fellow of the Geological Society.
F.L.S., Fellow of the Linnæan Society.
F.M., Field-marshal.
F.R.A.S., Fellow of the Royal Astronomical, or of the Royal Asiatic Society.
F.R.C.P., Fellow of the Royal College of Physicians.
F.R.C.S., Fellow of the Royal College of Surgeons. E., of England.
F.R.G.S., Fellow of the Royal Geographical Society.
F.R.S., Fellow of the Royal Society. L., London; E., Edinburgh.
F.R.S.S.A., Fellow of the Royal Scottish Society of Arts.
F.S.A., Fellow of the Society of Antiquaries. F.S.A.Scot., Do. of Scotland.
F.S.S., Fellow of the Statistical Society.
F.Z.S., Fellow of the Zoological Society.
G.C.B., (Knight) Grand Cross of the Bath.
G.C.H., (Knight) Grand Cross of Hanover.
G.C.M.G., (Knight) Grand Cross of St. Michael and St. George.
Gr., Greek; Lat., Latin; Ital., Italian; &c.
H.E.I.C.S., Hon. East India Company's Service.
H.M.S., His or Her Majesty's Service, or Ship.
H.R.H., His or Her Royal Highness.
Ib. or Ibid. (*Ibidem*), In the same place.
I.C.TH.U.S. (ιχθυς), *Iesous Christos, Theou Huios, Soter*—Jesus Christ, the Son of God, the Saviour.
Id. (*Idem*), The same; (*Idus*), The Ides.
i.e., (*Id est*), That is.
I.H.S.* *Iesus Hominum Salvator*, Jesus the Saviour of men; *In hâc* (*Cruce*) *Salus*, In this (cross) salvation.
Incog. (*Incognito*, Ital.), Unknown.
I.N.R.I. (*Iesus Nazarenus Rex Iudæorum*), Jesus of Nazareth, king of the Jews.
Inst. (*Instante—mense* understood), Instant, of the present (month); Institute.
I.P.D (*In Præsentiâ Dominorum*,) In presence of the Lords (of Session).
J.C. (*Juris Consultus*), Juris-consult.
J.P., Justice of the Peace.
J.V. (or U.) D. (*Juris Utriusque Doctor*), Doctor both of Civil and of Canon Law.
Kal. (*Kalendæ* or *Kalendis*), The Kalends.
K.B., Knight of the Bath.
K.C.B., Knight Commander of the Bath.
K.C.H., Knight Commander of the Order of Hanover.
K.C.M.G., Knight Commander of St. Michael and St George.
K.G., Knight of the Garter.
K.H., Knight of Hanover.
K.M., Knight of Malta.
K.P., Knight of St. Patrick.
K.T., Knight of the Thistle.
K. τ. λ., *Και τα λειπομενα* (*Kai ta leipomena*), same as 'Et cætera.'
Lb. (*libra*), Pound.
L.D., Lady Day.
LL.B. (*Legum Baccalaureus*), Bachelor of Laws (the plural being denoted by the double L).
LL.D. (*Legum Doctor*), Doctor of Laws.
L.R.C.S., Licentiate of the Royal College of Surgeons.
L.S.A., Licentiate of the Society of Apothecaries.
L.S.D. (*Libræ, Solidi, Denarii*), Pounds, shillings, pence.
M. (*Mille*), A thousand.
M.A. or A.M. (*Artium Magister*), Master of Arts.
Mass., Massachusetts; Vt., Vermont; Pa., Pennsylvania; &c. See UNITED STATES. See also ABBREVIATIONS in AM. SUPP.
M.D. (*Medicinæ Doctor*), Doctor of Medicine.
M.P., Member of Parliament.
M.R.C.S., Member of the Royal College of Surgeons.
M.R.I.A., Member of the Royal Irish Academy.
MS., Manuscript; MSS., Manuscripts.
Mus. D. (*Musicæ Doctor*), Doctor of Music.
M.W.S., Member of the Wernerian Society.
N.B. (*Nota bene*), Mark well; observe.
Nem. con. (*Nemine contradicente*), or Nem. diss. (*Nemine dissidente*), No one contradicting or dissenting; unanimously.
N.P., Notary Public.
N.S., New Style.
O.S., Old Style.
Oxon. (*Oxoniensis*), Of Oxford.
oz., Ounce.
P., President; professor; &c.
P.C., Privy Councillor.
P.C.S., Principal Clerk of Session.
Per ann. (*Per annum*), By the year.
Per cent. (*Per centum*), By the hundred.
Ph.D. (*Philosophiæ Doctor*), Doctor of Philosophy.
P.M. (*Post Meridiem*), After noon.
P.P., Parish priest.
pp., Pages.
Pro tem. (*Pro tempore*), For the time.
Prox. (*Proximo*), in the next (month).
P.S. (*Post scriptum*), Postscript.
Q., Query or Question.
Q.C., Queen's Counsel.
Q.E.D. (*Quod erat demonstrandum*), Which was to be demonstrated
Q.E.F. (*Quod erat faciendum*), Which was to be done.
Q.S. (*Quantum sufficit*), Enough.
q.v., (*Quod vide*), Which see.
R. (*Rex* or *Regina*), King or Queen.
R.A., Royal Academician; Royal Artillery.
R.E., Royal Engineers.
R.M., Royal Marines.
R.N., Royal Navy.
R.S.A., Royal Scottish Academician.
S., South; saint; seconds.
Sc., *Scilicet*, same as *viz.*
S.L., Solicitor at Law.
S.M. (*Sa Majesté*), His or Her Majesty.
S.P.Q.R. (*Senatus Populusque Romanus*), the Roman senate and people.
Sq. (*Sequens*), the following; Sqq., do. in the plural.
S.S.C., Solicitor before the Supreme Courts.
S.T.P. (*Sanctæ Theologiæ Professor*), Professor of Theology.
T.C.D., Trinity College, Dublin.
Ult. (*Ultimo—mense* understood), In the last (month).
U.P., United Presbyterian.
U.S., United States; United Service.
V.D.M. (*Verbi Dei Minister*), Preacher of the Word.
Viz. (*Videlicet*), To wit; namely.
W.S., Writer to the Signet.
Xmas., Christmas. Xtian, Christian, &c.
Ye, Yt; The, That. (This use of Y originated in the Anglo-Saxon character þ, which was equivalent to the modern *th*. In manuscripts, this character degenerates into a form like a black letter *y*, which was retained in these contractions after its origin and real sound had been lost sight of.)

Besides the generally current abbreviations given above, other short methods of statement are frequently employed in particular circumstances. In the present work, for instance, in which the saving of space is of great moment, when the title or heading of a subject recurs in the body of the article, it is generally—especially if a proper name—represented by its initial letter: e.g., A. for Abd-el-Kader. Two dates thus (1215—1250), following the name of a king, a pope, &c., indicate briefly the beginning and end of his reign or term of office; or thus (b. 1215—d. 1250), the

* This was originally IHΣ, the first three Greek letters of the name Jesus; but its origin having been lost sight of, by substituting S for Σ, and then mistaking the Gr. Η (*Eta*) for Lat. H, a signification was subsequently found out for each letter. The symbol was still further altered by converting the horizontal stroke, which was the usual sign of abbreviation, into a cross, as it now generally appears, IHS.

dates of his birth and death. The meaning of these and similar contractions is in general sufficiently obvious from the connection in which they stand. See CONTRACTIONS. See also AM. SUPP.

ABD signifies in Arabic 'slave' or 'servant,' and enters, along with the name of God, into the composition of many proper names,; as, Abd-Allah, 'servant of God;' Abd-el-Kader, 'servant of the mighty God;' Abd-ul-Latif, 'servant of the gracious God,' &c. So *Ebed* in Hebrew and Syriac.

ABD-EL-KADER, properly El-Hadji-Abd-el-Kader-Ulid-Mahiddin, was the third son of a Marabout chief of the race of Haschem, who trace their pedigree to the califs of the lineage of Fatima. He was born at Ghetna, an educational institution of the Marabouts, near Mascara, which belonged to his family. His father, who died in 1834, being esteemed a very holy man, had exercised great influence over his countrymen, which influence he bequeathed to his son. In his eighth year, A. made a pilgrimage to Mecca with his father; and in 1827, he visited Egypt, where, in Cairo and Alexandria, he first came in contact with western civilization. Religious enthusiasm and melancholy were the most prominent features of his character. He early showed an uncommonly gifted mind, and at the chief school of Fez he acquired such knowledge as composes Arabian science. A. was free from the savage cruelty, as well as from the sensuality, of the Arabs; he maintained purity of manners, and did not suffer himself to be misled by anger or passion. Although he firmly adhered to the faith of his nation, and used their fanaticism as one of his most important sources of influence, yet he had no sympathy with the fanatical intolerance of the majority among them. His public career began at the time of the conquest of Algiers by the French. No sooner was the power of the Turks broken, than the Arabian tribes of the province of Oran seized the opportunity to make themselves independent. Having got possession of Mascara, they elected A. as their emir, who soon succeeded in establishing his authority over a number of the neighboring tribes. He now attacked the French; and some bloody battles, fought on December 3, 1833, and January 6, 1834, against General Desmichels, then commanding in Oran, obliged the latter to enter into a treaty with him. In the interior of the country, the power of A. now spread in an alarming way. In consequence of victories over neighboring chiefs, he became master of Miliana and Medeah. All the cities and tribes of the provinces of Oran and Titèri acknowledged A. as their sultan; the more distant tribes sent him ambassadors with presents. It was not long before hostilities broke out between him and the French. The commencement was favorable to him, for the first operations of General Tretzel led to that fatal retreat, during which the French army was attacked at Makta, on June 28, 1835, by the whole assembled forces of A., amounting to nearly 20,000 cavalry, and suffered a disgraceful defeat.

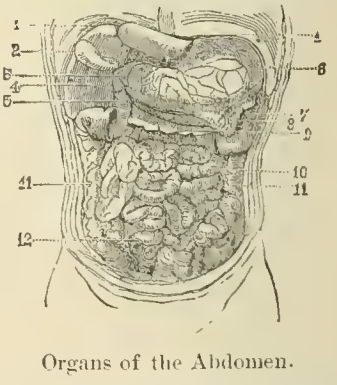
After a protracted struggle of six years, A. found himself obliged (1841) to take refuge in Marocco. Here he succeeded in getting up a sort of crusade against the enemies of Islam; and the arms of France were now turned against Marocco for the countenance given to A. After the decisive battle of Isly (1844) the sultan was obliged to give up A.'s cause, but soon found that the latter was at least his equal in power, and that he could not even prevent him from marching out of Nedem to attack the French again, both in October, 1845, and in March, 1847. But the star of A. was now about to set. In the night of the 11th December, he made a bold attack on the Moorish camp, in which he was defeated, and had to resolve on flight. He might easily have secured his own safety, but he would not abandon his attached followers, men, women, and children, to the plunder and massacre of the Moroccans. After a heroic combat on the 21st December, he effected their retreat across the Muluia into the territory of Algerie, where they mostly surrendered to the French. He himself, with a few horsemen, resolved to fight his way through to the south; but coming to the Pass of Kerbous, he found the way closed, and was received with musketry. Dispirited at length, A. surrendered, on December 22, 1847, to General Lamoricière and the Duc d'Aumale, upon condition that he should be permitted to withdraw either to Egypt or to St. Jean d'Acre. The French government refused to ratify this agreement. A. was sent with his family to Toulon, whence he was removed in 1848 to Pau, and finally to the Chateau d'Amboise. Liberated in 1852 by Louis Napoleon, he lived at Brussa, in Asia Minor, till its destruction by an earthquake in 1855. He then, for a time, lived in Constantinople, but finally made his home in Damascus. He was of great service to humanity during the Syrian massacres of 1860. In 1865 he visited Paris and England, and was at the Paris Exhibition in 1867. In 1870 he offered to fight against the Germans. He died at Damascus, May 26th, 1883. He wrote a religious work, translated in 1858, under the title, *Rappel à l'Intelligent: Avis à l'Indifferent.*

ABDICATION is the act of giving up an office, generally the office of ruler or sovereign. It is rarely done out of pure preference of a private station, but is generally the result of vexation and disappointment. It was perhaps voluntarily, and from being wearied with dominion, that Diocletian, and along with him Maximian, abdicated (305). Christina of Sweden retired from the throne (1654) out of preference for the freedom of private life, but wished still to exercise the rights of a sovereign. Charles V. laid down the crown (1556) because his great schemes had failed. Philip V. of Spain did so (1724) in a fit of melancholy, but resumed it on the death of his son. Amadeus of Savoy abdicated (1494) to become a priest. Victor Amadeus of Sardinia, who abdicated in 1730, wished to recall the step, but was not allowed. Louis Bonaparte resigned the crown of Holland, because he would not consent to treat that country as a province of France. Charles Emanuel of Sardinia retired from the throne in 1802, not finding himself equal to the crisis; and the same was the case with Victor Emanuel in 1819. William I. of the Netherlands resigned (1840), as his policy had become impossible from the turn of affairs in Belgium. Foreign force compelled the abdication of Augustus of Poland (1707), and later, that of Stanislaus Leszczynski (1735), and of Poniatowski (1795); as well as that of Charles IV. of Spain (1808), and of Napoleon (1814 and 1815). Insurrections have been the most frequent cause of forced abdications. The early history of the Scandinavian kingdoms abounds in instances. In England, the compulsory abdication of Richard II. (1399) is an early example. In the case of James II., it was disputed whether the king had 'abdicated' or 'deserted.' More recent times saw Charles X. (1830) and Louis-Philippe (1848) retire before the storm of revolution, without the conditions they made being regarded. The abdication of Ferdinand of Austria (1848) was an indirect consequence of the events of the year of revolutions; that of Charles Albert of Sardinia (1849), of the battle of Novara. Of several cases among German princes, the chief is that of Ludwig of Bavaria (1848). A late instance is that of Amadeus, king of Spain, who felt himself obliged to give up his crown, on the 11th of February, 1873.

In some countries, the king can abdicate whenever he pleases; but in England, the constitutional relations between the crown and the nation being of the nature of a contract, the king or queen, it is considered, cannot abdicate without the consent of parliament. It is, however, said that the king does abdicate, or, to speak perhaps more correctly, an A. may be presumed, and acted on by the people, if his conduct politically and overtly is inconsistent with, and subversive of, the system of constitutional government, of which the qualified monarchy of his office forms part.

At the conference between the two Houses of Parliament previous to the passing of the statute which settled the crown on William III., it would appear that the word 'abdicated' with reference to King James II. was advisedly used instead of 'deserted'—the meaning, it is presumed, being that King James had not only deserted his office, but that by his acts and deeds, of which the said desertion formed part, he had, in view of the constitution, ceased to have right to the throne. From this it may be inferred that A. was considered to have a twofold political signification, involving maladministration as well as desertion. The Scotch Convention, however, more vigorously and distinctly resolved that King James 'had forefaulted [forfeited] the crown, and the throne was become vacant.'

ABDOMEN. The trunk of the human body is divided by the diaphragm into two cavities—the upper being the thorax or chest, and the under, the abdomen or belly. Both the cavity and the



Organs of the Abdomen.

1. Diaphragm. 2. Gall-bladder. 3. Pyloric end of Stomach. 4. Right Lobe of Liver. 5. Duodenum. 6. Great end of Stomach. 7. Spleen. 8. Piece of Caul, or Omentum. 9. Pancreas (Sweetbread). 10. Small Intestine (Jejunum). 11. Great Intestine (Colon). 12. Small Intestine [Ilium].

viscera it contains are included in the term A. It contains the liver, pancreas, spleen, and kidneys, as well as the stomach, small intestine, and the colon. The lower bowel, the bladder, and internal organs of generation lie in the lowest part of the cavity,

which is called the pelvis. The A. is lined by a serous membrane, the peritoneum, which is folded over the viscera, allowing them a certain freedom of motion, but keeping them in their proper relations to each other. The A. is divided externally by two horizontal lines into three principal *regions*—the upper or epigastric, the middle or umbilical, and the lower or hypogastric. These are again subdivided by two vertical lines—the side-divisions being called the hypochondriac, lumbar, and iliac regions respectively; the names epigastric and umbilical are then applied in a restricted sense to the middle divisions of the two upper principal regions; while the middle division of the lower is called the region of the pubis. Diseases of the abdominal viscera are frequent, and chiefly consist either of chronic disorders of the digestive organs, or of derangements of the nerve-plexuses and ganglia there situated. These disorders announce themselves partly in bodily pain, and partly in mental affections, such as hypochondria and hysterics.

ABDOMEN, in Entomology, the last of the three parts into which the body of an insect is divided. It is composed of a number of rings or segments, frequently nine, more or less distinct from each other. It contains a portion of the intestines and the sexual organs. In the perfect insect, its segments bear no legs nor wings; but the hind-legs of larvæ or caterpillars, which afterwards disappear, are attached to them. In many insects, its last segments bear appendages of various uses and forms, as pincers, stings, borers or ovipositors, &c.

ABDOMINALES, or Abdominal Fishes, in the Linnæan arrangement, an order of fishes including all the Osseous Fishes of which the ventral fins are placed upon and beneath the abdomen, and so behind the pectoral fins. Subsequent naturalists have thought it right in classifying Fishes to give a higher place to other characters; and in the system of Cuvier, the name A. is given to an order of much more limited extent, a subdivision of the *Malacopterygii* or Soft-rayed Osseous Fishes, distinguished by having the ventral fins placed beneath the abdomen and not attached to the bones of the shoulder. It includes the *Cyprinidæ* (Carp, Minnow, &c.), *Esocidæ* (Pike, &c.), *Siluridæ*, *Salmonidæ* (Trout, Salmon, &c.), and *Clupeidæ* (Herring, &c.).

ABDUCTION, in the criminal law of England, signifies the unlawful taking away of the person of a female. Such is the usual limitation of the word; although, under the Jewish law, and subsequently according to the principles of the Civil law, the A. or 'stealing' of the person was applied to the male sex, as well as to women, coming more nearly to what we now understand by *Kidnapping* (q. v.). In the Civil law, the offence was called *plagium* or *crimen plagii*, under which name it still has a place in the Scotch criminal law, and, in practice, is applied to the A. of children of either sex, or of women generally. The A. may be accomplished either by force or by any fraudulent or sinister means; and this latter quality seems more appropriate to the strict meaning of the term, as derived from the Latin verb *abducere*, to lead off, or induce, or persuade away.

This subject will be best explained under the heads to which we have already referred.

1. ABDUCTION OF CHILD.—It is provided by the 24 and 25 Vict. c. 100 s. 56, that if any person shall unlawfully, either by force or fraud, lead or take away, or decoy or entice away, or detain any child under the age of fourteen, with intent to deprive the parent, guardian, or other person having the lawful charge of such child, of the possession of such child, or with intent to steal any article on its person; or shall with any such intent as aforesaid receive or harbor such child, knowing the same to have been so stolen or enticed, every such offender shall be guilty of felony, and shall be liable to penal servitude for seven years, or imprisoned, with or without hard labor, for any term not more than two years, and also, if a male, to be whipped, such male being under sixteen. It is also a misdemeanor subject to two years' imprisonment to take or decoy unlawfully out of the parent or guardian's possession any unmarried girl under the age of sixteen. To steal or unlawfully take or decoy a child under fourteen is felony.

Sir Archibald Alison, in his work on the *Principles of the Criminal Law of Scotland* (p. 280), says: 'This [stealing a child] is obviously a crime of the very greatest atrocity, from the unequalled agony and distress which it necessarily inflicts on the unfortunate parents who are in this cruel manner bereaved of their offspring. . . . . From the earliest times, accordingly, this atrocious offence has been punished with death by the Scotch law. Nor is it any defence that the child is taken away for affection to itself, or from any other motive, and not for the sake of lucre, taken in its ordinary sense, for the detainer has at least that advantage and benefit which he coveted in taking away the child; and this is sufficient to constitute theft in the estimation of the law.' The same principle is recognized by the law of England, which holds that as the offence of A. is positively prohibited, the absence of a corrupt motive will not be a defence to the charge. Further on, in the same work (p. 630), Sir Archibald lays it down that 'The wickedly and feloniously enticing or inducing an infant child to leave its parents or guardians without their knowledge or consent is a crime at common law;' and in support of this he refers to a case where the prisoner, who was a teacher of elocution, and was desirous to get a little child to recite poetry to his audience, applied to a girl, an infant of nine years of age, in the Orphan Hospital, and prevailed on her, by promises of fine clothes, and making a lady of her, to leave the hospital, and come to him, where she was soon found after in his custody. This was done at clandestine interviews with the child, and without the knowledge or concurrence of her relations who had placed her in the hospital. The flight of the accused, who was out on bail, prevented any further procedure in the case, beyond his outlawry.

2. ABDUCTION OF WIFE.—Blackstone and Stephen both lay down that this species of A. might be either by fraud and persuasion or open violence; though the law supposed force and constraint in the former case as well as in the latter, the wife having no legal power to consent. The remedy to the husband was an action by which he sought not the possession of his wife, but damages for the A. of her; and by statute 3 Edw. 1. c. 13, the offender could be imprisoned two years, and be fined at the pleasure of the crown. Both the crown and the husband might therefore have this action. The husband is also entitled to recover damages against such as persuade and entice the wife to live separate from him without a sufficient cause. But, although such was once the existing law of England, it is now antiquated, and is quite unsuited to the present state of society. The remedy for the offence, or rather injury, in question, will be more appropriately found under the statutes passed to amend the law relating to divorce and matrimonial causes, and under which the marriage may be either annulled, with, in the case of the adultery of the wife, damages from the adulterers; or the parties may be 'judicially separated.'

3. ABDUCTION OF WARD, OR PUPIL.—By the law of England, a guardian was always, and is still, entitled to an action, if his ward or pupil be taken from him; but the proper remedy now is by an application to the Court of Chancery, which is the supreme guardian of, and has independent jurisdiction over, all the infants in the kingdom. In Scotland, a similar jurisdiction as to the charge and custody of all Scotch pupils is exercised by the Court of Session.

4. ABDUCTION OF HEIRESS.—The law on this subject is very distinct. The 24 and 25 Vict. c. 100, s. 53, enacts that where any woman shall have interest, present or future, in any real or personal estate, or shall be heiress presumptive, or next of kin, to any one having such interest, if any person shall, from motives of lucre, take away or detain such woman against her will, with intent to marry or defile her, or to cause her to be married or defiled by any other person; every such offender, and every person counselling, aiding, or abetting him, shall be guilty of felony, and subject to penal servitude for fourteen years and not less than three years, or to imprisonment, with or without hard labor, for any term not exceeding two years.

Moreover, by the same statute, it is enacted that if any person shall fraudulently allure or take away such woman, being under the age of twenty-one, out of the possession, and against the will of her parent or guardian, with intent to marry or defile her, shall be guilty, though without any motives of lucre. And in this, as the preceding case, the offender forfeits all interest in property which would otherwise come to him by marriage.

It is an offence within the statute to take away from the custody of her putative father a natural child under twenty one.

By the above statutes the same law is extended to Ireland, without difference in the case of heiresses; and in both the above cases the Court of Chancery has power to settle the woman's property in a proper manner.

ABDUCTION OF WOMEN GENERALLY.—Not only are heiresses or females having any property protected against forcible marriages or against violation; but the same law has been extended also to all women with or without expectations. By the 24 and 25 Vict. c. 96, s. 54, whosoever shall, by force, take away, or detain against her will, any woman of any age, with intent to marry or carnally know her, or to cause her to be married or carnally known by any other person, shall be guilty of felony, and subject to a punishment similar in all respects to the case of heiresses. This enactment, which has existed in Ireland since 1830, was extended to England in 1861.

ABDUCTION OF VOTERS. See VOTERS, ABDUCTION OF, ELECTION, PARLIAMENTARY.

ABD-UL-LATIF, a celebrated Arabian writer of multifarious acquirements, was born at Bagdad in 1161. During his youth, he underwent an amazing amount of mental drudgery, in accordance with the eastern fashion of his time, in order to fit himself for becoming a scholar. The ordeal consisted in his committing to memory a large number of standard works, such as the Koran, the novels of Hariri, and not a few grammatical treatises. To complete his culture in the various branches of Mohammedan lore, he betook himself to Damascus, where the famous Saladin

had gathered round him the most learned men of the time. Through the liberality of the sultan and the kindness of the Vizir Fadhel, he was enabled to proceed to Egypt, where he delivered lectures while Saladin was fighting the Lion-heart at St. Jean d'Acre. Here he became intimate with Moses Maimonides, the great Jewish writer. He now devoted himself chiefly to the study of medicine, although while at Cairo, he also wrote his excellent and accurate work on Egypt, which was translated into Latin by Professor White of Oxford in 1800, and into French by Baron de Sacy in 1810. He died at Bagdad in 1231, on his way to Mecca, in the 70th year of his age.

ABD-UL-MEDJID-KHAN, the Grand Sultan, was born on the 23d April, 1823, and succeeded his father, Mahmud II., July 1, 1839. The Turkish Empire was then in a very dangerous position. The army had been defeated and dispersed by the Egyptians in the battle of Nisib (June 29, 1839), and there was nothing to hinder the victorious Ibrahim Pacha from advancing on Constantinople, where a large party were favorable to the Egyptian power. This party wished to make the viceroy of Egypt, Mehemet Ali, Chakan (the ancient title of the Grand Sultan) of both seas. He was the only man, they maintained, capable of upholding the banner of Islam against the unbelievers both within and without. Had it not been for the intervention of the Christian powers, the House of Osman was lost. The treaty of July, 1840, from which France kept aloof, rescued the young Padishah from sure destruction. Mehemet Ali had to submit (November 27, 1840); and the treaty of July, 1841, to which France subsequently adhered, settled the future dependent relation of Egypt to Turkey. The sultan, though not very energetic in body or mind, proceeded in the path of reform begun by Selim III. and Mahmud II.. In this he had for his chief adviser Reshid Pacha, an intelligent and humane Mussulman, educated in France. The aim of all his measures was to place the Osman population on a footing with the civilized inhabitants of the west. A. wished the happiness of all his subjects, without respect of creed. A sort of proclamation of their rights was issued in the hatti-sheriff of November, 1839. This was followed by numerous reforms in all departments; and in 1850, the professors of all religions were decreed equal in the eye of the law. That these decrees remained, in a great measure, a dead letter, is not attributable to the will of the sultan. The chivalrous part acted by A. (1850) in refusing, at the risk of losing his throne, to give up Kossuth and the other political refugees to the menaces of Russia and Austria, will make his name remembered in the annals of humanity.

The sovereigns of Turkey have long been in an anomalous position. The ambassadors of the great powers have ruled the divan; and the sultan had a specially difficult part to play during the war with Russia (1854-56), and the diplomatic negotiations consequent to it. A. was the thirty-first sovereign of the race of Osman. On the death of A. in 1861, his brother, Abdul-Aziz (b. 1830), succeeded him; but when Abdul-Aziz was deposed in May, 1876, A's eldest son, Mohammed Murad (b. 1840), became sultan for a few months, and then made way in August for the second son, Abdul-Hamid.

ABD-UR-RAHMAN, sultan of Fez and Morocco, born 1778, was the rightful heir to the throne when his father died, 1794; but was superseded by an uncle, after whose death he ascended the throne, 1823. His first four years of rule were occupied in quelling insurrections. Next, some danger to the state of Morocco was threatened by the refusal of Austria to pay the tribute for safety against pirates; but the sultan wisely adjusted the dispute by relinquishing this sort of 'black-mail,' formerly levied by Morocco on European ships in the Mediterranean. The religious war under Abd-el-Kader against the French in Algerie involved the sultan in its movements; but was concluded by the battle of Isly, 1844, and the subsequent mediation of England. The piratical habits of his subjects brought A. to the brink of war with more than one European state. The sultan was a zealous Mussulman, without the wild fanaticism common among his countrymen; as a ruler, he was strict, and often cruel. He was succeeded in 1859 by his eldest son, Sidi-Mohammed (born 1803; died 1873).

ABEL appears in the book of Genesis as the second son of Adam, and a shepherd. He was slain by his elder brother Cain, under the influence of jealousy, because the offering of the latter, had been rejected by Jehovah, and that of the former accepted. It is not said in Genesis, why Jehovah accepted the sacrifice of Abel; but the Saviour, in the New Testament, speaks of 'righteous Abel,' from which it is concluded that there dwelt in him a spirit of faith or trust in the unseen God, of which his brother was destitute. The writer of the Epistle to the Hebrews opens his enumeration of the 'faithful' in the 11th chapter of Hebrews, with these words: 'By faith Abel offered unto God, a more excellent sacrifice than Cain.' Such, also, has been in all ages the universal opinion of the Christian Church, which has regarded Abel as a type of innocence and faith.

ABEL, Charles Frederick, a native of Koethen, in Germany, born in 1719, was a distinguished musician. He was a pupil of Sebastian Bach, and for some years a member of the famous Dresden band of the Elector of Saxony, king of Poland. In 1758, when nearly forty years of age, he came to England in a state of great destitution; but his talents were quickly recognized. He was appointed chamber-musician to the queen of George III. His peculiar instrument, the *viola da gamba*, a small violoncello, with six strings, was never played by any one in equal perfection. He also obtained considerable reputation as a composer, though his pieces are not now held in very great estimation. He died in 1787, having shortened his life by his intemperate habits.

ABELARD (Fr. *Abélard* or *Abailard;* Lat. *Abælardus*), Peter, a scholastic philosopher and theologian, the boldest thinker of the 12th c., was born near Nantes, in 1079, at Palet, a village which belonged to his parents. An irrepressible thirst for knowledge, and a special pleasure in scholastic logic, moved him to resign his rights of primogeniture in favor of his younger brothers. He left Bretagne for Paris, in order to hear the prelections of William of Champeaux, but soon incurred the hatred of his master, whom he puzzled by his wonderful subtlety. He fled to Melun, and afterwards to Corbeil, persecuted and admired wherever he went. He then returned home for the restoration of his health. With renewed strength, he returned to Paris, reconciled himself with his opponents, and moulded by his influence as a lecturer, some of the most distinguished men of his age, amongst whom were the future Pope Celestine II.; Peter Lombard; Berengar, his future apologist; and Arnold of Brescia. At this time, there lived in Paris, Heloise, the niece of the Canon Fulbert, then seventeen years of age, and already remarkable for her beauty, talents and knowledge. She soon kindled in the breast of A., then thirty-eight years old, a violent and overwhelming passion, which was returned by Heloise with no less fervor. By means of Fulbert, A. became teacher and companion of Heloise, and the lovers were happy together until A's ardent poetical effusions reached the ears of the canon. He sought to separate the lovers; but it was too late. They fled together to the country, where Heloise bore a son, and was privately married to A., with the consent of her uncle. Not long after, Heloise returned to Fulbert's house, and denied the marriage, that her love might be no hindrance to A.'s advancement in the church. Enraged at this, and at a second flight which she took with her lover, Fulbert, in order to make him canonically incapable of ecclesiastical preferment, caused A. to be emasculated. In deep humiliation, A. entered as a monk the abbey of St. Denis, and induced Heloise to take the veil at Argenteuil. But the lectures which he began to give soon after exposed him to new persecutions. The synod of Soissons (1121) declared his opinions on the Trinity to be heretical. He left St. Denis, and built at Nogent-on-the-Seine a chapel and hermitage called Paraclete, which, after being enlarged by his scholars to a monastic foundation, he, on his appointment as abbot of St-Gildas-de-Ruys, in Bretagne, gave over to Heloise and her sisterhood for a dwelling. His residence in St. Gildas was imbittered by a continued struggle against his love, and by the hatred of the monks; till at last, in 1140, his doctrine was condemned by Pope Innocent III., and he was ordered to be imprisoned. But Peter the Venerable, abbot of Clugny, after A. had retracted his opinions on the Trinity and Redemption, reconciled him to his enemies. A. died with the reputation of a model of monastic propriety, on April 21, 1142, in the abbey of St. Marcel, not far from Chalons-on-the-Saône. Heloise had him interred at the Paraclete, hoping one day to lie by his side. She survived A. twenty years. The ashes of both were taken to Paris in 1808, and in 1828 were buried in one sepulchre in Père la Chaise.—The doctrines advanced by A. in his controversy with St. Bernhard, have a decidedly rationalist tendency; and he, and his predecessor Erigena, may be looked upon as the first avowed representatives of that school. A. laid down the principle, that nothing is to be believed but what has been first understood; while the church held that we must believe in order to understand; and Bernhard was for banishing inquiry altogether from the province of religion. In judging of A.'s merits, we are not to look so much at his writings, as to the influence which his wonderful power of public disputation enabled him to exercise on his age. His character, no less than his doctrine, gave great offence. Until recently, it is chiefly the romantic history of his love that has occupied attention. The chief biographies that have appeared are that by Rémusat (2 vols., Par. 1845), and that by Wilkens (Gött. 1855). The Latin writings and letters of A. and Heloise were collected by Amboise, and published by Duchesne (Par. 1616). Some works of A. have been recently discovered; among others, *Sic et Non*, a collection of doctrinal contradictions from the Fathers. Cousin, who published the hitherto unedited works in 1836, has given us a complete edition of A.'s works (2 vols., Par. 1849–59).

ABELE. See Poplar.

ABELITES, a Christian sect of the 4th c., found chiefly in the neighborhood of Hippo, in North Africa. Their chief distinction

consisted in marrying but abstaining from matrimonial intercourse, in order not to propagate original sin. They held that Abel so lived, because the Bible mentions no children of his.

ABELMOSCHUS. See HIBISCUS.

ABENCERRAGES, a noble Moorish race whose struggles with the family of the Zegris, and tragical destruction in the royal palace of the Alhambra, in Granada, in the time of Abu-Hassan (1466-84), the last but one of the kings of Granada, furnish the materials for a charming Spanish work of fiction, *Historia de las Guerras Civiles de Granada* (Madrid, 1694). From this Chateaubriand composed *Les Aventures du Dernier Abencerrage*, and furnished the text for an opera of Cherubini's. The work, however, seems to be destitute of historical foundation; at least Conde is perfectly silent on the subject in his *Historia de la Dominacion de los Arabes en España* (3 vols., Madrid, 1829).

A'BENDBERG, a hill in the canton of Berne, rising abruptly out of the waters of Lake Thun, on the south side. It is interesting as the site of an institution, established by Dr. Guggenbühl, for the cure of Cretinism (q. v.), and supported by contributions from far and near. The sanguine hopes raised as to the good to be effected by the healthiness of the situation, and the mode of treatment followed, have been greatly disappointed, little alleviation being perceptible. The establishment still exists as an asylum for Cretins.

ABEN-ESRA, properly Abraham-Ben-Meir-Ben-Esra, born 1093 in Spain, died 1168 in Rome, was one of the most learned Jews of his times. He understood the Hebrew, Arabic, and Aramaic languages; had considerable knowledge of mathematics, astronomy, and medicine; was a scientific observer; and generally distinguished himself as a sagacious thinker. Having left his native land, he visited Lombardy, Provence, France, Egypt, and England, and passed the later years of his life in Rome; everywhere giving lectures on grammar, theology, astronomy, &c., besides writing and translating several works in Hebrew and Arabic. His *Commentaries on the Old Testament* are the most important of his works, which include some treatises on astrology, since published in Latin. The scholastic writers mention Aben-Esra as ABENARE or AVENARD.

ABEOKUTA, a city, or rather collection of small towns or villages, capital of the territory of Egba, in the Yoruba country, on the west coast of Africa. A. is about 80 miles, by the river Ogun, north of Lagos (on the Bight of Benin), and 240 miles west of the Lower Niger. It is situated 567 feet above the sea-level, on an undulating plain, fantastically broken by masses of gray granite, and covered with bush. Looking down on the city from a height, Burton says: 'The scene before me wants neither grandeur nor beauty; there is a gorgeous growth around — hill, water, forest, and homestead all are present. . . . . The primeval forest has been cleared away around the town, yet there is not a vestige of cultivation; and if you ask for the farms, you are told that they are distant some 5 to 20 miles. The reason is that, if placed within reach, nothing could defend them from the depredations of robbers and cattle.' A. is surrounded by a wall of hardened mud, from 18 to 20 miles in circumference, between 5 and 6 feet high, without embrasure, and pierced here and there 'with an aperture by way of loophole.' The town itself, Burton found to measure 4 miles by 2. The houses are square, and built of mud, with tall roofs of thatch; the streets are narrow and irregular, and the only scavengers are the sun, the vulture, and the pig. There are a few European traders and missionaries; the success of the latter, according to Burton, not having been extraordinary. There is a trade in palm-oil and grain. Pop. estimated at 150,000.— For further interesting details, see R. F. Burton's *Abeokuta and the Camaroons Mountains* (1863).

ABER is a Celtic word which enters into the composition of several names of places, chiefly in Wales and Scotland. It indicates the mouth or embouchure of a stream, either into the sea, or into another river—as Aberbrothock, at the mouth of the Brothock, in Forfarshire; Abergavenny, at the junction of the Usk and Gavenny, in Wales.

ABERCROMBIE, JOHN, M.D., in his own day the most eminent of Scottish physicians, and still worthy of remembrance for his professional and moral excellence, was born in 1781, at Aberdeen, where his father was long a parish minister. He studied medicine in Edinburgh, taking his degree in 1801, and thenceforth devoted himself to the practice of his profession in the Scottish capital. At a comparatively early age, he attained a high reputation; and after the death (in 1821) of the celebrated Dr. Gregory, he became recognized as the first consulting physician in Scotland. His professional writings contributed to his celebrity, which was still further extended by the publication, in 1830 and 1833, of his works on *The Intellectual Powers* and *The Moral Feelings*. These works have no pretensions to originality or depth of thought, but acquired, from the high personal character of the author, a reputation during his life, which a few years have sufficed to impair. They possess, however, the merit of being more readable than many works of the same class, and are pervaded by a moral and religious feeling, which, in the case of their pious and benevolent author, was perfectly genuine. Dr. A. died suddenly, Nov. 14, 1844. Among the honors bestowed upon him during his life were the degree of M.D. from Oxford, the rectorship of Marischal College, the vice-presidency of the royal Society of Edinburgh, and the office of Physician in Ordinary to her Majesty for Scotland.

ABERCROMBY, SIR RALPH, was born at Menstry, in Clackmannanshire, in 1734. He was designed by his father for the Scottish bar; and studied from 1752 to 1755 at the universities of Edinburgh and Leipsig. His natural inclination, however, pointed to a military life; and in 1758, he went to Germany as a cornet in the 3d Dragoon Guards. In 1780, he raised a regiment in Ireland, which was called the 103d, or King's Irish. It was disbanded in 1783; and the next ten years were spent by Sir Ralph in the retirement of a country life. He had married in 1767. In 1793, he accompanied the Duke of York to Holland. His conduct throughout that unfortunate campaign, especially during the disastrous retreat in the winter of 1794–5, won him the love and admiration of the whole army. On his return to England, he was appointed to the chief command of the expedition to the West Indies, which, notwithstanding the vexatious obstruction of his designs, he conducted with distinguished success, taking Grenada, Demerara, Essequibo, St. Lucia, St. Vincent, and Trinidad. Soon after, he was appointed commander of the forces in Ireland; but his enlightened and manly remonstrances against the policy of government towards that country occasioned his removal to a similar command in Scotland. In 1799, he was appointed second in command to the Duke of York in the expedition to Holland, still more unhappy and ignominious in its results than the former. A. alone acquitted himself on all occasions with entire credit. On his return he was appointed to command the expedition to the Mediterranean. The fleet anchored in Aboukir Bay on the 2d of March. On the 7th, A. reconnoitred the shore in person. Before mid-day of the 8th, the British troops were in possession of the sandhills that commanded the shore, having landed in the face of a storm of shot that ploughed the water around them. On the 13th, the enemy were driven within the lines of Alexandria. On the morning of the 21st, Menou attempted to surprise the British camp. He found them ready, under arms. In the glorious action that ensued, the British commander was struck by a musket-ball in the thigh; but not till the battle was won, and he saw the enemy retreating, did he show any sign of pain. He was borne from the field in a hammock, cheered by the blessings of the soldiers as he passed, and conveyed on board Lord Keith's ship. The ball could not be extracted; mortification ensued; and on the 28th he died. A. was at once gentle and brave, clear-sighted and cool, prompt and daring; he was also a man of liberal accomplishments. The peerage conferred on his widow was afterwards enjoyed by his eldest son, with the title of Baron Abercromby.

ABERDARE, a town in the county of Glamorgan, about 4 miles south-west of Merthyr-Tydvil. Coal and iron are found in abundance in the vicinity, coal being largely exported. A., which is connected with the coast both by rail and canal, is a flourishing center of iron and tin works. The town has kept pace with the development of its industries; it has many substantial buildings, is well supplied with water, and possesses a public park. Pop. (1841) 6471; (1871) 37,744; (1881) 33,796.

ABERDEEN, the chief city and seaport in the N. of Scotland, lies in the S.E. angle of the county, at the mouth of the river Dee, which forms its harbor, and 111 miles N. of Edinburgh. Its mean annual temperature is 45°.8 F., and rainfall, 30.57 inches. William the Lion made A. a royal burgh in 1179. The English burned A. in 1336, but it was soon rebuilt, and called New Aberdeen. Old A., within the same parliamentary boundary, is a small town a mile to the N., near the mouth of the Don. King's College and University, founded in Old A. in 1494, and Marischal College and University, founded in New A. in 1593, were in 1860 united into one institution, the University of Aberdeen. It had about 800 students in 1879—1880; and its general council, with that of Glasgow University, sends one member to parliament. In the 17th c. A. had become an important place, but it suffered much from both parties in the civil wars. It has now a flourishing trade and large manufactures, and its handsome light-gray granite architecture is much admired. The harbor has been much enlarged and deepened, and a new breakwater has been lately built. The total registered shipping of the port in 1880 amounted to 118,182 tons. The chief exports are linens, woolens, cotton-yarns, paper, combs, granite (hewn and polished), cattle, grain, preserved provisions and fish. A. has the largest comb and granite-polishing works in the kingdom. It has considerable iron-works and much ship-building. The A. clipper-bow ships are celebrated as fast sailers. A. has above 60 places of worship, and 10,000 children at school. Connected with A., which has always been a celebrated seat of learn-

ing, have been the names of Barbour and Boece; Bishops Elphinstone, Dunbar and Forbes; the Earls Marischal, Jameson, Gregory, Reid, Beattie, Campbell and Hamilton. The burgh is governed by 25 councillors, including a provost, six bailies, a dean of guild, &c. Pop. in 1871, of municipal burgh, 76,348; parliamentary burgh, 88,125. In 1881 the pop. of the parliamentary burgh was 105,003, sending one member to parliament. The value of real property in 1880-1881 was £429,267.

ABERDEENSHIRE, a large maritime county in the E. of Scotland, between 56° 52′ and 57° 42′ N. lat., and 1° 49′ and 3° 48′ W. long.; bounded N. by Banffshire and the North Sea; E. by the North Sea; S. by Kincardine, Forfar, and Perth shires; W. by Inverness and Banff shires. It is the fifth in size of the Scottish counties; greatest length, 102 miles; greatest breadth, 50 miles; with 60 miles of sea-coast, and an area of 1970 square miles. It has long been popularly divided into five districts (proceeding from south-west to north-east)—Mar, Strathbogie, Garioch, Formartin and Buchan. A. is generally hilly, and in the south-west (Braemar) entirely mountainous, the Grampians running along the south side, and branching off to the north-east and north. Braemar contains the highest mountains; Ben-Muic-Dhui (next to Ben Nevis, the highest hill in the British Isles), 4296 feet; Cairntoul, 4245; Cairngorm, 4083; Ben-na-Buird, 3860; Lochnagar, 3770. The predominant rocks are granite and gneiss. The granite is very durable, and is much used for building and polishing. The chief rivers are the Dee (96 miles long), Don (78 miles), and Ythan (37 miles), which run eastward into the North Sea; and the Doveran (58 miles), which runs north-east into the North Sea (see DEE, DON, DOVERAN). On the upper part of the Dee is *Balmoral* (q. v.). The Ythan yields the pearl-muscle, but rarely pearls of any value. The mean annual rainfall of A. varies from 30 to 37 inches. Clay soils predominate near the coast, loamy soils near the center, and poor gravelly, sandy and peaty soils elsewhere. The most fertile parts lie between the Don and Ythan, and in the north-east angle of the county. Nowhere in the kingdom have the natural disadvantages of soil and climate been more successfully overcome. A. has 188 miles of railway, and 2359 miles of public roads, the latter supported by rates, and not by tolls. The chief towns and villages are Aberdeen (New and Old), Peterhead, Fraserburgh, Huntly, Kintore, Inverury and Turriff. The county returns two members to parliament; the city of Aberdeen, one; and the burghs of Peterhead, Kintore and Inverury, with Elgin, Cullen and Banff, one. About 37 per cent. of the area of A. is cultivated. In 1880, it had 195,316 acres in oats, 16,564 in barley and bere; 92,972 in turnips; and 152,106 cattle. A. produces one-fifth of the turnips and one-seventh of the cattle reared in Scotland, and is unsurpassed in breeding and feeding stock. The fisheries on the coast are very productive. Pop. in 1871, 244,603; in 1881, 267,990; inhabited houses, 49,185. Above 80 per cent. of the children are at school. The munificent Dick and Milne bequests for parochial schoolmasters have given A. a high place in the statistics of education. A. has about 290 places of worship, 105 being Established, and 100 Free. Value of real property (exclusive of railways), in 1878—1879, £849,102.

ABERDEEN, GEORGE HAMILTON GORDON, EARL OF, was born at Edinburgh in 1784. He was educated at Harrow and at St. John's College, Cambridge, where he took his degree of M.A. in 1804. Before this, on succeeding to the earldom in 1801, he made a tour through Greece, the record of which is preserved in Byron's well-known line—

'The traveled thane, Athenian Aberdeen.'

In his twenty-second year, he was elected one of the sixteen Scottish representative peers, and entered public life as a Tory. In 1813, he was appointed ambassador to the Austrian court, and conducted the negotiations which terminated in the alliance of that power with Britain. At this time he formed that close friendship with Prince Metternich which so decidedly influenced his subsequent policy as a statesman. On the conclusion of the war, he was elevated to the British peerage as Viscount Gordon. From this time till the year 1828, his lordship made no prominent appearance in public life. In that year he took office in the new ministry formed under the Duke of Wellington. The general principle which guided his policy, as Secretary of State for Foreign Affairs, was that of non-interference in the internal affairs of foreign states, which, joined to his well-known sympathy with such statesmen as Metternich, has exposed him—not always justly—to the suspicion of being inimical to the cause of popular liberty. His gradual abandonment of high Tory principles was evinced by his support of the bill for the repeal of the Test and Corporation Acts, and of the Roman Catholic Emancipation Act. From the fall of the Wellington ministry to the Peel administration in 1841, his lordship was out of office, with the exception of his brief administration of the Colonial Office in the Tory ministry of 1834–5. In 1841, he again received the seals of the Foreign Office. M. Guizot was at that time foreign minister in France, and the two statesmen acted in cordial alliance. The conclusion of the Chinese War, the Ashburton Treaty, and the Oregon Treaty, were the principal services rendered to the country during his administration of foreign affairs. His act in 1843 for removing doubts regarding the admission of ministers to benefices in Scotland neither saved the disruption of the Church, nor pleased those for whom it was meant, and is now virtually repealed by the 'Act for the Abolition of Patronage' (1874). From the time that the repeal of the corn-laws became the rallying-point of the Peel party, he became identified with their policy. In 1846, he resigned with Sir Robert Peel. In 1853, on the resignation of Lord Derby, the extraordinary state of parties necessitated a coalition, and Lord A. was selected as the fittest man to head the new ministry, which for some time was extremely popular. The feeble and vacillating policy displayed in the conduct of the war with Russia, gradually undermined its stability, and the disastrous mismanagement brought to light in the winter of 1854, in all departments of the public business connected with the war, filled up the measure of the popular discontent. On Feb. 1, 1855, Lord A. resigned office. He was author of an Essay on Grecian Architecture (1822). He died in 1860.

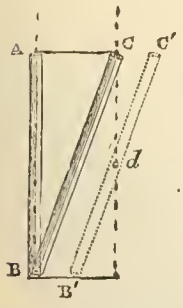
A'BERDEVINE, or SISKIN (*Fringilla Spinus*), a song-bird, nearly allied to the goldfinch, with which it is placed by Cuvier and others in the new genus *Carduelis*. It is rather smaller than the goldfinch, and less elongated in form. The crown of the head and the throat are black, the nape, dusky green, and there is a broad yellow streak above and behind each eye. It is only a winter visitant of Britain, and breeds in the north of Europe, building its nest in high trees. It is frequently kept as a cage-bird, being easily tamed; and breeds freely with the canary. It feeds on the seeds of the thistle, adder, birch, and elm, and occasionally does great damage to the hop plantations in Germany. In France it injures the blossoms of the apple trees.

ABERGAVENNY (the Roman *Gobanium*), a market-town of England, in Monmouthshire, 13 miles west of Monmouth, is beautifully situated in the valley of the Usk (the garden of Wales), at the junction of the Usk and Gavenny, and is surrounded on every side by high mountains and thick woods. The town is regularly and compactly built, and many improvements have of late years been made. St. Mary's Church, which was once a fine cruciform structure, and contains many interesting monuments, has been spoiled by alterations. The castle, which is very ancient, is now a ruin. The principal modern building is the lunatic asylum. There are collieries and iron-works in the neighborhood. The Hereford and Tredegar Railway passes near the town. Pop. (1881) 7285.

ABERNETHY, JOHN, a very eminent English surgeon, was born in London in 1764. His grandfather was the Rev. John Abernethy, an Irish Presbyterian clergyman, who acquired distinction by his writings, and his bold adoption of Bishop Hoadly's views on the right of private judgment and the subscription of Confessions. A.'s early tastes disposed him to the bar; but in 1780 he was apprenticed to Mr. (afterwards Sir Charles) Blicke, surgeon of St. Bartholomew's Hospital. He attended at the same time the lectures of John Hunter and Sir W. Blizard. In 1787, A. was elected assistant-surgeon to St. Bartholomew's, an office which he filled for twenty-eight years; at the end of which time he was appointed surgeon, with a salary. Soon after his election, he began to lecture in the hospital on anatomy and surgery, and may be said to have laid the foundation of its character as a school of surgery. At first, he manifested extraordinary diffidence, but his power soon developed itself; and his lectures at last attracted such crowds, that, in 1790, it was found necessary to build a lecture-theater in the hospital for his use. His clear, simple, and positive style, illustrated by an inexhaustible variety of apt anecdotes, made him the most popular medical teacher of his day. In 1813, he was appointed surgeon to Christ's Hospital, and in 1814, Professor of Anatomy and Surgery to the College of Surgeons. His practice increased with his celebrity, which the singular eccentricity and occasional rudeness of his manners contributed to heighten. Notwithstanding, however, the irritability and harshness which he so often exhibited, those who knew him best bear unanimous testimony to the generosity and kindliness of his character. He married in 1800, and had several children. He died at Enfield, in 1831. Of his works, the most original and important is his *Observations on the Constitutional Origin and Treatment of Local Diseases*, first published in 1806, in which a simple principle, till then little attended to, was made the foundation of much important and ingenious observation. His *Lectures on the Theory and Practice of Surgery* were published in 1830.

ABERRATION OF LIGHT is an apparent alteration in the place of a star, arising from the motion of the earth in its orbit combined with the progressive passage of light. When rain is falling perpendicularly a drop entering at the top of an upright tube at rest, will go through; but if the tube be carried forward horizontally, a drop entering the top will strike against the side

before it goes far; and to make the drop go through the tube in motion, we must incline the top of it forward in the direction of the motion. The amount of this inclination will be the greater, the more rapid the motion of the tube is compared with that of the falling drops. If in the time that a drop takes to fall through the height AB of the parallelogram in the annexed cut, the inclined tube BC is moved horizontally over a space equal to its breadth, AC, a drop entering the top of the tube will descend without touching the sides. For in half the time, the tube will be in the position, B'C', and the drop in the position *d*; and so for any other portion of the time. This exactly illustrates the astronomical phenomenon in question. The tube is a telescope directed to receive the light of a star; this tube, and the person looking through it, are moving along with the earth in its orbit, and the light may be conceived as particles coming from the star like drops of rain, moving much faster, no doubt, still requiring time. That a particle or ray of light from the star may pass through the tube, it must be directed, not straight to the star, but at a slight angle in the direction of the earth's motion. Thus the place where we see the star is not its true place. As the earth's motion, however, is slow compared with the velocity of light, the angle of inclination is small—never exceeding about 20″. The result is, that, if we conceive the true place of a star as a fixed point, the apparent place of the star describes about this true place, in the course of a year, an ellipse whose greater axis is about 40″. The aberration of light was discovered by the English astronomer Bradley, in 1727, while seeking to determine the parallax of certain fixed stars.



ABERY'STWITH, a seaport of Wales, and one of the Cardigan district of parliamentary boroughs. In 1880, 420 vessels, of a total tonnage of 30,937 tons, entered the port. A. is much resorted to for sea-bathing, and is well provided with good hotels and lodging-houses. Pop. (1871) 6898; (1881) 6664.

ABEYANCE, a legal term importing that a freehold inheritance, dignity, or office is not vested in any one, but is in expectation, or suspended, until the true owner appears, or the right thereto is determined. Titles of honor are said to be in A. when it is uncertain who shall enjoy them. A parsonage remaining void is also said to be in A. This A. or suspense, being repugnant to the general principles of the tenure of land, is never allowed except when it is unavoidable. It finds no place in the law of Scotland, where it is a maxim that the *fee* of an inheritance, or the *right* of property, cannot be *in pendente*, but must be somewhere, for this, among other reasons, that creditors must know with whom the right of property is. Titles of honor and office stand on a different footing in Scotland, where, however, the general provisions of the law are so comprehensive as almost to exclude a case of A.

ABIES. See Fir.

ABINGDON, a market town in Berkshire, England, situated at the junction of the Ock and the Thames. The name was originally Abbendon (town of the Abbey). It sends a member to parliament. Pop. of parliamentary borough (1881), 6608.

ABJURATION, Oath of. Formerly there were three oaths, called the Oaths of Allegiance, Supremacy, and Abjuration, required of all persons before admission to any public office; and next, by the 21 and 22 Vict. c. 48, one oath was substituted for the three referred to, and was as follows:

'I, A. B., do swear, That I will be faithful, and bear true allegiance to her Majesty Queen Victoria, and will defend her to the utmost of my power against all conspiracies and attempts whatever which shall be made against her person, Crown, or dignity, and I will do my utmost endeavor to disclose and make known to her Majesty, her heirs and successors, all treasons and traitorous conspiracies which may be formed against her or them; and I do faithfully promise to maintain, support, and defend to the utmost of my power, the succession of the Crown, which succession, by an Act, intituled *An Act for the further limitation of the Crown, and better securing the rights and liberties of the Subject*, is and stands limited to the Princess Sophia, Electress of Hanover, and the heirs of her body, being Protestants; hereby utterly renouncing and abjuring any obedience or allegiance unto any other person claiming or pretending a right to the Crown of this realm; and I do declare, that no foreign prince, person, prelate, state, or potentate, hath or ought to have any jurisdiction, power, superiority, pre-eminence, or authority, ecclesiastical or spiritual, within this realm; and I make this declaration upon the true faith of a Christian. So help me God.'

The subject of oaths was, however, again revised by the legislature in 1868 and 1871, and was settled in the following manner by the act 31 and 32 Vic. c. 71.

The former statutes prescribing certain forms of oaths were repealed, and the above form of oath was abolished, and the abjuration altogether omitted as no longer fit to be perpetuated among the solemn sanctions applicable to high offices. Three several oaths were prescribed to take the place of the former oaths, and these were—(1) the oath of allegiance, (2) the official oath, (3) the judicial oath. Certain high officers now require to take both the oath of allegiance and the official oath, and certain other officers require to take both the oath of allegiance and the judicial oath. The oath of homage taken by archbishops and bishops, and of canonical obedience to them, was left unaffected. But the oath of allegiance was substituted for the oaths taken by the clergy, and members of parliament, and judges, &c. This oath of allegiance is in the following form: 'I, A. B., do swear that I will be faithful and bear true allegiance to her Majesty, Queen Victoria, her heirs and successors, according to law. So help me God.' This oath gets rid of the objections formerly felt by Jews in taking the oath.

The act 34 and 35 Vict. c. 48 repealed nearly all the previous statutes as to oaths.

The act of 10 Geo. IV. c. 7, which settled the form of oaths to be taken by Roman Catholics instead of the oaths of Allegiance, Supremacy, and Abjuration, has been repealed as regards the form of oath; but as it was part of a memorable settlement, it is here given:

'I, A. B., do sincerely promise and swear, That I will be faithful and bear true allegiance to her Majesty, Queen Victoria, and will defend her to the utmost of my power against all conspiracies and attempts whatever, which shall be made against her person, Crown, or dignity; and I will do my utmost endeavour to disclose and make known to her Majesty, her heirs and successors, all treasons and traitorous conspiracies which may be formed against her or them: And I do faithfully promise to maintain, support, and defend, to the utmost of my power, the succession of the Crown, which succession, by an Act, intituled *An Act for the further limitation of the Crown, and better securing the rights and liberties of the Subject*, is and stands limited to the Princess Sophia, Electress of Hanover, and the heirs of her body, being Protestants; hereby utterly renouncing and abjuring any obedience or allegiance unto any other person claiming or pretending a right to the Crown of this realm: And I do further declare, That it is not an article of my Faith, and that I do renounce, reject, and abjure the opinion, that princes excommunicated or deprived by the Pope, or any other authority of the See of Rome, may be deposed or murdered by their subjects, or by any person whatsoever: And I do declare, That I do not believe that the Pope of Rome, or any other foreign prince, prelate, person, state, or potentate, hath, or ought to have, any temporal or civil jurisdiction, power, superiority, or pre-eminence, directly or indirectly, within this realm. I do swear, That I will defend, to the utmost of my power, the settlement of property within this realm, as established by the laws; and I do hereby disclaim, disavow, and solemnly abjure any intention to subvert the present church establishment, as settled by law within this realm; And I do solemnly swear, That I never will exercise any privilege to which I am or may become entitled, to disturb or weaken the Protestant Religion, or Protestant Government in the United Kingdom: And I do solemnly, in the presence of God, profess, testify, and declare, that I do make this Declaration, and every part thereof, in the plain and ordinary sense of the words of this oath, without any evasion, equivocation, or mental reservation whatsoever. So help me God.'

This oath having frequently been considered objectionable as covertly imputing disloyalty and insincerity to the Roman Catholic body, has been superseded by the above short oath of allegiance common to all parts of the United Kingdom.

ABLATIVE CASE. See Declension.

ABLUTION. See Purification.

ABO (pronounced *Obo*), the chief town of the government of Abo, in Finland, now belonging to the Russian Empire, is situated on the river Aurajokki, near its embouchure in the Gulf of Bothnia; pop. (1880) 22,967. The town was founded by the Swedes in 1157, and remained the capital of Finland until 1819. In the year 1827, a great part of the town, including the university buildings, was destroyed by fire, and consequently the university was removed to Helsingfors, now the capital.—The *Peace of Abo* (1743), between Sweden and Russia, put an end to the war commenced by Sweden, under French instigation, in 1741. In this war, Russia had gained possession of the whole of Finland through the misconduct of the Swedish generals. In this treaty the river Kymene was made the boundary between the territories of Sweden and Russia; but by another peace, concluded in 1809, the whole of Finland, as far as the Tornea, was ceded to Russia.—The government of Abo-Bjorneborg has an area of 9450 sq. m., and a pop. of (1880) 340,602.

ABOLITIONISTS, a term used to designate a party in the U. S., who sought the immediate and total abolition of slavery. See Slavery. Abolitionist views had long been held by many,

especially by members of the Society of Friends; but the term was not commonly used until an aggressive party spread from New England throughout the north and west, demanding immediate and unconditional emancipation. After about 30 years of agitation, the A. became sufficiently powerful to get some of their doctrines adopted by the republican party. The ends of the A. were gained when, under Lincoln's administration, slavery was abolished, January 1, 1863.

ABORIGINES (Lat.), properly the earliest inhabitants of a country. The corresponding term used by the Greeks was *Autochthones*. The Roman and Greek historians, however, apply the name to a special people, who, according to tradition, had their original seats in the mountains about Reate, now Rieti; but, being driven out by the Sabines, descended into Latium, and in conjunction with a tribe of Pelasgi, subdued or expelled thence the Siculi, and occupied the country. The A. then disappear as a distinct people, they and their allies the Pelasgi having taken the name of Latini. The non-Pelasgic element of the Roman population is supposed to represent these A., who would thus belong to the Oscans or Ausonians.

ABORTION is the term used in Medicine to denote the expulsion of the product of conception (the impregnated ovum) from the womb before the sixth month of pregnancy. If the expulsion takes place after that date, and before the proper time, it is termed a *premature labor* or *miscarriage*. In law, no such distinction is made. The frequency of abortion as compared with normal pregnancy is very differently estimated by different writers; but the best evidence leads us to the belief that abortion is of far more common occurrence than is generally supposed, and that it takes place on an average in one out of every three or four cases of pregnancy. The following are amongst the *causes predisposing* to this accident: (1) A diseased condition of either parent, and especially a syphilitic taint. (2) A peculiar temperament on the part of the mother. Those women who present a strongly-marked nervous or sanguine temperament seem to abort with singular facility; and the same tendency is observed in those in whom the catamenial or monthly discharges is abundant or excessive. Again, very fat women, while they have a tendency to sterility, are liable to abort when pregnancy does occur. Any cause interfering with the normal oxidation of the blood—as, for instance, the constant breathing of impure air, may provoke abortion—a fact excellently illustrated by the experiments of Brown-Sequard on pregnant animals (rabbits), when he showed that the application of a ligature to the windpipe excited uterine contractions, ending, if the experiment were continued long enough, in abortion, but ceasing if air was freely readmitted into the lungs. Change of climate, as from India to England, certainly predisposes to this accident; and it has been observed by various writers that great political events, the horrors of war, and famine, exert a similar action. The marvelous events that occurred in Paris in 1848 were speedily followed by an extraordinary number of abortions and of still-born children; and a similar fact had been previously noticed by the elder Nagele and Hoffmann during the famine of 1816 and during the siege of Leyden. Nor can there be a doubt that, amongst the causes predisposing to abortion, must be included the employment of such corsets and other garments as by their tightness interfere with the circulation of the blood, and alter the natural position of the womb and of the abdominal viscera. Many diseases supervening during the course of pregnancy, especially the eruptive fevers (as small-pox, scarlatina, &c.), almost invariably lead to abortion of a very dangerous character; and it has been known from the time of Hippocrates that intermittent fevers have this effect. Amongst the *direct causes* of abortion may be placed blows on the abdomen, falls, any violent muscular efforts, too long a walk or ride on horseback (indeed, women with a tendency to abort should avoid horseback during pregnancy), a severe mental shock, &c. Moreover, the death of the fœtus from any cause is sure to occasion abortion.

The *symptoms* of abortion vary according to the state of pregnancy at which it is threatened, and according to the exciting cause. Many of these resemble those of congestion of the womb, such as a sensation of weight or painful pressure in the region of the loins or sacrum, extending to the bladder and rectum (with or without Tenesmus, q.v.); these symptoms being aggravated by standing or walking, and being accompanied by chills, accelerated pulse, loss of appetite, and a general feeling of discomfort. A discharge of serous fluid, sometimes slightly tinged with blood, is then observed. The feeling of weight is replaced by pains, leading to the expulsion of the ovum, which, during the first two months, is so small as commonly to escape detection. In more advanced stages of pregnancy, the pains are more severe, the discharge is more abundant, and consists chiefly of blood; and after more or less time, the product of conception escapes either in whole or in part. In the former case, the patient has little further trouble; in the latter, hæmorrhage will probably continue, and the parts retained may putrefy, and give rise to serious symptoms. After about the commencement of the fourth month, the symptoms gradually approximate to those presented in ordinary parturition.

In the *treatment* of abortion, prophylactics (or the guarding against causes likely to lead to it) hold the first place. Women liable to this affection should, on the slightest threatening, assume as much as possible the horizontal position, avoiding all bodily exertion or mental excitement. They should use non-stimulating foods and drinks, and keep the bowels open by gentle aperients—such as manna and castor-oil, and carefully avoid aloes and other medicines irritating the lower bowel. Moreover, a separate bedroom must be insisted on by the physician. We shall only enter into the curative treatment so far as to state that if it is deemed necessary to check hæmorrhage before professional aid can be called in, cloths soaked in cold water may be applied locally (care being taken to change them before they grow warm), and iced water containing an astringent, such as a little alum, may be given internally. Further proceedings must be left to the medical attendant.

There are occasional cases (as where the outlet of the pelvis is very contracted) in which it is necessary to induce abortion by professional means, but it would be out of place to enter into this subject in these pages. It cannot be too generally known, that all attempts at procuring criminal abortion, either by the administration of powerful drugs, or the application of instruments, are accompanied with extreme danger to the pregnant woman.

ABORTION, in Criminal Law. Neither in the Law of England nor of Scotland is it murder to kill a child in the mother's womb (although it would be murder of the mother, if she died in consequence of the treatment). But the offence in question falls under the name A., which may be defined as the crime of administering to a pregnant woman any medicine, poison or noxious drug, or of using any surgical instrument or other means, with the intent of procuring miscarriage. The English law on the subject is now regulated by the 24 and 25 Vict. c. 100, s. 58, which makes the offence felony, and subjects offenders to penal servitude for life, or for not less than three years, or to be imprisoned for any term not more than two years. In the law of Scotland, the procuring of A. is an offence at common law, punishable with 'an arbitrary pain,' and that equally whether the desired effects be produced or not. As in England, penal servitude or imprisonment, according to circumstances, is the punishment usually awarded. See AM. SUPP.

ABOUKIR, the ancient *Canopus*, is now an insignificant village on the coast of Egypt, about 13 miles north-east of Alexandria. The castle of Aboukir stands on the west side of the bay of the same name. This bay is celebrated on account of Nelson's victory here gained over the French fleet, August 1, 1798. The French fleet was stationed in a curved line near a small island guarded by a battery; but Nelson, with his usual intrepidity, forced a passage with half of his fleet of fifteen vessels between the island and the French line of battle, while the other half attacked the enemy in front. The French admiral De Brueys was killed by a cannon-ball, and his flag-ship, *l'Orient*, was destroyed by fire. Only 60 or 70 men were saved out of a crew of 1000. The French fleet was completely defeated, and only two vessels escaped.

ABOUSAMBUL, or IPSAMBUL, a place on the left bank of the Nile, in Nubia, lat. 22° 22', the site of two very remarkable rock-cut temples, perhaps the oldest existing specimens of architecture in the world. The larger temple contains fourteen apartments, hewn out of the solid rock. The first and largest of these is 57 feet long, and 52 broad, and is supported by two rows of massy square pillars (four in each row), 30 feet high. To each of the pillars is attached a standing colossus, reaching to the roof, overlaid with a kind of stucco, and painted with gaudy colors. In front of the temple are four colossal seated figures—the largest pieces of Egyptian sculpture yet discovered. Reproductions of two of these, on the scale of the original (65 feet in height), form very striking objects in the Crystal Palace at Sydenham, where also may be seen a fac-simile, on a small scale, of the temple itself. These figures are supposed to represent Rameses the Great (or Sesostris), whose achievements are described on the painted walls of the temple.

ABOUT, Edmond Francois Valentin, a French littérateur of great and rising reputation, was born at Dieuze, on the 14th February, 1828. He studied first at the Lycée Charlemange, where he greatly distinguished himself; and afterwards at the Ecole Normale. In the beginning of 1852, he received an appointment to the French School at Athens, an institution supported by the French government, with no very definite object, but with the hope that the members, who are selected on account of their attainments and promise in scholarship, and left perfectly free to choose their own studies, should be able to make contributions to the history or the archæology of Greece. A. remained at Athens for about two years. He wrote, as required by the terms of his appointment, a Memoir for the Academy of Inscriptions, entitled *L'Ile d'Egine;* but it was as the satirist of modern Greece, not as

the investigator of Grecian antiquities, that his name first became familiar to the public. On his return to France, towards the end of 1853, he published *La Grèce Contemporaine*, a work which at once attained to great popularity, and was in course of the following year translated into several foreign languages. This work, full of lively and pointed sketches, abounding in shrewd and witty observation, its censures, very severe as they were, scarcely seeming offensive, from the ease and perfect good-humor with which they were conveyed, at once made its author be regarded as among the most promising writers of the day. It unquestionably affected European opinion as to the character and the capabilities of the modern Greeks; the truthfulness of its portraiture being confirmed by all who had special knowledge of this people. It gave earnest of the qualities which go to making a brilliant novelist; and A. did not long delay to come before the public as a novelist. His first novel, *Tolla*, appeared in the *Revue des Deux Mondes*, and was republished early in 1855. It did not disappoint the high expectations formed of it; but the author had laid himself open to a charge which, whenever it can be colorably sustained, is certain to be disastrous. He had taken many of his leading incidents from an Italian work, *Vittoria Savorelli*, published in 1841, and soon after withdrawn, the incidents contained in which were well known as actual occurrences; and though something of this was hinted in the book, there was no distinct acknowledgment of it. A hue and cry of plagiarism was got up against A., from which his reputation took some time to recover. His comedy, *Guillery*, brought out in February 1856 at the Théâtre Français, did not make his peace with the Parisians; it was a complete failure, so far as the theater-going public was concerned, and had to be withdrawn after two representations. A set of stories which he now began to contribute to the *Moniteur*, however—*Les Mariages de Paris*—had a success which more than made up for the savage criticism which he had to endure: they placed him high in public favor; and since then, his career has been a series of successes. *Les Mariages de Paris* was followed by *Le Roi des Montagnes* (1856), *Germaine* (1857), *Les Echasses de Maître Pierre* (1857), *Le Turco* (1866), *L'Infâme* (1867), and *Les Mariages de Province* (1868).

In 1859, after a tour in Italy, of a portion of which he contributed a description to the *Moniteur*, A. published a political pamphlet—*La Question Romaine*—which, displaying the same qualities as his early work on Greece, but matured, and wielded for a definite object, and being, moreover, regarded as written with the approval of the Emperor of the French, created a sensation throughout Europe. His object was to expose the abuses of the ecclesiastical government at Rome; and numerous answers to his work were made by friends of the papacy. In the following year, he published two political pamphlets, *La Nouvelle Carte d'Europe*, and *La Prusse en* 1860; both of which, being taken as indicative of the Emperer Napoleon's leanings, underwent criticism in all parts of Europe. A second work on Rome—*Rome Contemporaine*—appeared in 1861. He was decorated with the Legion of Honor in 1858.

Of late years, he has been producing novels with unabated popularity; and he has also written several slight dramatic pieces, which have been favorably received. It is unnecessary to put down a catalogue of works which are perfectly familiar to those who are interested in French contemporary fiction. In 1864, he published *Le Progrès*, a work of considerable pretensions, in which he discussed at great length, but with his usual liveliness of style, the existing state of society, especially in France, and the methods of improving it. His conclusion was that in France there were needed for progress the liberty of association (for the purposes of production and trade), an amendment of the land-system, a proper distribution of population as between country and town, the absence of political interference in the affairs of private persons, freedom of religious worship, and other similar conditions. In 1868, A. became a leading contributor to the *Gaulois* newspaper. At the outbreak of the Franco-German war in 1870, he accompanied the army of MacMahon to Alsace as special correspondent of the *Soir*, and in 1872 he became editor of *Le XIX*me *Siècle*. He published *Alsace* in 1872. In the same year he suffered a week's imprisonment, for some abusive newspaper articles, from the German authorities, who chose to consider him as a German subject from his being a native of Lorraine.

ABRAHAM, the progenitor of the Israelitish nation. He was a native of Chaldæa, but migrated, with his wife Sarah and his nephew Lot, to Canaan, where he lived a nomadic life, and worshipped the one God, Jehovah, in the midst of the polytheistic Canaanites. The details of the narrative, as given in the book of Genesis, are familiar to every one. A. died at the age of 175 (about 1800 B. C.). Of his two sons, Isaac was the ancestor of the Israelites; and the Arabs claim to be descended from Ishmael, whose mother was Hagar, a bond-woman. Later tradition ascribed to A. a complete knowledge of astronomy and philosophy, the invention of alphabetic writing, the art of interpreting dreams, &c. Even among Mohammedans, A. is reckoned a prophet and the friend of God; and they attribute to him the building of the sacred Kaaba at Mecca.

ABRACADABRA, a word said to be of Persian origin, and to designate in that language Mithra, the sun-god. It was, in former times, the most venerated of those magical formulas that were constructed out of the letters of the alphabet, and was supposed to be highly efficacious for the cure of fevers, and especially quartan and semi-tertion agues. Serenus Sammonicus gives the following directions for its use: Write the letters of the word so as to form a triangle, capable of being read many ways, on a square piece of paper. Fold the paper so as to conceal the writing, and stitch it into the form of a cross with white thread. This amulet wear in the bosom, suspended by a linen ribbon for nine days. Then go in dead silence, before sunrise, to the banks of a stream that flows eastward, take the amulet from off the neck, and fling it backwards into the water. If you open or read it, the charm is destroyed. The adjoining is one of the principal forms of arranging this mystic word.

A B R A C A D A B R A
A B R A C A D A B R
A B R A C A D A B
A B R A C A D A
A B R A C A D
A B R A C A
A B R A C
A B R A
A B R
A B
A

ABRAHAM-A-SANCTA-CLARA, a very eccentric but popular and useful German preacher, was born 1642, and died in Vienna 1709. His real name was Ulrich Megerle, but he is generally known by the name given to him in his monastery. Uncouth puns, coarse expressions, and strange freaks of humor, marked his sermons; but beneath their fantastic shells they had good kernels. A. was an honest, faithful, and devoted priest, as was proved by his self-sacrificing conduct during the plague in 1679. Though very severe in his reproof of vice, he was highly esteemed. The singular style of his writings is indicated by their very titles, e.g., *Gack Gack*, i. e., *Wallfarth Maria Stern in Texa; Heilsames Gemisch-Gemasch* (Wholesome Hodgepodge). His collected works amount to twenty vols. (1835). A selection was published in 2 vols. (1846).

ABRAHAM-MEN, a class of sturdy beggars who simulated lunacy, and wandered about the country in a disorderly manner; at one time working on the sympathy, and at another on the fears of women, children, and domestics. They were common in Shakspeare's time, and, it would seem, existed even as late as the period of the civil wars. The term is a cant one. 'An Abram cove,' as Decker, in his *English Villanies*, calls one of these mendicants, meant one who personated a 'Tom o' Bedlam.' He would 'disguise himself in grotesque rags, with knotted hair, long staff, and with many more disgusting contrivances to excite pity,' but he did not hesitate to live by thieving too, and when detected pilfering or in any species of depredation, he pleaded the immunities of the real Bedlamite, who was formally permitted to roam about the country when discharged from 'Bethlem Hospital.' A verbal relic of this class is still preserved in the slang phrase, 'to sham Abraham.'

ABRAHAMITES, or Bohemian deists. Under this name, a number of residents in Bohemia, trusting in the edict of toleration issued by Joseph II., avowed themselves (1782) as believers of the doctrine alleged to have been held by Abraham before his circumcision. As early as the ninth c., a sect of the same name had arisen in Syria, and had denied the divinity of Christ. But the Bohemian deists professed to be followers of John Huss, though they held no Christian doctrine beyond that of the unity of God, and accepted nothing of the Bible save the Lord's Prayer. As they would join neither Jewish nor Christian sects, the emperor refused to tolerate them; and in 1783, expelled them from their native land, and scattered them in various parts of Hungary, Transylvania, and Slavonia, where many were made converts to the Roman Catholic Church, while others died as martyrs to their simple creed.

ABRANTES, Duke of. See Junot.

ABRAXAS STONES are so called from having the word *abraxas* or *abrasax* engraved on them. They are cut in various forms, and bear a variety of capricious symbols, mostly composed of human limbs, a fowl's head, and serpent's body. These gems, whose value and significance have been greatly exaggerated, are common in collections, and are represented as coming from Syria, Egypt, and Spain. It is certain that the use of the name abraxas was at first peculiar to the Gnostic sect of the Basilidians (q. v.); and probably the word, by taking the numerical value of its Greek letters, may signify the number 365, so that there is no need to have recourse to old Persian or Egyptian, as is sometimes done. The Basilidians, however, did not designate by this name the highest deity, but the spirits of the world collectively. At a later period, the doctrines and practices of the sect were carried by the Priscillianists to Spain, whence many of these stones are got. Gnostic symbols were afterwards adopted by all sects given to magic and alchemy; and thus there is little doubt that the greater

part of the abraxas-stones were made in the middle ages as talismans.

ABROGATION of laws is the repealing or recalling of them—as where a statute repeals a previous one. Generally, in England, all statutes, no matter how old, or how unsuited soever to the times, remain in force until they are expressly repealed. But in Scotland a statue may become obsolete and virtually repealed, so that it may not owing to the lapse of time be founded on. See STATUTE.

A'BRUS, a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, of which the only known species, *A. precatorius*, is a shrub, originally belonging to India, where it is chiefly found in clayey soils, but now not uncommon in the West Indies and other tropical regions. The roots possess properties exactly similar to those of the common liquorice. The seeds are nearly spherical, as large as small peas, of a scarlet color, with a black scar, and are familiar enough to most people in Britain, being used as beads. They are narcotic.

ABRU'ZZO, a district of Italy, was formerly the north-east corner of the kingdom of Naples, and divided into three parts—Abruzzo Ulteriore I. and II., and Abruzzo Citeriore. These three divisions correspond to the present Italian provinces, Chieti, Teramo and Aquila respectively. The whole district contains about 5000 square miles, and 920,000 inhabitants. Its chief towns are Chieti, Teramo, Aquila, Sulmona. It forms the wildest and loftiest portion of the Apennines. The streams are numerous, but the only river of any consequence is the Pescara, which flows into the Adriatic. The rent and jagged mountain-groups arrange themselves in picturesque shapes, reaching in Il Gran Sasso d'Italia, or 'the great rock of Italy,' which is the highest of the chain, the elevation of 9800 feet. The highlands slope precipitously on all sides, but especially towards the north-eastern shore. The climate of A. is raw in the higher regions; snow rests on the hills from October to April, and on some of the peaks, all the year round; but the valleys are extremely fertile, though husbandry is in a wretched condition, and the low open plains are left without the slighest protection from inundations of the rivers in spring, or means for irrigation in the arid summer. Dense forests of oak and fir clothe the sides of the mountains; at the base, almond, walnut, and other fruit-trees grow abundantly; olives in the deep-lying valleys. Fine cattle pasture in these regions; herds of swine roam through the lofty pine-woods; and the remoter fastnesses are the haunt of bears, wolves and boars. The chief importance of A. used to be its military position as a defence of the kingdom of Naples. There are few roads into it, so that it is very difficult for an enemy to reach Naples from the north. It is admirably suited for the purposes of guerilla warfare. But the people have ceased to possess a reputation as banditti. No trace of the old spirit which made their ancestors, the Marsi, Sabines and Samnites, so terrible to the Romans, and which in modern times manifested itself in a love of petty plundering, is to be found. They have become a race of rude and simple shepherds, fondly attached to their mountain homes, musical, superstitious and hospitable; but they are robust and powerful, and during the French invasion of Naples in 1799, displayed a vigorous courage in opposing the soldiers of the Revolution.

A'BSALOM, the third son of David, king of Israel, remarkable for his beauty, and for his unnatural rebellion against his father. By popular acts he contrived to win the affections of the people, and then stirred up a formidable rebellion. The adherents of the king having rallied round him, a battle was fought in the forest of Ephraim, in which the rebels were defeated. In the flight, as A. was riding under a tree, his hair caught in the branches, and he was left suspended; in which position Joab, the commander of David's army, thrust him through, contrary to the king's express orders that he should be spared. The grief of David for his loss was excessive. See 2 Sam. c. 18.

ABSALOM, Archbishop of Lund. See AXEL.

A'BSCESS (*Apostema*), a collection of purulent matter formed by disease within some tissue or organ of the body. The process by which an abscess is formed is the following: First, the capillary vessels become overcharged with blood, in consequence of inflammation. From the blood thus made stagnant, or flowing very feebly, a fluid exudes through the walls of the capillary vessels, and, containing a large portion of albumen, becomes pus or purulent matter. This matter, at first contained in the minute interstices of the tissues, gradually dissolves them, and so makes for itself a larger cavity; and frequently, by gradual dissolution of the adjacent parts, works its way either to the surface or to some natural cavity of the body. Pus thus makes its appearance often in a different part of the body from where it was formed. It also occurs, that when the purulent matter does not find any outlet either naturally or artificially, it is gradually dried up or absorbed. In abscesses superficially seated—either in or close under the skin—the early treatment consists chiefly in promoting the formation of pus by the application of moist and warm bandages or poultices. The next step is the removal of the pus. When this is too long delayed, serious disturbance of the organ, or even poisoning of the blood, may ensue. An abscess must be regarded not as a distinct, original disease in itself, but as the result of another disease—inflammation; or as an effort of nature for the removal of injurious matters from the system.

ABSCISSA. See PARABOLA.

ABSENTEE', a term applied, by way of reproach, to capitalists who derive their income from one country, and spend it in another. It has been especially used in discussions on the social condition of Ireland. As long as Ireland had its own parliament, a great portion of the large landed proprietors lived chiefly in the country during summer, and passed their winters in Dublin; thus spending a large portion of their incomes among their dependents, or at least among their countrymen. The Union changed the habits of the Irish nobility and gentry, who were attracted to London as the political metropolis, or were induced, by the disturbed condition of Ireland, to choose residences on the continent. Such Irish landed proprietors were styled 'absentees;' and it was argued that their conduct was the great source of Irish poverty, as it drained the resources of the land, or, in other words, sent money out of Ireland. One class of political economists—among them M'Culloch—maintain that, economically viewed, absenteeism has no injurious effect on the country from which the absentee draws his revenue. An Irish landlord living in France, it is argued, receives his remittances of rent, not in bullion, but in bills of exchange; and bills of exchange represent, in the end, the value of British commodities imported into France. The remittance could not be made unless goods to the same amount were also drawn from Britain. Thus, although the landlord may consume, for the most part, French productions, he causes, indirectly, a demand for as much of British productions; and his income goes, in the end, to pay for them. His residence abroad, then, does no harm to the industry and resources of the country at large, although it is admitted that it may be felt as an evil in a particular locality. The truth of this doctrine, however, in its full extent, is disputed. Among other objections to it, it is argued, that whatever may be true of the amount actually consumed, all the tradesmen and others who supply the absentee's wants have their profits, and have thus the means of accumulating; and that these accumulations which are thus added to the national wealth of a foreign country, would have been added to the wealth of his native country had he been living at home. The result of the controversy would seem to be, that absenteeism does, to some extent, act injuriously on the wealth of a country, though it is not true that the whole revenues thus spent are so much clear loss, there being several indirect compensations.—On the evil of absenteeism, in a moral point of view, all are agreed; especially in a country in the condition of Ireland, where nearly the whole wealth is in the hands of extensive landed proprietors, with almost no middle class.

ABSINTHE is a spirit flavored with the pounded leaves and flowering tops of certain species of *Artemisia* (q. v.), chiefly wormwood (*A. Absinthium*), together with Angelica-root, sweet-flag root, star-anise, and other aromatics. The aromatics are macerated for about eight days in alcohol, and then distilled, the result being an emerald-colored liquor. Adulteration is largely practised, even blue vitriol being sometimes found in so-called A. The best A. is made in Switzerland, the chief seat of the manufacture being in the canton of Neufchatel. It is chiefly used in France, but is of late largely exported to the United States. When to be drunk, the greenish liquor is usually mixed with water. The evil effects of drinking A. are very apparent; frequent intoxication or moderate but steady tippling, utterly deranges the digestive system, weakens the frame, induces horrible dreams and hallucinations, and may end in paralysis or in idiocy.

ABSOLUTE stands opposed to *relative*, and means that the thing is considered in *itself*, and without reference to other things. In physics, we speak of the *absolute* velocity of a body—i. e., the rate of its motion through space; and of the *relative* velocity of two bodies—i. e., the rate at which they approach or recede from one another, one or both being in motion. In the language of modern metaphysics, the Absolute is the unconditioned, unalterable original—that which is the ultimate cause and ground of the phenomena of the visible world. Absolute, in politics, is applied to a ruler whose authority is unrestricted by constitutional checks.

ABSOLUTION, originally a term of Roman law, signifying acquittal, is now used in an ecclesiastical sense. In the primitive Christian Church, its form was this: Members that had given scandal by gross and open sins, were excluded from the Lord's Supper or from the congregation altogether, and could be readmitted only if they repented and underwent the penance laid upon them by the church. When they had done so, the presbyter, along with the elders, pronounced the absolution in presence of the congregation—meaning, that the congregation forgave the offence, on their part, and received the sinner again into their number. Down to the 3d c., the concurrence of the congregation continued to be necessary to absolution. But by the 4th c., it had

become a right of bishops to absolve, and the public confession had gradually turned into a private confession before the priest, who now imposed the penance of himself, modified or remitted it, and then absolved. Absolution had not, as yet, been extended to any but open and gross sins; but when the dominion of the hierarchy over men's minds had reached its height, and the fourth Lateran Council (1215) had made auricular confession, at least once a year, obligatory, confession and its attendant absolution were extended to all sins whatever; and the absolution was made to convey, not merely, as before, foregiveness on the part of the church, but foregiveness in the sight of God. The formula, *Deus* or *Christus absolvit te*, which was used till the 12th c., was changed into *Ego absolvo te;* thus ascribing to the priest the power to forgive sins in the sight of God. This is still the received theory of absolution in the Roman Catholic Church, sanctioned by the Council of Trent, and grounded on John xx. 21.—The Protestant churches ascribe to the absolution of the clergy only a declarative, and not an exhibitive power; on the ground of repentance, it announces and assures forgiveness on the part of God, but does not impart it. See PENANCE.

ABSORBENTS. See LACTEALS and LYMPHATICS.

ABSORPTION (in Botany).—It is believed that plants absorb carbonic acid gas, and also to some extent fluids, by their leaves and other aërial organs; and it is supposed that this absorption takes place principally through the *stomata* of the leaves (see LEAVES), and both by the upper and under surface of the leaf, in some plants by both surfaces indifferently, in others much more powerfully by the one surface or the other. But plants principally depend upon their roots for nourishment, and it is at the extremities of their fibrils that absorption takes place most rapidly, according to a peculiar process to which has been given the name of ENDOSMOSE (q. v.).

ABSTINENCE. See FASTING.

ABSTINENCE SOCIETIES, associations for the promotion of abstinence from all kinds of alcoholic liquors, and the members of which usually receive the designation of abstainers or teetotalers—this last phrase inferring an utter and uncompromising abstinence; or at least that the only exception shall be for sacramental and medical purposes. Abstainers usually take a pledge or vow to that effect; the ground of their abstinence from alcoholic liquors being that they are injurious to, or at least no way promotive of, health, and that from the great social evils of intemperance it is important to set an example of entire abstinence. A. S. exist in great numbers in North America and the United Kingdom. In the early growth of this remarkable social movement, A. S. were called Temperance Societies, and under that head the subject will be treated in its various forms of development.

ABSTRACTION is that intellectual process by which the mind withdraws (*abstraho*) some of the attributes of objects from the others, and thinks of them to the exclusion of the rest. The abstract is opposed to the concrete. John, William, my brother, form concrete images in my mind, each with a multitude of attributes peculiar to himself. But they have also certain attributes common to them and to all individuals of the race; I can overlook the others, and attend to these, and thus form a notion or conception, which is called *a man*. Man is, therefore, an abstract notion, the word connoting, as it is called, a certain though not very well-defined number of attributes. With the exception of proper names, all nouns are thus abstract. There are degrees, however, in abstraction. The abstract notion *animal* rises above that of *man*, embracing all men and innumerable organized beings besides. An *organized being*, again, is a still higher stage, and embraces both animals and plants. Being, time, space, are among the highest abstractions. The higher abstractions rise, the fewer attributes are implied or connoted in the name; hence the propriety of the phrase, *empty* abstractions. On the other hand, the number of objects to which the name is applicable, increases; and thus reasoning in abstract terms has the advantage of being general, or extensive in its application. But such reasoning is apt to become vague and fallacious, unless constant regard is had to concrete instances. Abstract language is best adapted for scientific exposition; concrete, for graphic and poetical effect.—ABSTRACT in Arith. is applied to numbers considered in themselves, and without reference to any objects numbered; thus 7, 20, are abstract numbers; but 7 feet, 20 horses are concrete numbers.

ABSURDUM, REDUCTIO AD, the method of proving a truth by showing that to suppose the proposition untrue would lead to a contradiction or absurdity.

ABSYNTHIUM. See WORMWOOD.

ABU', a mountain of India, in the territory of Serohe, in Rajpootana, rising far above any other of the Aravulli ridge, and said to be about 5000 feet above the sea. The base is broad, its circuit being estimated at forty or fifty miles; the summit is very irregular, and divided into many peaks. It is a celebrated place of pilgrimage, especially for the Jainas, who have a magnificent group of four temples at Dilwara, about the middle of the mountain, one of which is described as 'the most superb of all the temples in India.' Before it is an equestrian statue of the founder, Bimul Sah, a Jain merchant of Anhulwara. All the temples exhibit symptoms of decay. The summit of A. is about 40 miles north-east from the British cantonment of Deesa, and it has lately begun to be used as a sanitorium.

ABU or BU (Arab. for 'father') is prefixed to many Arabic proper names, as the equivalent syllable *Ab* is prefixed to Hebrew names: ex., Abu-bekr, 'Father of the virgin' (Aysha). But *Abu*, like *Ab*, often signifies merely possessor; as in Abulfeda (possessor of fidelity), 'the Trusty;' Abner, 'the Brilliant'—literally, 'father or possessor of light.'

ABU-BEKR ('Father of the virgin' Ayesha, the wife of Mohammed), was a man of great influence in the Koreish tribe; and in 632, when Mohammed died, was made the first calif or successor of the Prophet. After defeating his enemies in Arabia, and warring successfully against Babylonia, Syria, and the Byzantine emperor Heraclius, Abubekr died 635 A.D., aged 63, and was buried at Medina, near the remains of Mohammed and his wife Ayesha (q.v.)

ABULFARAJ (Lat. *Abulfaragius*), called also Barhebraeus—i. e., Son of the Hebrew, as being by birth a Jew, though afterwards a Christian—was born at Malatia, in Armenia, 1226, and became so distinguished for his knowledge of the Syriac, Arabic, and Greek languages, and of philosophy, theology, and medicine, that he was called the phœnix of the age. At the age of twenty, he was made bishop of Gula, and afterwards of Aleppo; and rose to the rank of Maphrian, the highest dignity among the Jacobite Christians next to Patriarch. Of his numerous Syriac and Arabic writings, most of which yet lie buried in the library of the Vatican, the best known is a *Chronicle*, in Syriac, of universal history from Adam down to his own time. The first part of it was published at Leipzig in 1789, the rest (3 vols.) at Louvain in 1872–4. A. himself abridged this work in Arabic, under the title of *History of the Dynasties* (edited by Pococke, Arab. and Lat., Oxf. 1663). Among his writings of a theological kind may be mentioned his *Magazine of Mysteries*, being a Commentary on the Syriac Version of the Bible.

ABU'LFEDA, a Moslem prince, known as a writer of history, was born 1273 A. D., at Damascus; and during his youth, distinguished himself in several campaigns against the Christian kingdom founded by the crusaders. From 1310 to the time of his death, he ruled over the principality of Hamat, in Syria, was a true ally of the sultan, visited Egypt and Arabia, patronized literature and science, and died in 1331. He left several important works in Arabic, among which are his Annals, the earlier portion of which has been edited by Fleischer, under the title of *Historia Anteislamica* (Leip. 1831), and the rest by Reiske, in his *Annales Moslemici* (Copenh. 1789-94). This work was in great part compiled by A. from earlier Arabic authors, and is a valuable source of history, especially of the Arabic Empire. He also wrote a Geography, which has been edited, with a French translation, by Reinaud and De Slane (Par. 1848), and by Reiske (Dresden, 1842.)

ABUSHE'HR (variously written Bushehr, Bushire, in Pers. Bendershehr) is the name of a seaport on the east coast of the Persian Gulf. It is situated at the extremity of a peninsula. The district is liable to be devastated by earthquakes and the simoom, and is deficient in water; but the situation is so favorable for commerce that the trade is valued at £600,000 a year (of which three-fourths represent imports). It is the land terminus of the Indo-European telegraph line; the headquarters of the English naval squadron in the Persian Gulf; and a chief station of the British Indian Steam Navigation Co. The exports are horses, fruits, shawls, pearls, silk, rose-water, asafœtida, copper, gall-nuts, &c.; imports, sugar, indigo, iron, cotton goods, &c. Pop. nearly 20,000.

ABUTMENT, in Arch., is the part of a pier or wall from which an arch springs, and which resists the outward thrust. The term *im ost* is used when the arch is a semicircle, so that the pressure is vertical. In reference to a bridge, the abutments are the walls adjoining the land, which support the ends of the roadway, or the extremities of the arch or arches.

ABYDOS, a town in Asia Minor, situated at the narrowest part of the Hellespont, opposite Sestos. It is celebrated as the place whence Xerxes and his vast army passed into Europe in 480 B. C.; also as the scene of the story of Hero (q. v.) and Leander. In the later times of antiquity, the people of A. were reproached for their effeminate and dissolute manners.—There was another ABYDOS, in Upper Egypt (Thebais), on the left bank of the Nile, and on the main route of commerce with Libya. Even in the time of Strabo, this town was in ruins. Here the remains of the Memnonium and of a temple of Osiris are still remarkable. In the former, W. J. Bankes, in 1818, discovered the celebrated Tablet

of A., bearing, in hieroglyphics, a genealogy of the eighteenth dynasty of the Pharaohs. It is now in Paris, and copies have been published.

ABYSSI'NIA, called Habesh by the Arabs, is the large tract of highlands in the east of Africa. From the Red Sea on the N. E., it rises in terraces towards the S. W. Between the highlands and the Red Sea lies a flat tract called Adal, narrow at the north (in lat. 15° 30'), and widening to the south. The plains of Nubia and Kordofan form the boundaries on the N. and W., while the southern limits are not well known. The total area is about 200,000 sq. m., and the population 3,000,000 to 4,000,000. The country consists of high table-lands, intersected by deep ravines formed by the rivers, and steep sandstone terraces. Numerous mountain-chains, mostly of volcanic origin, rise above the table-lands: the highest are the mountains of Samen or Samien, rising to about 15,000 feet above the sea-level. Some of the plains have an elevation of from 7 to 10,000 feet. A. gives birth to numerous rivers, the largest of which are the Abai or Nile (Bahr-ele-Azrek or Blue River), and the Takkazie, an affluent of the Nile. In the south is the Hawash—from which the country takes its name—which flows eastward into the salt-lake of Assal in Adal. The largest lake is that of Tzana or Dembea, through which the Abai or Blue Nile flows. The climate in the elevated tracts of Abyssinia is temperate and salubrious; in the low tracts along the coast, and in the north and north-west, the heat is excessive, and the climate noxious. On the whole, A. is a country of great fertility; but, like the climate, the productions of the soil vary greatly with the different degrees of elevation. Wheat and barley are cultivated, also maize, the grains called Teff (*Poa Abyssinica*), and Tocusso (*Eleusine Tocusso*), various leguminous plants, cotton, coffee, sugar-cane, tobacco, &c. The coffee-plant grows wild. Among wild animals, the lion, leopard, hyena, wolf, jackal, elephant, buffalo, rhinoceros, and zebra are found.

The people of A. belong mostly to the Shemitic race, and resemble the Arabs both in physical characteristics and structure of language. See ETHIOPIA. The ethnology of the country is variously given by different authorities. According to Rüppell, there are three principal races. The aboriginal Abyssinians, inhabiting the greater part of Amhara, and numerous also in Tigré, are of middle size, with oval faces, lips not thicker than those of Europeans, pointed noses, and straight or slightly curled hair. In this race he includes the Falashas, or Jews, the Gamant, and the Agows. A second race, abounding most in the north of Tigré, have thick lips, noses blunt and somewhat curved, and thick hair, verging on woolliness. The third are the Gallas, inhabiting the south of Shoa and the regions west of Lake Dembea and the Abai; a large-bodied race, round-faced, short-nosed, with a depression between the nose and brow, deep-set lively eyes, and thickish lips. The color of these races is brown of various shades. The only negroes in A. are slaves from the country of the Shangallas, to the west.

The oldest accounts of the Abyssinians are full of fables, but seem sufficient to prove that they attained some degree of civilization in remote antiquity. Christianity was introduced about the middle of the 4th c., and soon prevailed extensively. Axum was at that time the capital. Two centuries later, the Abyssinians were powerful enough to invade Arabia, and conquer a part of Yemen. In the subsequent struggles against the invading Moslem, the coast-land Samhara and the country of Adal were lost. In the 10th c., a Jewish princess overthrew the reigning dynasty, the surviving representative of which fled to Shoa. After three centuries of confusion, the empire was restored under Icon Amlac, and some progress was made in improvement. Early in the 15th c., the Abyssinians entered into close relations with the Portuguese, by whose assistance the empire was saved, in 1540, from falling into the hands of the invader Granie, sultan of Adal. The southern provinces, however, were lost, and the seat of empire was removed from Shoa to Gondar. Under the influence of the Portuguese missionaries, the royal family adopted the Roman Catholic faith; and the old Coptic Church was formally united to the see of Rome. The people and ecclesiastics obstinately resisted the innovation; the emperor gave way; and ultimately, in 1632, the Romish priests were expelled or put to death. In consequence of the commotions thus excited, the monarchical power declined, while that of the governors of provinces greatly increased, and, indeed, became almost absolute. The political divisions of the country are subject to continual alteration; but the following are the most important:—1. The kingdom of *Tigré*, extending between the river Takkazie or Bahr-el-Aswad (Black River), and the mountains of Samen on one side, and the district of Samhara on the other. Its chief towns are Antalo and Adowa. 2. The kingdom of *Gondar* or *Amhara*, extending on the west of the Takkazie and the Samen Mountains. The capital, Gondar, is situated in the north-east of the plain of Dembea or Gondar, at an elevation of 7420 feet. 3. The kingdom of *Shoa* (including *Efat*), lying south of Amhara, and separated from the Galla tribes by the Hawash. This is, by all accounts, the best organized and most powerful state now existing in A. The capital, Ankobar, at an elevation of 8198 feet, contains from 8000 to 10,000 inhabitants, and enjoys a delightful climate. The Gallas, a savage but enterprising race, effected a settlement in the south of A. in the 16th c. They inhabit the whole of the eastern part of tropical Africa. Several of their tribes have been modified in character and customs by conversion to Mohammedanism, and have founded kingdoms—such as *Enarea*, one of the highest mountain countries of Africa, and rich in produce; *Kusha*, on the river Goshob, where the slave-trade is actively carried on by the Portuguese; and several smaller independent states of which little is known.

In consequence of invasions and civil warfare, the present social and political condition of A. is very unfavorable. The kingdom of Shoa is in better circumstances than the other states. Though Christianity is still the professed religion of the majority of Abyssinians, it exists among them only in its lowest form, and is little more than ceremonial. Their church is national and independent, but the visible head, or *Abuna* ('our father') is ordained by the Coptic patriarch of Alexandria. The doctrines of the Abyssinian coincide with those of the Coptic Church, especially in the monophysite heresy; but several peculiar rites are observed, including circumcision of both sexes, and observance of the Mosaic laws respecting food, &c.; love-feasts, and adult baptism. The oldest Abyssinian churches are hewn out of rocks. The modern churches are mostly small, round, or conical buildings, thatched with straw, and surrounded by pillars of cedar. Statues and bas-reliefs are not tolerated in churches, but paintings are numerous. The state of manners and morals in A. is as low as might be looked for in a country so long a prey to anarchy and violence. Human life is lightly valued, the administration of justice is barbarously negligent and corrupt, and the marriage-bond is tied and loosed with extreme facility. The land generally yields at least two crops annually; but the agriculture is miserable, and the condition of the lower classes proportionately wretched. Among fruits, the fig is the most plentiful. Wine is used only for the Eucharist; the common drink is *bouza*, a kind of sour beer, made from the fermentation of bread. The manufactures of A. are rude, but sufficient, with a few exceptions, for the wants of the natives; cotton stuffs and leather goods are the staple articles. The foreign trade is carried on principally through Massowah; the chief exports being slaves, gold, butter, musk-horns, wax, and ivory.

A. has recently become better known to us through the visits of missionaries, scientific travelers, &c., and the British Expedition of 1867—1868. See the Travels and Journals of Bruce, Lord Valentia, Salt, Ritter, Gobat, Isenberg and Krapf, Ruppell, Parkyns, Plowden, Markham, and Blandford; the Report of the French Scientific Commission (1845); Contributions of MM. d'Abbadie to *Journ. Asiat.*, and of Beke and Kirk in *Journ. of Roy. Geogr. Soc.*; *Record of the Expedition to A.*, by Major Holland and Captain Hozier. See THEODORE.

ACA'CIA, a genus of plants of the natural order *Leguminosæ*, sub-order *Mimoseæ*. The genus *A.* differs from *Mimosa* in the greater number of its stamens (10—200), and in the want of transverse partitions in its bivalvular legumes. The acacias are diffused over all quarters of the globe except Europe. The greater number of them have a singular appearance, because of the leaf-stalks spreading out in a leaf-like form (*phyllodium*); while the leaflets are more or less stunted in appearance, and frequently are altogether absent. Other species have bipinnate leaves, with a great number of leaflets, and are extremely beautiful. Many are of great importance in an economical point of view, because of the juice which flows from them, which, when inspissated, becomes an article of commerce under the name of Gum (q. v.). The species called *A. gummifera*, *A. Seyal*, *A. Ehrenbergii*, *A. tortilis*, *A. Nilotica*, and *A. vera*, natives of Africa, produce gum-arabic, also *A. speciosa*, and *A. Arabica*, natives of the south of Asia. *A. Arabica* is called the Babul-tree in India, and its gum, babul. A gum similar to gum-arabic is produced by *A. decurrens*, *A. mollissima* (the Silver Wattle), and *A. affinis* (the Black Wattle), in New Holland, and by *A. karroo*, at the Cape of Good Hope. Gum Senegal is the produce of *A. Verek*, and *A. Adansonii*, natives of the western coast of Africa. Yet *A. Verek* is also said to yield true white gum-arabic. Catechu (q. v.) is obtained from the wood of *A. catechu*. The astringent bark and pods of some species are used for tanning. The bark of *A. Arabica* is administered in India as a powerful tonic medicine. The pods of *A. concinna* form an article of commerce in India, its seeds being saponaceous and used in washing. A decoction of the pods of *A.*

Acacia Arabica (Gum-arabic Tree).

Arabica is sometimes used in the same way. A considerable number of species afford useful timber. The flowers of many species are fragrant. A number of species from New Holland and other countries have been introduced into the south of Europe. Some are of frequent occurrence in green-houses in Britain; and a few of the Australian species succeed tolerably in the open air in the south of England. The foliage of the acacias with bipinnate leaves shows a peculiar sensitiveness to changes of weather; when a thick cloud obscures the sun, the opposite leaflets close together, and so remain till the sun reappears. The Locust-tree of North America (*Robinia pseud-acacia*) is often called A. both in Britain and upon the continent of Europe. Other species of *Robinia* also receive the same name. See LOCUST-TREE and ROSE A. *Flores Acaciæ* (A. Flowers) is an old medical name for Sloe flowers.

ACA'DEMY, a name originally applied to the philosophical school of Plato, and derived from the place in which that philosopher was accustomed to meet and converse with his pupils. This was a garden or grove in the suburbs of Athens, said to have once belonged to the hero Academus, and by him to have been presented to the citizens for a gymnasium. The spot is at this day known under the name of *Akadimia*. The variations of doctrine among the successors of Plato gave rise to the distinctive titles of *Old*, *Middle* and *New A.* The first is applied to the philosophic teaching of Plato himself and his immediate followers; the second, to that modification of the Platonic philosophy taught by Arcesilaus (q.v.); and the third, to the half-sceptical school founded by Carneades (q.v.).

In its common English acceptation, the word academy is loosely applied to any species of school which professes to communicate more than the mere elements of instruction. This, however, though perhaps more in affinity with the original application of the term, must be regarded as an abuse of its more general and strict acceptation in modern usage, as signifying a society of savans or artists, established for the promotion of literature, science, or art. The first institution in ancient times that seems to merit the name, in this sense, of academy, was the celebrated *Museum* founded at Alexandria in the 3d century B.C. by Ptolemy Soter, which concentrated in that intellectual capital all that was most eminent in science, philosophy, poetry, and criticism. After this model, the Jews, and, at a later period, the Arabians, founded numerous institutions for the promotion of learning. During the middle ages, with the exception of the Moorish institutions at Granada and Cordova, in which poetry and music formed prominent subjects of study, we find nothing corresponding to the modern idea of an academy, save the learned society established in his own palace, at the suggestion of his teacher Alcuin, by Charlemagne. This association was dissolved by the monarch's death; and not till the middle of the 15th c., when the conquest of Constantinople drove many learned Greeks to seek an asylum in Italy, do we find any trace of a similar institution. Under the enlightened patronage of Lorenzo and Cosmo de' Medici, the lovers of Greek learning and philosophy were united in the bond of a common pursuit, and zealously labored to revive the long extinguished light of classic literature. After the decline of the Greek and Platonic Academies of Florence, there arose institutions of a more comprehensive character, the example of which spread from Italy throughout all the states of Europe.

Academies may be divided into those established for general ends, and such as contemplate specific objects. The members are usually classified as *Ordinary*, *Honorary*, and *Corresponding*. The results of their labors in their various departments are reported at the periodic meetings, and printed in the records of the academy. Prizes are generally established as the rewards of distinguished merit in original discovery, or excellence in the treatment of subjects proposed for competition. Among general academies, deserving of mention in the first place is the *A. of Sciences*, at Paris, established by Colbert in 1666, and now a branch of the *Institut de France* (see INSTITUT). The first scientific academy founded in modern times was the *Academia Secretorum Naturæ*, established at Naples in 1560, and afterwards put down by a papal interdict. It was succeeded by the A. of the *Lincei*, founded at Rome by Prince Ceci, which attained distinguished success. Galileo was one of its members. Subsequently arose the A. *del Cimento*, at Florence, and the A. *degl' Inquieti*, of Bologna, afterwards incorporated into the *Accad. della Traccia*, and finally, in 1711, merged in the Institute of Bologna, or Clementine A.—The *Berlin A. of Arts and Sciences*, founded in 1700 by Frederick I., was in 1710 divided into four sections: 1. Physics, Medicine, and Chemistry; 2. Mathematics, Astronomy, and Mechanics; 3. German Language and History; 4. Oriental Literature, in special connection with missions. The first president was Leibnitz, whose extraordinary versatility of genius qualified him for a leading place in all its departments. Under the Great Frederick, new life was infused into the academy by the encouragement offered to learned men of all countries to settle at Berlin. Maupertuis was now appointed president, and the academy was re-organized under the four classes of Physics, Mathematics, Philosophy, History and Philology. The public meetings are held twice a year. The transactions did not appear regularly till after 1811. They were formerly published in French, but now in German.—The *Imperial A. of Sciences of St. Petersburg* was planned in 1724 by Peter the Great, with the advice of Leibnitz and Wolf. It was established in the following year by Catherine I., and liberally supported by the empress: fifteen members received pensions as professors of various branches. Of these were Wolf, Bülfinger, Nicolas and Daniel Bernoulli, and the two De Lisles. After various fluctuations, the academy attained a position of high eminence and utility under the patronage of Catharine II. Among the most important results of her liberality are the travels and researches of such men as Pallas and Klaproth. The academy is still composed of fifteen salaried members, besides a president and director, and four pensioned supernumeraries, who attend the meetings and succeed to the vacant chairs. It possesses an extensive library and a very valuable museum. The first series of its transactions (1725–47) bears the name of *Commentarii;* the second (1748–77), of *Novi Commentarii;* the third (1777–82), of *Acta*.

Up to this date, they were written in Latin; thenceforth in Latin or French. From 1783 to 1795, they are called *Nova Acta*; from that time to the present they are entitled *Memoires*.—The *A. of Sciences at Stockholm*, founded in 1739, consisted at first of six members, one of whom was the celebrated Linnæus. It received a royal charter in 1741, but no endowment. Its publications since 1779, are distinguished as *New Transactions*. Papers on agriculture are separately published, under the title of *Œconomica Acta*. In 1799, it was divided into six classes: 1. Political and Rural Economy, 15 members; 2. Commerce and Mechanical Arts, 15; 3. Swedish Physics and Natural History, 15; 4. Foreign Physics and Natural History, 15; 5. Mathematics, 18; 6. History, Philology and Fine Arts, 12. The resident members preside in rotation, during a term of three months: the transactions appear quarterly. At the annual meeting in April, prizes are distributed.—The *Royal A. of Sciences at Copenhagen* owes its origin, like the last mentioned, to six learned men, employed by Christian VI. in 1742 to arrange his cabinet of medals. In 1743, the king, on the recommendation of Count Holstein, the first president, took the academy under his protection, endowed it, and ordered that natural history, physics, and mathematics should be embraced within the sphere of its operations, at first limited to the national history and antiquities. The academy's transactions are in Danish; some of them are translated into Latin.—The *A. of Sciences of Mannheim* was founded in 1755 by the Elector-palatine Karl Theodor, and divided into the sections of history and physical science; the latter was subdivided in 1780 into physic proper and meteorology. The transactions under the two former heads are published under the title of *Acta*, the meteorological memoirs are entitled *Ephemerides*.—The *A. of Sciences of Munich* was founded in 1759. Soon after the erection of Bavaria into a kingdom, it was reorganized on a very extensive footing, under the presidency of Jacobi. Its memoirs are published under the title of *Abhandlungen der Baierischen Akademie*.—The *A. of Lisbon*, established by Queen Maria in 1779, numbers 60 members; viz., 24 ordinary, and 36 honorary and foreign; and is divided into three sections; 1. Natural Science; 2. Mathematics; 3. Portuguese Literature. It is liberally endowed by government, and has a library, museum, observatory, and printing-office. Its *Memorias* have appeared since 1787.—The *Royal Irish A.* dates its origin from 1782, when a number of gentlemen, chiefly connected with the university of Dublin, associated themselves for the pursuit of science, history, and literature. The plan of the society was afterwards extended. The first volume of its transactions appeared in 1788. The *American A. of Arts and Sciences* was established at Boston in 1780: it had previously existed in another form, the original institution being due to Franklin. The first volume of its transactions was published in 1785.—The *A. of Sciences at Vienna* was founded in 1846. It is divided into the sections of History and Philology; Mathematics and Natural Science; Philosophy, Political Economy, and Medicine. It published *Reports* of its meetings since 1848, and since 1850, *Memoirs*.

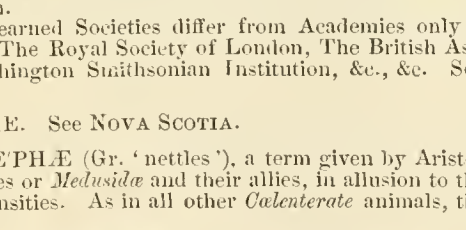
Among the academies established for the cultivation of particular departments of knowledge, are the following:—1. LANGUAGES. The *Academia della Crusca*, or *Academia Furfuratorum*, was founded at Florence in 1582, chiefly for the purpose of promoting the purity of the Italian language; whence its somewhat fantastic designation—*crusca* signifying chaff or bran. It first drew attention by its attacks on Tasso. Its principal service has been the compilation of an excellent dictionary, and the publication of correct editions of the older Italian poets. A new edition of this dictionary is at present in preparation, but from the slow rate of its progress, it is calculated that many centuries must elapse before its completion. For an account of the *Académie Française*, instituted in 1629, as a private society, see INSTITUT. The *Royal Spanish A.* was founded at Madrid in 1714, by the Duke of Escalona, for the cultivation and improvement of the national language, in which it has done good service particularly by the compilation

of a Spanish dictionary. A similar institution was founded at St. Petersburg in 1783, and afterwards united to the Imperial A. At Stockholm, a similar academy was established in 1786; and at Pesth (for the cultivation of the Magyar language) in 1830.—2. ARCHÆOLOGY. At the head of antiquarian institutions stands the *Académie des Inscriptions*, founded at Paris in 1663, by Colbert. See INSTITUT. For the elucidation of northern languages and antiquities, an academy was founded in 1710 at Upsala, in Sweden; a similar institution was established at Cortona, in Italy, in 1727. Both have issued valuable works. The *A. of Herculaneum* was founded at Naples in 1755, by the Marquis of Tanucci, for the elucidation of Herculanean and Pompeian antiquities. Its publications, commencing in 1775, bear the title of *Antichità di Ercolano*. An academy for the investigation of Tuscan antiquities was established at Florence in 1807; and at Paris, in 1805, a Celtic A. for the elucidation of the language, history, and antiquities of the Celts, especially in France. This society changed its name, in 1814, to *Société des Antiquaires de France*.—3. HISTORY. The *Royal A. of Portuguese History* was founded at Lisbon, in 1720, by John V. At Madrid, in 1730, a learned association was formed for the elucidation of Spanish history. It was constituted an academy in 1738, by Philip V. It has published editions of Mariana, Sepulveda, Solis, and the ancient Castilian chronicles, some of which had never before been printed. A historical academy has existed for some time at Tübingen.—4. MEDICINE. The *Academia Naturæ Curiosorum* was established at Vienna, in 1652, by the physician Bauschius, for the investigation of remarkable phenomena in the animal, vegetable, and mineral kingdoms. In honor of Leopold I., who patronized it liberally, it took the additional name of *Cæsareo-Leopoldina;* and, since 1808, has had its chief seat at Bonn. Its valuable memoirs have appeared at irregular intervals under the title of *Miscellanea, Ephemerides*, and *Acta*. The *Académie de Médecine* of Paris was founded in 1820, for the prosecution of researches into all matters connected with the public health, such as epidemics, &c. The Surgical A. of Paris (whose functions have partly descended to the preceding) was founded in 1731. It was dissolved during the troubles of the first revolution. The Vienna A. of Surgery, established in 1783, is, properly speaking, a college.—5. FINE ARTS. The academies of painting and sculpture of St. Petersburg (connected with the Imperial A.) and Paris, are institutions for the education of pupils. The French *Académie des Beaux Arts* is a branch of the Institut (q.v.). The *Royal A. of Arts* in London was founded in 1768, for the promotion of the arts of design, painting, sculpture, &c. The number of academicians is 40. Connected with it is a school, with professors selected from among the academicians. The annual exhibition of the academy is open to all artists of merit. The *Royal Scottish A.* of Painting, Sculpture, and Architecture, was founded at Edinburgh in 1826, and received a royal charter in 1838. The number of academicians is 30; the general plan of the institution is similar to that of the London A. Similar to these also is the *Royal Hibernian A.* incorporated at Dublin in 1803. Numerous academies of the fine arts have been established in Italy—at Rome, Milan, Turin, Florence, Mantua, and Modena; as also at Madrid, Vienna, and Stockholm.

Many learned Societies differ from Academies only in name; such are The Royal Society of London, The British Association, The Washington Smithsonian Institution, &c., &c. See SOCIETIES.

ACADIE. See NOVA SCOTIA.

ACALE'PHÆ (Gr. 'nettles'), a term given by Aristotle to the Jelly-fishes or *Medusidæ* and their allies, in allusion to their stinging propensities. As in all other *Cœlenterate* animals, the urticating or stinging properties of such forms reside in the *cnidæ* or 'thread cells,' with which the tissues of their bodies are provided. These cells consist each of a sac or vesicle, containing fluid and a thread-like filament; the cell rupturing on being pressed or otherwise irritated, and emitting the thread and fluid. The former must act mechanically as a kind of dart; whilst the fluid acts chemically in producing irritating effects by its injection into the wound made by the filament. Some of the forms allied to the Jelly-fishes, and included under the old term Acalephæ—such as the *Physaliæ* or 'Portuguese men-of-war'—sting, by means of these cells, so severely that the effects on the human subject may persist for days or even weeks.

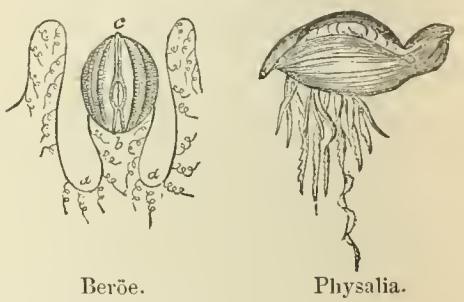


A B

Medusa.

A, under surface, showing the mouth in the center, surrounded by the tentacula, and the ovarial chambers exterior to the origins of these; B, side-view, showing the tentacula hanging down in their natural position.

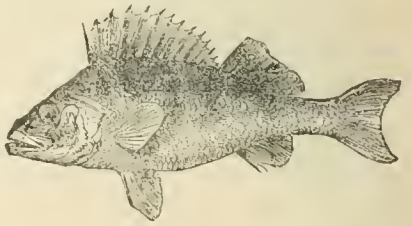
In modern zoology, it may be noted, the term *Acalephæ* is now generally abolished. Formerly, this name was given to a group of Cœlenterate or Radiate animals, represented by the true *Medusidæ* or Jelly-fishes, and also by the *Lucernarida;* whilst older systems still, included in the group Acalephæ other oceanic organisms (*Calycophoridæ* and *Physophoridæ*), among which were the 'Portuguese man-of-war,' &c., and also the order *Ctenophora* (*Beroë, Cestum Veneris*, &c.), this latter order being now removed to a class superior to that of the Jelly-fishes and their allies. In modern systems of zoological classification, therefore, the old division of the Acalephæ is represented by at least two distinct orders of Cœlenterate animals. Thus the true Jelly-fishes or Medusidæ constitute the sub-class *Discophora*, ('disc-bearers'), and are distinguished by being free-swimming forms; the body in each consisting of a single organism, and being composed of a clear gelatinous swimming-bell or *nectocalyx*, from the roof of which the mouth is suspended; whilst throughout the substance of the bell-shaped body a system of *radial* and *circular* canals is distributed. These organisms, familiar to every seaside visitor, swim gracefully by contracting and expanding their clear jelly-like bodies; the aperture or mouth of the bell being generally closed or protected by a membrane named the *veil* or *velum*. Around the margin of the bell *auditory sacs* or hearing-organs are found; and pigment-spots or *ocelli* existing in the same situation, are believed to represent rudimentary eyes. Tentacles or organs of touch are also developed, and may depend from the margins of the bell. The true Medusidæ are named *Gymnophthalmata*, or 'naked-eyed' forms, to distinguish them from the *Lucernarida*, in which the eyes are protected by a kind of 'hood.' The Lucernarida accordingly are named by some zoologists, *Steganophthalmata* ('covered-eyed') Medusæ; whilst, more properly, the latter term is limited to Medusa-like forms included within that order. Amongst some of these 'hidden-eyed' Medusæ some very peculiar reproductive phases occur. Thus the egg of a Medusa may be seen to give rise to a little rooted organism, like a little *Hydra* (q. v.) in form, and which is named the *Hydra-tuba*. This latter organism then becomes divided transversely into a number of saucer-like segments, and is named the *Strobila* (sars). Whilst, ultimately, the segments become detached; each swimming away as a young Medusa, and being known as an *Ephyra*. These animals feed on minute crustacea, fishes, and the like; and very many exhibit a phosphorescent light, or animal luminosity.



Beröe. Physalia.

a a, tentacula; *b*, mouth; *c*, termination of intestine.

ACANTHOPTERY'GII, in Zoology, one of the two primary divisions of the *Osseous Fishes* in the system of Cuvier, distinguished by having spinous rays in the first portion of the dorsal fin, or in the first dorsal, if there are two. The name is derived from the Greek *akantha*, a thorn, and *pteryx*, a wing. The A. are



Example of a Fish (Perch) belonging to the division *Acanthopterygii*.

divided by Cuvier into fifteen families, among which are *Percidæ* (Perch, Bass, &c.), *Triglidæ* (Gurnard, Flying-fish, &c.), and *Scomberidæ* (Mackerel, Tunny, &c.).

ACA'NTHUS, the name given by the Greeks and Romans to the plants sometimes called Brancursine, of which it is also the botanical generic name. *A. mollis* and *A. spinosa*, natives of the south of Europe, are the species best known. The twining habit of the plants, their large white flowers, and, above all, the

A. spinosus, natural. Ornamental A. Leaf.

beautiful form of their dark and shining leaves, have led to their artistical application, especially in the capitals of Corinthian columns. See ORDERS OF ARCHITECTURE. Roman drinking-cups have been found whose handles are twined with A. leaves. —The ancients made the *A. mollis* chiefly their pattern; but in Gothic ornaments, more use is made of the smaller and less beautiful leaves of *A. spinosa*.

The genus A. is the type of the natural order ACANTHACEÆ, which contains nearly 1400 known species. They are herbaceous plants or shrubs, chiefly tropical; dicotyledonous. The greater part are mere weeds, but the genera *Justicia*, *Aphelandra*, and *Ruellia* contain some of our finest hot-house flowers. The leaves are opposite, rarely in fours, simple; two or three bracts, which are often large and leafy, accompany each flower. The calyx is persistent, usually 5-leaved, occasionally cut into many pieces, sometimes obsolete. The corolla is monopetalous, hypogynous, usually irregular, deciduous. The stamens are generally two; sometimes four, didynamous, the shorter ones sometimes sterile; the anthers 1-2-celled, opening lengthwise. The disk is glandular; the ovary free, 2-celled, with two or more ovules in each cell; placentæ adhering in the axis; style one. The fruit is a capsule bursting elastically with two valves, the dissepiment also separating into two pieces through the axis. The seeds are roundish, hanging by hard, usually hooked processes of the placenta; testa loose; albumen wanting; embryo curved or straight; cotyledons large; radicle subcylindrical, next the hilum. —Some of the *Acanthaceæ* are used in their native countries as medicines. A valuable deep-blue dye, called Room, is obtained in Assam from a species of *Ruellia*.

ACAPU'LCO, the best harbor belonging to Mexico in the Pacific, and a place of considerable commercial importance; situated in lat. 16° 50′ N.; long. 99° 48′ W. The harbor is so well sheltered that deeply laden vessels may lie safely at anchor close to the granite rocks. The town, defended by Fort Diego, on an eminence, has a very unhealthy site, and is one of the places most frequently visited by cholera, which proves especially fatal to new settlers. The population is composed of pearl-fishers, sailors and husbandmen. The chief exports are cochineal, indigo, cocoa, wool and skins; the imports are cottons, silks, spices and hardware. Pop. about 5000.

ACARNA'NIA, a country of ancient Greece, separated from Epirus on the north by the Ambracian Gulf, now the Gulf of Arta; from Ætolia on the east by the river Achelóus; and washed south and west by the Ionian Sea. Along with Ætolia, it forms one of the *nomes* or departments of the modern kingdom of Greece. The western part of A.—from the mouth of the Achelóus or Aspropotamo to Cape Actium in the north-west—is occupied by a mass of rocky and thickly-wooded mountains, rising abruptly from the indented coast, and culminating in the summit of Berganti. A considerable part of A. is overgrown with wood—a rare feature in modern Greece. There is no town of importance in the whole district, though naturally it is not destitute of resources.

A'CARUS, a genus of *Arachnides* (q.v.), of the order *Trachearia*, the type of a tribe called *Acarides*, which corresponds with the genus Acarus as defined by Linnæus. The species of the Acarides are very numerous. All of them are small; many microscopical. Some are familiar to us under the names of Mites (q.v.), Ticks (q.v.), &c. Some live upon the juices of plants; some in the dung of animals; many species are found in the vegetable and animal substances used for human food, especially when these have been kept for a considerable time, as in cheese, flour, sugar, on the surface of preserves, of dried fruits, &c.; others are parasites upon the bodies of animals, particularly in diseased conditions, as in cases of itch. A minute species has been detected in the follicles of the human skin, and others even in the human brain and eyes. Some insects, particularly beetles, are often covered with Acarides. A species (*Trombidium holosericeum*), common in gardens in spring, is remarkable for its blood-red color, and a nearly allied but much larger species (*T. tinctorum*), found in the East Indies, yields a fine dye. A Persian species (*Argas Persicus*) is poisonous, and causes sores. The bite of many species is annoying, as of the common Harvest-bug (*Leptus autumnalis*). The Acarides have eyes. Some of them have the mouth furnished with mandibles, others with a sucker. They are oviparous, and extremely prolific. They have generally eight legs; but, when young, many of them have only six, and in some genera the additional pair seems never to be acquired. A few are aquatic, and have legs covered with hairs to adapt them for swimming.

Acarus (Mite): highly magnified.

A'CARUS FOLLICULO'RUM is the most generally accepted name for a microscopic parasite residing in the sebaceous sacs and hair-follicles of the human skin. It is also known as the *Demodex folliculorum*, the generic name being derived from the Greek words *demos*, lard, and *dex*, a boring worm. It was first described by Dr. Simon of Berlin in 1842, under the title of *Acarus folliculorum*, which was suggested by the eminent zoologist, Erichsen of Berlin. In the following year, Mr. Erasmus Wilson made it the subject of an elaborate memoir which appeared in the *Philosophical Transactions*, in which, as there are doubts as to its exact zoological position, he simply terms it the *Entozoon folliculorum*. According to Professor Owen, who gave it the name of *Demodex*, it represents the lowest form of the class *Arachnida*, and makes a transition from the *annelids* to the higher *articulata*. As regards the size and form of these animals, there is much variety; they pass their whole existence in the fatty matter of the sebaceous cells, moulting repeatedly during their growth, and being finally expelled from the follicles with the secretion of these organs. Their presence has no reference, according to Mr. Wilson, to disease of the skin or of the follicles. They are met with in almost every person, but are most numerous in those in whom the skin is torpid, in invalids, and in the sick. They vary in length from $\frac{1}{3}\frac{1}{0}$th to $\frac{1}{1}\frac{1}{0}\frac{1}{0}$th of an inch, and the accompanying figure represents the magnified parasite. Their number is various; in some persons not more than two or three can be found in a follicle, while in others Mr. Wilson has seen upwards of fifteen. The head is always directed inwards, and when a number are present they seem to be collected into a conical bundle, the larger end of the cone being formed by their heads. The situation in which they are most commonly found is the skin of the face, and particularly that of the nose, but they have also been met with in the follicles of the back, the breast, and the abdomen. As far as we know, they are never found on the limbs.

A reference to the figure shows that the animal possesses eight thoracic appendages (*c*, *c*) of the simplest and most rudimentary kind, each of which is terminated by three short setæ. The integument of the abdomen is very finely annulated. The mouth is suctorial or proboscidiform, consisting of two small spine-shaped maxillæ (*b*), and an extensive labium capable of being elongated or retracted; it is provided on each side with a short, thick, maxillary palp (*a*, *a*), consisting of two joints with a narrow, triangular labrum above. The sexes are distinct, but the differences between the male and female are not well recognised. Ova are frequently seen, both in the body of the female and in detached discharged masses. Any of our readers may readily observe their own *acari* by collecting between two pieces of thin glass the expressed fatty matter from a nasal follicle, and moistening it with a drop of olive oil. Very similar if not identical animals have been found in the contents of the pustules of mangy dogs.

Acarus folliculorum, magnified.

ACATHI'STUS, a hymn sung in the ancient Greek Church in honor of the Virgin.

ACAYUCAN, a town of Mexico, a military port, about 100 miles south-south-east of Vera Cruz, having trade in cochineal. Pop. 6000.

ACCELERA'NDO (Ital.), in Music, with gradually increasing velocity of movement.

ACCELERATED MOTION, in mechanics, is motion in which the velocity is continually increasing. When the increments of velocity are equal in equal times, the motion is said to be *uniformly* accelerated. The best example of such a motion is that of a falling body. It is found that near the earth's surface a

body, descending from a state of rest, falls $16\frac{1}{12}$ feet in the first second. Now, a little consideration will show that at the end of the first second, it is moving at the rate of $32\frac{2}{3}$ feet per second. For, since the velocity was nothing at first and increased uniformly, $16\frac{1}{12}$ feet must have been the mean velocity, i.e., the velocity at the middle of the time; and therefore the velocity at the end must be double, or $32\frac{2}{3}$ feet; $32\frac{1}{6}$ feet is thus the measure of the accelerative force of gravity. At the end of the second and third seconds, the velocity is found to be doubled, trebled, &c., or $64\frac{1}{3}$, $96\frac{1}{2}$ feet.

ACCELERATION OF THE MOON. It was first observed by Halley, that the time of the moon's revolution round the earth has for several thousand years been decreasing, or her velocity has been increasing. This phenomenon remained for a considerable time inexplicable; at last, Laplace, in 1787, discovered the cause in the varying eccentricity of the earth's orbit, which has been on the decrease since about 12,000 years B.C. Since that time, the moon has been gradually coming nearer to the earth; and this will go on till 36,900 after Christ, when the eccentricity of the earth's orbit will begin again to increase.—ACCELERATION OF THE FIXED STARS is the excess of a mean solar day over a sidereal day; i.e., a day measured by the transits of a star over the meridian; the excess is about 3′ $56\frac{1}{2}$″ sidereal time.

A'CCENT, in Grammar, is a special stress of voice laid upon one syllable of a word, by which it is made more prominent than the rest; the accented syllable is sometimes indicated by a mark, as *awa'y, fo'rtify*. Every word in English has one syllable thus brought markedly into notice. When the accented syllable falls near the end of a long word, there may be one or more secondary accents, as in *re'comme'nd, subo'rdina"tion*. A. depends upon force of vocal or articulative effort, not upon highness or lowness of pitch. Variations of pitch produce what elocutionists call *inflection*. It is the confounding of A. with a rise of tone, and the contrasting of it with a sinking of tone, that has produced so much confusion on this subject, especially as regards the accents of the ancients. In English, many nouns are converted into verbs simply by transposing the A., as *o'bject—obje'ct*. It is A., and not quantity, that determines English measures or metres in versification. No rule can be given as to what syllable of a word shall be accented. There seems to be an increasing tendency in our language to throw the A. towards the beginning of words. In the Finnish language, the A. is said to be invariably on the first syllable.—*Emphasis* is to sentences what A. is to words; it is a stress laid upon one word of a sentence to make it prominent. If A. is syllabic emphasis, emphasis is logical A.

A'CCENT, in Music, is analogous with A. in language. It consists of a stress or emphasis given to certain notes or parts of bars in a composition, and may be divided into two kinds—grammatical, and rhetorical or æsthetic. The first kind of A. is perfectly regular in its occurrence—always falling on the first part of a bar. It is true that long or compound measures of time have, besides the chief A. in every bar, some subordinate accents; but these are only slightly marked. As a general rule, we may observe, that the grammatical or regular A. must not be exaggerated. It should be marked only so far as to give a clear sense of rhythm. The æsthetical A. is irregular, and depends on taste and feeling, exactly as does the A. and emphasis used in oratory. In vocal music well adapted to words, the words serve as a guide to the right use of æsthetical accents.

ACCE'PTANCE is the act whereby the drawee engages to pay a bill according to the terms of the A. It may be said to consist in the drawee writing the word 'accepted' on the bill and subscribing his name; or writing, as has been decided in England, the word 'accepted' only (although it is not so in Scotland, where the act of A. must be shown by the actual signature of the acceptor); or merely subscribing his name at the bottom or across the bill. But there are other and various forms of A., in England and Scotland, as to which, and generally, see BILL OF EXCHANGE. In common parlance, the accepted bill is called *an A.*, and the drawee, or party who engages to pay the bill, is called the *acceptor*. See AM. SUPP.

A. is also a term in the Scotch law of contracts. A mutual contract may commence by an offer, and be completed by A. The offer is viewed as an obligation provisional on the A., but may, before A., be recalled, on condition of making reparation for any loss fairly occasioned by the offer. The offer may be verbal, by letter, or even tacit, as when goods are sent without an order, or contrary to order, in which case, acquiescence is A. The A. may be either tacit or express. The word is not a technical one in the law of England, but the matter to which it relates in that system will be found under CONTRACT.

A'CCESSARY or ACCESSORY. In the criminal law of England, an A. is a person who is not the chief actor in a felony, nor even present at its perpetration, but who is in some way concerned, either *before* or *after* the fact committed. An A. *before* the fact is one who procures or counsels another to commit a crime, he himself being absent. An A. *after* the fact is a person, who, knowing a felony to have been committed, receives, protects, or assists the felon. In sudden and unpremeditated offences, there can be no accessaries *before* the fact; and in all crimes under the degree of *felony* there are no accessaries at all, either before or after the fact, but all persons concerned therein are held to be equally guilty as principals.

There are no accessaries in treason, but all are principals, on account of the heinousness of the crime.

In the Scotch law, 'art and part' in the indictment, or formal accusation, is the phrase by which accession to a crime is signified; and it applies to all offences against the criminal law, there being, according to the practice of the Scotch courts, no distinction in this respect between felonies, properly so called, and misdemeanors. See ACCESSORY in AM. SUPP.

ACCESSORY ACTIONS, in the practice of the Scotch law, are those which are, in some degree, subservient or ancillary to other actions. For example, actions for reviving a cause, or prosecuting it against the heir of a deceased defendant, or for restoring lost deeds or other documents, are of the nature of A. A.

ACCESSORY OBLIGATION is a technical term in the Scotch law signifying an obligation annexed to another obligation which is antecedent or primary. Thus, an obligation for the regular payment of interest, or by way of further security, is an A. O.

ACCE'SSION. In the law both of England and Scotland, property may be acquired by A., and this A. may be either natural or artificial. The young of cattle and other animals, for example, belong to the person who is the owner of the mother, and the fruits and produce of the earth to the proprietor of the soil; and for the same reason, the gradual addition to lands on the bank of a river belongs to the proprietor of the land receiving the addition. These are instances of *natural* A. Property, again, is said to be acquired by *artificial* A. when it is the result of human industry; thus trees planted, or buildings erected, on the ground of another, belong to the owner of the ground itself, and not to the planter or builder; and so with regard to the conversion of wood or metal, which, in whatever form, remain the property of the original owner.

ACCESSION TO THE THRONE signifies the commencement of the sovereign's reign.

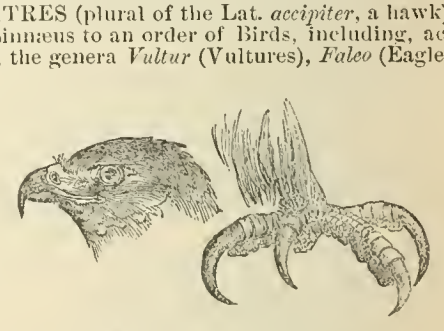
ACCESSION, Deed of. In the practice of Scotch conveyancing, this is a deed by which the creditors of a bankrupt or insolvent debtor approve of a trust-settlement executed by the debtor for the general behoof, and consent to the arrangement proposed. The corresponding deed in English practice is a deed of trust for creditors, or, under the Bankrupt Law Consolidation Act, 12 and 13 Vict, c. 106, a deed of arrangement for creditors.

ACCIDENTAL COLORS. See LIGHT.

A'CCIDENTS, in Mus., occasional sharps, flats, and naturals placed before notes in the course of a piece.

ACCIDENTS, in Log., are opposed to Essentials, or to substance. An Accident is a property of an object which may be modified, or even be altogether abstracted, without the object ceasing to be essentially what it is. But many of the distinctions made by the older philosophers between accidental and essential are fallacious.

ACCI'PITRES (plural of the Lat. *accipiter*, a hawk), the name given by Linnæus to an order of Birds, including, according to his system, the genera *Vultur* (Vultures), *Falco* (Eagles, Falcons,



Head and Foot of Golden Eagle.

Hawks, &c.), *Strix* (Owls), and *Lanius* (Shrikes), and principally distinguished by a hooked bill, short strong feet, and sharp hooked claws. The name has not generally been adopted by subsequent ornithologists, but the order, as a truly natural one, has been retained under the names *Rapaces, Raptores*, &c.; the Shrikes, however, being generally excluded from it.

ACCLI'MATIZE, to accustom an animal or plant to a climate not natural to it. The process, of course, varies widely, accord-

ing to the amount of difference between the old and the new climate. In cases where the difference is extreme, important changes take place in the constitution, and are often attended with certain diseases described as 'diseases of acclimatization.' Thus, Europeans settling in tropical parts, are liable to disease of the liver, while natives of tropical lands, when resident in England, are exposed to pulmonary disease. The power of bearing changes of climate is greatest in the Anglo-German race, and usually bears a direct ratio to the intellectuality of a race. Civilized people display greater ingenuity and strength of will than savages in accommodating themselves to changes of climate, by making careful corresponding changes in their mode of life. Ulloa and Humboldt assert that persons of and above middle age best stand transportation to tropical climates. Among animals, we find great powers of adaptation to various climates in the horse, dog, cat, rat, &c.; and among plants, in the various cereals, in potatoes, and several weeds common to almost all climates; but there seems to be a limit to the power, at least as seen in the individual. To A. beyond a certain point is the work of some few generations. Almost all the domestic animals now commonly spread over Europe, and even in high northern latitudes, were originally natives of warm climates. The change produced by the acclimatizing of animals may be either an improvement or a deterioration; of the latter, we have an instance in the Shetland pony; of the former, we see an example in the merino sheep of Spain. As an instance of want of the faculty of being acclimatized, the reindeer may serve. Removed from the cold north to the fertile valleys of a temperate clime, the reindeer degenerates and dies. On the other hand, the horse, whose native land is the East, arrives at its highest development in England; and the Syrian sheep, brought northwards as far as Spain, becomes remarkable for its fine fleece. Spain, on the whole, has a climate much warmer than that of Silesia and Pomerania; and yet the merino sheep, bred in these countries, have become superior to their ancestors imported from Spain. This is a proof that art may do very much in modifying the influences of climate. Silk-worms, brought from China first into Italy, have been acclimatized not only in the south of France, but even on the coast of the Baltic. Recently, attempts have been made to A. in France the llama, the vicugna, and the alpaca of Peru, and with some success in the last instance, as alpacas have been found to thrive pretty well in the Pyrenees. It has been very generally believed that plants may become gradually inured to a climate so different from that to which they have been accustomed, that if they had been at once transferred to it, they would have perished. On the other hand, it is maintained that each species of plant, has certain limits of temperature within which it will succeed, and that alleged instances of acclimatizing have been merely instances of plants formerly supposed to be more delicate than they really were. But as it is certain that different varieties of the same species are often more and less hardy, it would seem that in the production of new varieties by seed, there is still a prospect in the acclimatizing, to a certain extent, of species of which the existing varieties are too delicate to grow well in the open air. Of late years numerous Acclimatization Societies have been formed, the best known being the Paris *Société d'Acclimatation*.

ACCOLA'DE, the term applied to the ceromony with which a knight was admitted into the order of chivalry. The grand-master, in receiving the neophyte, embraced him by folding the arms round the neck (*ad collum*).—In music, the A. is the couplet uniting several staves, as in part-music or pianoforte-music.

ACCO'MPANIMENT, in Music, is the assisting or aiding of a solo part by other parts, which may consist of a whole orchestra, or a single instrument, or even subservient vocal parts. It serves to elevate and beautify the solo part, and is subject to certain rules for composition as well as for performance. It must be subservient, and therefore should not predominate, but merely assist to place the solo part in its brightest light. In this point of view, modern composers have often erred by making the A. too full, and causing it to stand out so independent and engrossing, that the solo part is often, as it were, entirely lost. This abuse takes place mostly in vocal music; and not only is the effect destroyed, but the vocal organ of the singer is frequently ruined. Were it not too true that this bad practice has become the fashion, it would be difficult to believe that a composer would lend himself to it. In proper A., after faithfully fulfilling its duty to the solo part, there always remains opportunity enough for display in the ritornells and symphonies. The Italians in their best period were celebrated for the simplicity and effectiveness of their A. Now, they have entirely lost this claim. In A., the composer must keep three principal points in view—namely, harmony, rhythmical figure, and suitable choice of instrumentation, in respect to number and character of tone; but all must be subservient to the ruling character of the solo part. Right or proper harmony is, or should be, easily found by every experienced composer. It is, as it were, born at the same time with the melody, and only requires to be here and there adjusted with care. When this is not the case, there arises a double character, which interrupts and totally destroys the melody. The figure of the A. should be chosen so as to be conformable to the solo part, having to express what the solo part cannot be expected to do, and may also, by a succession of secondary ideas, render clear and certain the individuality of the principal solo part, such as the blustering of the poltroon, the daring of the courageous, or the fear of the timid. The necessity of a judicious choice of instrumentation for the proper support of the solo part is evident. The A. should, above all things, by its certainty and firmness, prevent wavering. Good A. is as creditable as solo playing; and all qualified orchestras view it as of great importance.—The word also means the art of playing harmony from a figured bass; this, though more in use formerly, is still a necessary study for the A. of recitative. See FIGURED BASS.

ACCO'RDION, a simple musical instrument, but little better than a toy, which produces its tones by the vibration of metallic tongues of various sizes, while wind is supplied by the action of bellows. The *concertina* and the *harmonium* are superior instruments, constructed on the same principle—the action of a gust of air on metallic tongues.

A'CCRINGTON, a manufacturing town of England, in Lancashire, which has recently increased much in size and importance, lies in a deep valley, surrounded by hills, about 34 miles north-east of Liverpool, and 13 miles east of Preston, on the banks of the Hindburn. Pop., including Old A. (1871), 21,788; (1881), 31,435. Christ Church is a fine Gothic building, erected in 1838. The inhabitants are mostly employed in cotton factories, weaving, and calico-printing. A. is considered the center of the cotton-printing business. There are coal-mines in the neighborhood, in which many of the inhabitants find employment.—OLD A. is an adjacent chapelry, also with cotton manufactures.

ACCUM, FREDERICK, a native of Westphalia, came to London in 1803. He is known in this country chiefly on account of his work, *A Practical Treatise on Gas-light*, which was useful when that method of illumination was being introduced in all the large towns of England. It was translated into several languages, and became very popular. Subsequently, he wrote a book upon practical chemistry, which was well received, and one on the adulteration of food. Ultimately he became professor in an institution in Berlin, where he died in 1838.

ACCUSATIVE CASE. See DECLENSION.

ACE'PHALA. See MOLLUSCA.

A'CER and ACERACE.E. See MAPLE.

ACE'RRA (anc. *Acerræ*), a town in South Italy, in the province of Caserta, nine miles north-east of Naples, with which it is connected by railway. It was once fortified, but the walls are now crumbling into ruins. It has a cathedral and seminary. The country around is fertile, but extremely unhealthy, being afflicted with malaria, caused partly by the sluggish artificial channels called the Regi Lagni, the representatives of the *Clanius non æquus Acerris* of Virgil; and partly by the flax-grounds, where the stalks are left to macerate. Pop. nearly 12,000.

ACETAL ($C_{12}H_{14}O_4$) is a colorless liquid, of an agreeable odor, and a flavor said to resemble that of the hazel-nut. It is one of the products of the slow oxidation of alcohol under the influence of finely divided platinum, or of chlorine, or of dilute sulphuric acid and peroxide of manganese. Its specific gravity is 0·821, and it boils at 221°. It yields various reactions and products of interest in organic chemistry.

ACE'TIC ACID, the sour principle in vinegar, is the most common of the vegetable acids. If alcohol, diluted with water, be mixed with a ferment, such as yeast, and exposed to the air at, or a little above, its ordinary temperature, it is rapidly converted into vinegar or A. A. The change is accompanied by the absorption of oxygen, 2 atoms of which combine with as many of hydrogen to form water, whilst other 2 take the place of the hydrogen which has become water, so that A. A. is produced from alcohol by the substitution of 2 atoms of oxygen for 2 of hydrogen. Thus alcohol is $C_4H_6O_2$. If we take from this 2 atoms of hydrogen, and add two of oxygen, it becomes $C_4H_4O_4$. But from the mode in which A. A. acts when it combines with bases, it is certain that one of the equivalents of hydrogen and one of oxygen are united as water, so that the formula of A. A. is $C_4H_3O_3 + HO$. A striking experiment may be made illustrating the mode in which alcohol is converted into A. A. If slightly diluted alcohol be dropped upon *platinum-black*, the oxygen condensed in that substance acts with great energy on the spirit, and A. A. is evolved in vapor. Here the whole office of the platinum is to determine the oxygen of the air, and the hydrogen of the alcohol to unite. In the commercial processes for manufacturing vinegar, some vegetable substance containing nitrogen (one of the albuminous principles) takes the place of the platinum-black, and determines the same

change. A. A. is not known in the anhydrous form. In its most concentrated state it contains an equivalent of water, $C_4H_3O_3 + HO$. When it combines with metallic oxides, they take the place of the water; acetate of soda, for example, consisting of anhydrous soda and anhydrous A. A., $NaO, C_4H_3O_3$. The salts of A. A., called A'CETATES, are numerous and important in the arts. The most important is acetate or sugar of lead. See LEAD. For the commercial processes of manufacturing A. A., see VINEGAR, and ACETIFICATION.

ACETIFICA'TION. Since the article ACETIC ACID was originally written, a total new view has been adopted regarding the process by which wine, beer, cider, and alcoholic fluids generally become converted into acetic acid, when they are exposed to the action of the air, and especially in hot weather. The views held by Liebig regarding the part that wood-shavings, sand, ash, &c. play in condensing oxygen, and transmitting it to the alcohol, are now supplanted by those of Pasteur, who maintains that the true acetifying matter is a very minute mycoderma—a special vegetable organized being. It is impossible to conceive a more simple form of vegetation, consisting of extremely minute spores arranged in chains; each spore having a mean diameter not exceeding $\frac{1}{1700}$th of an inch, and the length being about twice as great. The rapidity of the development of these spores, under favorable circumstances, is almost inconceivable; and the power which they possess in fixing the oxygen of the air, and of transmitting it to the alcohol, and of establishing an incomplete combustion of the latter, is no less wonderful. A surface of a square yard covered with this plant, is able, in the course of 24 hours, to fix the oxygen of more than 1000 quarts of air. The temperature of the surface of the fluid at which this slow combustion is proceeding is considerably raised, and often remains for several days at 21° or 25° above that of the surrounding air. The process which has just been described bears a very close analogy to the respiratory process, the oxygen of the air being in one case fixed by minute vegetable cells, and in the other by the blood corpuscles.

A'CETYL ($C_4H_3O_2$), known also under the names *Acetoxyl* and *Othyl*, is an organic radical not yet isolated, but which is supposed to exist in acetic acid and its derivatives; the rational formula for acetic acid being on this hypothesis $\left.\begin{matrix} C_4H_3O_2 \\ H \end{matrix}\right\} O_2$. See TYPES, CHEMICAL. The reason for assuming the existence of this radical in the acetic compounds is, that the formula to which it leads affords the simplest explanation of the most important reactions of acetic acid. Thus, when acetic acid is treated with a metallic oxide or hydrate, the basic atom of hydrogen is replaced by a metal, and an acetate of the metal $\left.\begin{matrix} C_4H_3O_2 \\ M \end{matrix}\right\} O_2$ is produced. The term *acetyl* was formerly applied to the radical C_4H_3, and the anhydrous acid was regarded as a binoxide of this radical. Hence the two other names for the subject of this article—the former suggested by Kolbe, and the latter (an abbreviation of oxygen-ethyl) by Williamson.

ACHA'IA, a small district in the north of the Peloponnesus, was divided into twelve little states; and was bounded E. by the Saronic Gulf; N. and W. by the Bay of Corinth; and S. by Arcadia and Elis. The land, rising gradually from the coast to the hills of the interior, was famed, in ancient times, for fertility in the produce of oil, wine, and fruits. When the Romans divided the whole of Greece into Macedonia and A., the latter included all Greece excepting Thessaly. In the modern kingdom of Greece, A. forms, along with Elis, a *nome* or department, in the extreme north-west of the Morea, and its chief town is Patras (q. v.). Excepting the west coast, the land is fertile, and produces corn, wine, and oil.—The ancient Achæans were, in a great measure, separated from the other people of Greece. Their twelve little towns, of which Ægium was the chief, formed a confederacy, which was dissolved in the Macedonian times; but was renewed in 280 B. C., and subsequently extended itself, under the name of the *Achæan League*, throughout Greece, until 146 B. C., when Grecian liberty fell under the power of Rome.

ACHALGA'NJ, a town of British India, in the south part of the chief commissionership of Oude, four miles north-east of the Ganges, in N. lat. 26° 25', and E. long. 80° 35'. Pop. 5000, of whom 500 are Mohammedans, and the rest Hindus.

ACHARD, FRANZ KARL, a meritorious naturalist and chemist, born April 28, 1754, in Berlin, chiefly distinguished himself by his improvements in the process of preparing sugar from beet-root. In these labors he was supported by the king of Prussia. The results of his experiments were acknowledged as partly successful in 1799 and 1800; but were not carried into extensive application until the king gave to A. a farm in Lower Lusatia, where he founded a model manufactory of beet-root sugar. Here, after six years of experiments, conducted with the aid of Neubeck, a medical man, A. found out the true method of extracting beet-sugar; and in 1812, when the factory had become a very profitable investment, the king annexed to it a school for teaching the process of manufacture. A. was called to Berlin as director of the physical class in the Academy of Sciences, and died April 20, 1821. He wrote, among other similar essays, one on the *European Manufacture of Sugar from Beet* (Leip. 1809).

ACHELO'US, now called ASPROPOTAMO (i. e. White River, from the cream-color of its waters), the largest river in Greece, rises in Mount Pindus, flows through the land of the Dolopians, divides Ætolia from Acarnania, and falls into the Ionian Sea. The extensive alluvial deposits at the mouth of this river have been observed from ancient times. It is said that the banks of the A. were anciently the haunt of lions.

ACHE'NIUM, ACHŒNIUM, or AKENIUM, a term now very frequently employed by botanists, to designate a dry, hard, one-seeded, indehiscent fruit, in which the integuments of the seed are closely applied to it, but distinct from it. Such are what are popularly called the *seeds* of borage, and other plants of the same natural order. They were termed nuts by Linnæus. Sometimes the achenia are aggregated upon a common receptacle, forming what is called an *etaerio*, as in the ranunculus, in which they are placed upon a dry receptacle, or in the strawberry, in which the receptacle is fleshy. Sometimes the aggregated achenia are enclosed within the fleshy tube of the calyx, as in the rose. The fruit of the *Compositæ* is also sometimes called an A.; but a different appellation (*cypsela*) has been given to it, because the tube of the calyx coheres with the fruit, the name A. being limited to *superior* fruits.

A'CHERON, the name given to several rivers by the ancients, always with reference to some peculiarity, such as black or bitter waters, or mephitic gases. The A. in Thesprotia, which flows through the lake Acherusia, and pours itself into the Ionian Sea; another river of the same name in Elis, now called Sacuto; and several streams in Egypt, were supposed to have some communication with the infernal world. According to Pausanias, Homer borrowed from the river in Thesprotia the name of his infernal A., which the later poets surrounded with many imaginary horrors. Other lakes besides that above mentioned, bore the name of Acherusia; e. g., the lake near Hermione in Argolis.

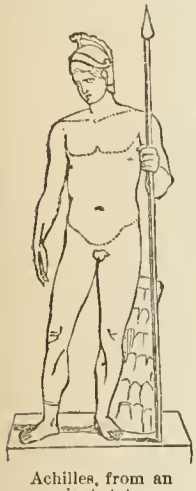
A'-CHEVA'L POSITION. When troops are arranged so that a river or highway passes through the center and forms a perpendicular to the front, they are said to be drawn up in A. P. Wellington's army at Waterloo was *à-cheval* on the road from Charleroi to Brussels. In cases where a river forms the perpendicular to the front, secure possession of a bridge is necessary; otherwise one half of the troops might be routed, while the remainder stood idle as spectators.

A'CHILL, or 'Eagle' Isle, off the west coast of Ireland, is reckoned within the county of Mayo. It is 15¼ miles long by 12½ miles broad, and has a very irregular coast-line, though its general shape is almost that of a right-angled triangle. It has a wild and desolate appearance; most of the surface is boggy; of the 35,000 acres which the island contains, not half a thousand are cultivated. There are three villages in A., and a number of hovels or huts scattered over its barren moors, sometimes in small clusters, forming hamlets, but so wretched as hardly to be fit for beasts. A. rises towards the north and west coast, where the mountains attain an elevation of 2000 feet. One of them, composed, like the rest of the island, wholly of mica-slate, presents, towards the sea, a sheer precipice from its peak to its base, a height of 2208 feet. There is a mission-station in the island, which forms an exception to the general wretchedness of the houses. It possesses, amongst other agencies of civilization, a printing-press. The population is gradually decreasing, from emigration and other causes; it amounted in 1881 to 6700.

ACHILLÆ'A, a genus of plants of the natural order *Compositæ* (q. v.), having small flowers (heads of flowers) disposed in corymbs, and the receptacle covered with chaffy scales (small bracteæ). The florets of the ray are female, and have a short, roundish tongue or lip; the florets of the disk are hermaphrodite, the tube of the corolla flatly compressed and two-winged; the involucre is imbricated.—The common YARROW or MILFOIL (*A. millefolium*) abounds in all parts of Europe and in some parts of North America—into which, however, it has perhaps been carried from Europe—growing in meadows, pastures, &c. It is about a foot in height: its leaves bipinnate, the pinnæ deeply divided, the segments narrow and crowded. It has white or rose-colored flowers. The leaves have a bitterish aromatic, somewhat austere taste, and little smell; the flowers have a strong aromatic smell, with an aromatic bitter taste, and contain an essential oil, a resin, bitter extractive, gum, several salts, and traces of sulphur. Both leaves and flowers are used in medicine as a powerful stimulant and tonic. The leaves were formerly much used for healing wounds, and are still so employed by the common people in the Highlands of Scotland and in some parts of

the continent. The expressed juice is a popular spring medicine in Germany. Yarrow is often sown along with grasses intended to form permanent pasture for sheep; and *A. moschata*, sometimes called MUSK MILFOIL, is cultivated as food for cattle in Switzerland. *A. moschata*, *A. atrata*, and *A. nana*—all natives of the Alps—are very aromatic, and bear the name of GENIPI or GENIPP. The inhabitants of the Alps value them very highly, and use them for making what is called *Swiss Tea*. They are very stimulating and tonic; as are also *A. setacea* and *A. nobilis*, both natives of Switzerland and other middle parts of Europe, and *A. ageratum*, a native of the south of Europe, used by the French as a vulnerary, and called *Herbe au Charpentier*.—SNEEZEWORT (*A. Ptarmica*) is a native of Britain and other parts of Europe, 1—3 feet high, with lanceolate leaves, and much larger flowers than the common Milfoil. It grows in meadows and damp places. The root, which is aromatic, is used as a substitute for *Pellitory of Spain* (q. v.), and the whole plant is pungent and provokes a flow of saliva.

ACHI'LLES, the hero of Homer's *Iliad*, was the son of King Peleus and Thetis, a sea-goddess, belonging to a line descended from Jove. Of his life before the Trojan war, and of his death after the fall of Troy, the poets after Homer first profess to give accounts. We are told that he was dipped in the river Styx by his mother, and was thus made invulnerable, except in the heel, by which he was held during the process; hence 'the heel of A.' became a proverbial phrase to denote any vulnerable point in a man's character. It had been prophesied at his birth that his life would be short; and, therefore, when the seer Calchas announced that without A. Troy could not be taken, his mother, to keep him from the dangers of the expedition, concealed him at the court of King Lycomedes, among whose daughters the boy lived disguised as a girl. But Ulysses discovered him by a stratagem. He offered to the young ladies a number of articles, some of feminine attire and others of arms; and the young warrior was betrayed by his choice, A., in the Greek campaign against Troy, appeared with fifty vessels manned by his followers, the Myrmidons; but remained sullen and inactive during a great part of the contest. When the city of Lyrnessus was taken, he had seized and carried away the beautiful Briseïs. A pestilence in the Greek camp being ascribed to the anger of Apollo, whose priest had been robbed of his daughter, Chryseïs, by Agamemnon; Agamemnon was compelled by the army to send Chryseïs back to her father. On this, he took away Briseïs from A., which greatly offended the latter. With this incident, the *Iliad* begins. Neither the splendid offers made by Agamemnon, nor the disasters of the Greeks, could afterwards move A. to take any part in the contest, until his friend Patroclus was slain by Hector. The hero then buckled on his armor, which had been made for him by Vulcan, and of which the shield is described at great length by Homer. The fortunes of the field were now suddenly changed in favor of the Greeks; and the vengeance of A. was not satiated until he had slain a great number of the Trojan heroes, and lastly, Hector, whose body he fastened to his chariot, and dragged into the Grecian camp. He then buried his friend Patroclus with great funereal honors. King Priam, the father of Hector, came by night to the tent of A., and prayed that the body of his son might be given back to the Trojans. A. consented; and with the burial of Hector the *Iliad* closes. We are told, that soon after the fall of Hector, A. made a contract of marriage with Polyxena, the daughter of the Trojan king, but was slain by her brother Paris, in the temple of Apollo, where the marriage should have been celebrated. According to other accounts, he was slain by Apollo, who assumed the likeness of Paris as a disguise. His ashes were placed in an urn, with those of his friend Patroclus, and were buried on the promontory of Sigeum, where, after the fall of Troy, the princess Polyxena, who had been made a prisoner, was offered as a propitiatory sacrifice.



Achilles, from an ancient statue.

ACHILLES' TENDON (*Tendo Achillis*), attaches the soleus and gastrocnemius muscles of the calf of the leg to the heel-bone. It is capable of resisting a force equal to a 1000 lbs. weight: and yet is frequently ruptured by the contraction of these muscles in sudden extention of the foot. The name was given with reference to the death of the Grecian hero Achilles by a wound in the heel. Ancient surgeons regarded wounds or serious bruises of the A. T. as fatal.

ACHIME'NES, a genus of plants of the natural order *Gesneraceæ* (q.v.), much cultivated in stoves and greenhouses for the beauty of their flowers. The species are numerous—natives of the warm parts of America.

A'CHORÉS are one of the forms of pustules—viz., that in which the pustules are very small, but have large inflamed bases. They are most common on the faces of children, and their secretion forms those large, thick, irregular scabs, resembling dried honey, which are so common on children's chins. They seem to be inflamed hair sacs or sebaceous follicles. Their treatment is the same as that for Impetigo (q.v.).

ACHROMA'TIC (without color), the name applied to lenses and telescopes through which objects are seen without false colors, or, in other words, free from that colored fringe which, in the old telescopes, surrounded the object, and diminished its distinctness. The white, or rather colorless ray of light is composed of several colored rays which have various degrees of refrangiblity. See REFRACTION, LIGHT, COLOR. When the direct ray is refracted, it divides itself into colored rays, deviating in various degrees from the right line of the primitive ray. The rays thus refracted by the convex object-glass do not meet exactly in one point, the focus of the glass, but rather at several points, so as to produce the various colors, red, blue, and yellow, which surround the object. Newton, misled by imperfect experiments, believed it impossible to find any remedy for this defect; but Euler, in 1747, expressed his conviction that the desired A. improvement was practicable, and this belief was confirmed by the researches of the Swedish mathematician Klingenstierna. The practical solution of the difficulty was reserved for John Dollond; though, when he obtained a patent for his A. telescope, a priority of invention was claimed for a gentleman of the name of Hall. Dollond succeeded in forming an A. object-glass by a combination of crown-glass and flint-glass, which follow one law as to their relative refractive powers, and another as to their powers of dispersing the colors. By uniting a convex lens of crown-glass with a concave one of flint-glass, in certain relative dimensions, a reunion of the colored rays may be effected, and the object will be seen without false colors. In the construction of A. telescopes, Dollond was followed by his son Peter, and also by the optician Ramsden. A further improvement was made by Fraunhofer of Munich, who succeeded in producing perfectly pure glass—a very difficult achievement in the case of flint glass. We owe an important improvement of the A. telescope to the Viennese optician Plössl, who has lately invented what he calls the dialytic telescope, in which the several kinds of glass composing the compound object-glass are not placed close together, but at regulated distances apart. This arrangement allows a shortening of the tube. See TELESCOPE.

A'CI REA'LÉ, a town of Sicily, in the district of Catania. It lies at the foot of Mount Etna, on the coast, where the small river Aci, flowing from Etna, enters the sea. The town is built of lava, is defended by a fortress, and contains (1881) 22,431 inhabitants, who are employed chiefly in the manufacture of linen and silk; it also carries on a not inconsiderable trade in flax and grain. Many of the edifices are very handsome. A. R. is famed for its mineral waters, and for the cave of Polyphemus and the grotto of Galatea in its vicinity.

A'CIDS. An acid is a chemical compound distinguished by the property of combining with bases in definite proportions to form salts (q.v.). The most striking characteristics of A. are a sour taste, and the property of reddening vegetable blues. They are also mostly oxidized bodies; and at one time oxygen was thought to be essential to an acid, as the name *oxygen* (the acid-producer) indicates. Subsequent experience has extended the definition. There is an important class of undoubted A. that contain no oxygen; and silex, or flint, which, being insoluble, neither tastes sour nor reddens litmus-paper, is held to be an acid because it combines with bases and forms compounds like acknowledged A. The oxygen A., which are by far the most numerous class, are formed of elements (sulphur, nitrogen, chromium, &c.), with two or more equivalents of oxygen. The elements that form the strongest A. with oxygen are the non-metallic, and most of them have more than one stage of acid oxidation. Thus sulphur, with two equivalents of oxygen, forms sulphurous acid, symbol SO_2; with three equivalents it forms sulphuric acid, symbol SO_3. Similarly, arsenic gives rise to arsenious acid (AsO_3) and arsenic acid (AsO_5). The higher stage of oxidation forms the stronger and more stable acid. All metals, except arsenic, that form A. with oxygen, have also, at a lower stage of oxidation, one or more oxides. To these oxygen A. must be added the organic A., composed either of carbon and oxygen, as oxalic acid (C_2O_3), or of these two along with hydrogen, as acetic acid ($C_4H_3O_3$) and formic acid (C_2HO_3). There are also A. found in animal fluids or resulting from their decomposition which contain nitrogen in addition to the three elements above named; such is uric acid ($C_{10}N_4H_4O_6$). The *hydrogen A.* are formed of hydrogen and a radical, either simple or compound. The most important of these, and the type of its class, is hydrochloric or muriatic acid (ClH); others are hydriodic (IH)

and hydrocyanic A. (NC_2H). As all A., however, even oxygen A., possess acid properties—i. e., combine with bases—only when in combination with water, a new view of the constitution of A. is beginning to prevail, which makes hydrogen the real acidifying element in all A. Thus, instead of considering, vitriol as a compound of sulphuric acid and water (SO_3+HO), the hydrated acid is held to be the real sulphuric acid, and its rational formula to be (SO_4H). It thus becomes analogous to hydrochloric acid (ClH). This view has not only the advantage of bringing all A. into one class, but makes the theory of their combination with bases and of their capacity of saturation uniform and simple. See CHEMISTRY.

ACKERMANN, RUDOLPH, a native of Saxony in Germany (b. 1764—d. 1834), came to London, where he opened a repository of the fine arts in the Strand, which succeeded well. He introduced the art of lithography into England, and was the originator of the 'Annuals' (q. v.), which he commenced by his *For-get-me-not*, published in 1823 and following years. Among his numerous illustrated publications may be mentioned his *Repository of Arts, Literature, and Fashions; Microcosm of London; Westminster Abbey.* English wood-engraving, water-proofing, and gas-lighting were greatly promoted by A.

A'COLYTES, a name occurring first about the 3d c., and applied to functionaries who assisted the bishops and priests in the performance of religious rites, lighting the candles, presenting the wine and water at the communion, &c. They were considered as in holy orders, and ranked next to sub-deacons. These services have, since the 7th c., been performed by laymen and boys, who are improperly called A.; but in the Romish Church, aspirants to the priesthood are still at one stage consecrated as A. See ORDERS, HOLY.

ACONCAGUA, the highest peak of the Andes (q. v.) rising to a height of 23,910 feet. A., which is not, as often asserted, a volcano, is about 100 miles E.N.E. of Valparaiso, on the frontier of Chili and the Argentine Republic.

A'CONITE (*Aconitum*), a genus of plants of the natural order *Ranunculaceæ* (q. v.), having five petaloid sepals, of which the upper one is helmet-shaped, and two hammer-headed petals concealed within the helmet-shaped sepal. The fruit consists of 3—5 follicles. *A. Napellus*, the common WOLF'S-BANE or MONK'S-HOOD, often cultivated in flower-gardens for the sake of its erect

Monk's-hood (*Aconitum Napellus*)
a, fruit; *b*, root.

racemes of blue flowers, is a somewhat doubtful native of England, but common in some parts of Europe. The roots are fusiform and clustered. The root and whole plant are very poisonous, containing an alkaloid, called *Aconita*, or *Aconitine*, one of the most virulent of all known poisons; but an extract of the leaves is a valuable medicine, administered in small doses for nervous and other diseases. An A., sometimes called *A. Stoerckianum*, but generally regarded as a variety of *A. Cammarum* (also known as *A. paniculatum*), was brought into great repute on the continent during last century by Dr. Stoerck, an Austrian imperial physician, and is still much cultivated for medicinal use. The same properties seem in greater or less degree to belong to a number, if not to all, of the species of this genus, and they contain the same alkaloid. The virulent *bikh* poison of India, equally fatal in its effects whether introduced into wounds or taken into the stomach, is prepared from the roots of several species. The *A. Ferox* of Nepaul, from which much of it is obtained, has been identified by Drs. Hooker and Thomson with *A. Napellus*. Two other Himalayan species, *A. palmatum* and *A. luridum*, are equally employed in its preparation. *A. album*, or white-flowered monk's-hood, a native of the Levant, and *A. lycoctonum*, yellow-flowered monk's-hood, or wolf's-bane, a native of the Alps, are not unfrequent in our flower-gardens.

ACORN-SHELL. See BALANUS.

A'CORUS, a genus of plants of the natural order *Aroideæ* (see ARUM), or, according to other botanists, of the natural order *Orontiaceæ*, which is regarded as a connecting-link between *Aroideæ* and *Junceæ*. The plants of this genus have a leaf-like scape, which bears upon its side a dense, cylindrical, greenish spike of flowers, with 6-partite herbaceous perianth and six stamina in each flower. To this genus belongs the SWEET FLAG (*A. calamus*) which was long ago brought from Asia, and in the 15th c. was planted in the gardens of princes and rich men, but has now become naturalized in England, Germany, &c., growing in marshes and ditches. Its root (rhizome) is perennial, divided into long joints about the thickness of the thumb, has a bitterish acrid taste, and is very aromatic. It is a powerful medicine of transient tonic effect, occasionally used, especially in cases of weak digestion. In many places of the continent it is to be found in every confectioner's, cut into slices, and prepared with sugar. It is also used to correct the empyreumatic odor of spirits, and to give them a peculiar flavor. It is called *Calamus Root*. In Britain it is chiefly employed by perfumers in the manufacture of hair-powder.—The other species of A. are likewise aromatic, and are applied to the same uses. *A. gramineus* is cultivated in China.

ACOSTA, GABRIEL, a Portuguese nobleman, descended from a Jewish family, born at Oporto in 1587. After being educated in the doctrines of the Roman Catholic Church, he became sceptical, and leaving Portugal, went to Amsterdam, where he adopted the Jewish faith. He did not remain long contented with his new creed; but wrote against the Pentateuch, disputed the doctrine of the soul's immortality, and became involved in controversy with his rabbinical teachers. On account of his work, entitled *Examen de Tradiçoens Phariseas conferidas con à ley Escripta* (Examination of Pharisaic Traditions compared with the Scriptures), 1624, he was charged with atheism by the Jews before a Christian magistracy. Having lost his property, and being sentenced to a seven years' excommunication, he sought reconciliation with the synagogue, and submitted to very ignominious chastisements, which were repeatedly inflicted as often as his religious doubts arose again; until, in a state of insanity, he ended his career by suicide in 1640, or, as others say, in 1647. His autobiography was published in Latin and German (Leip. 1847).

ACOTYLE'DONOUS PLANTS (*Acotyledones* of Jussieu), one of the great primary classes into which the vegetable kingdom is divided, according to the structure of the seed and whole development therewith connected. See COTYLEDON. The class of *Acotyledones* contains those plants which, in the Linnæan system, form the class CRYPTOGAMIA (q. v.). It consists partly of *Acrogenous Plants* (q. v.), as Ferns and Mosses, and partly of *Thallogenous Plants* (q. v.), as Lichens, Fungi, and Algæ. It thus includes the vegetable tribes of lowest organization, whose embryo exhibits no distinct seed-lobes (cotyledons), but is a mere cell or *spore*, with granular matter in its interior, and germinates indifferently from any point of its surface.

ACOU'STICS (Gr. *akouo*, I hear) is the science of sound. This part of physics is often treated in connection with the atmosphere—an arrangement that seems inappropriate; for the atmosphere is only the most common conductor of sound; and every substance, whether solid or fluid, is capable, as well as air, of sounding itself, or of conveying the sound of other bodies. A. is rather a part of the science of motion. All motion is either rectilineal, circular, or vibratory; and when a vibratory motion is quick enough to affect the sense of hearing—for which at least thirty vibrations in a second are required—it constitutes a sound. A definable, uniform sound is a note or tone, and the rapidity of the vibrations is its pitch; a confused, indeterminate sound is a noise. The chief subjects treated of in A. are: 1. Musical sounds, or Notes (q. v.). Here the question is concerning the absolute and relative velocities of the vibrations, and those modifications, called temperament, to which their original proportions are subjected for the practical purposes of music. 2. The origin of Sound (q. v.), and the laws which guide the vibrations of sounding bodies, and give rise to different phenomena in different substances. In all sounding bodies, it is elasticity that is to be looked upon as the moving power. The elasticity of a sounding body may arise from stretching, as in the strings of a violin or the head of a drum; or from its own stiffness, as in rods, bells, &c. 3. The propagation of sound, as well through the air and other gases as through solids and liquids; and the reflection of sounds or echoes. All elastic bodies conduct sound, many much more powerfully than air. In water the conducting power is four times stronger than it is in air; in tin, seven times; in silver, nine times; in iron, ten times; in glass, seventeen times. 4. Perception of sound, or the structure and functions of the Ear (q.v.).

The ancients had made attempts to cultivate A. Pythagoras and Aristotle were aware of the way that sound is propagated through the air, but as a science independent of its application

to music, it belongs almost entirely to modern times. Bacon and Galileo laid the foundation of this new mathematical science; Newton showed by calculation how the propagation of sound depends upon the elasticity of the atmosphere or other conducting medium. He observed that a sounding body acts by condensing the portions of air that lie next it, and in the direction of the impulse. These condensed portions then spring back by their elasticity, and at the same time impel forward the portions lying next them. Each separate portion of air is thus driven forwards and backwards; and thus all round the sounding body there is an alternate condensation and rarefaction of air, constituting, as it were, waves of sound. In determining the velocity of sound, Newton, Lagrange, and Euler erred in their calculations; the best researches on this subject are those of Laplace. Chladni first raised A. to an independent science. In recent times, comparatively little has been done in this branch of physics. Savart has determined more exactly the number of vibrations in a second necessary to produce an audible sound; and Cagniard de Latour invented the sirene, and discovered many of the conditions under which both solids and fluids sound. The sounding of heated metals, when laid on cold metallic supports, has occasioned much discussion. See *Edinb. Phil. Journal.* Faraday and Marx have examined the figures of sound; Wheatstone, the phenomena of sympathetic sounds; and Willis, the formation of vowel-sounds by the human voice.

While the principles of A. are well known in theory, they are seldom carried out to a satisfactory result in practice. We allude more particularly to the many instances in which costly assembly halls and churches are defective as regards public speaking; it being seemingly a mere chance that new edifices of this kind exhibit proper acoustic qualities. In some cases, the sounds uttered cause echoes and reverberations, perplexing alike to a speaker and his auditory, and in others the sounds are dispersed at a high elevation and are lost. This subject urgently demands consideration in connection with architecture. As a general rule, the ceilings of halls should be at a moderate elevation; the lowering of a ceiling and the removal of chandeliers, have been known to improve the speaking and hearing properties; and the hanging up of flags and draperies has, in a variety of instances, had a similarly good effect. The whispering gallery of St. Paul's, London, offers an interesting example of one of the phenomena in acoustics. See ECHO.

A'CNÉ (probably from Gr. *akme*, an efflorescence) is an important skin disease. It is placed by some dermatologists in the order *Pustulæ*, and by others in the order *Tuberculæ*, which includes solid, hard elevations of the skin, much larger than *Papulæ*. The sebaceous follicles of the Skin (q. v.) are the primary seat of the affection. Their natural secretion accumulates in their interior, and there is, at the same time, a tendency to inflammation of the follicle and surrounding tissue. It is by no means rare to find on the face and shoulders of young persons about or above the age of puberty a number of black spots, each of which is placed on a slightly-raised pale base. These black points are called *comedones*. Pressure at the base occasions the expulsion of a little, elongated, spiral, white mass, with a black point or anterior end, commonly but erroneously regarded as a worm.* Interspersed are other spots, with the base more raised and inflamed, which become more or less perfect pustules, each of which rests on a comparatively large red base. In some of the inflamed follicles, coagulated lymph (to use the old phraseology) is thrown out, and a small hardened mass is the result. According as one or other of these appearances preponderates, we have different varieties of this disease. When the pustule is the most striking feature, the affection is called *Acne simplex* or *vulgaris;* when the black points abound, it is *Acne punctata;* and when there is decided induration, it is *Acne indurata*. We have already mentioned the age at which this affection commonly occurs: it is never seen in children, and is rare in aged persons.

As long as there is no inflammation, the treatment simply aims at favoring the escape of the contents of the sebaceous follicles, by rubbing the face and other affected parts with cold cream at bedtime, washing on the next morning with soap and water, and gentle subsequent friction with a soft towel. When acute inflammation is present, and the pustules are very tender, there is no better application than tepid water, with or without a little gelatine in solution; and subsequently the ointment of the hypochlorite of sulphur has been found useful by Wilson and others. *Acne indurata*, which is the least tractable of the three forms, is sometimes benefited by the application of fly-blisters. In all these cases, the state of the digestive organs must be carefully attended to.

Acne Rosacea is, according to some writers, a much more grave variety of acne; while others regard it as a special disease, to which they assign the name of *Rosacea*, under which term it is described in this work.

* In the midst of the white mass of sebaceous matter, a parasite, *Acarus folliculorum* is, however, often found.

ACQUAVI'VA, a town of South Italy, in the province of Bari, 16 miles south of the town of Bari, in a healthy situation at the foot of the Appennines. It is surrounded with walls and ditches, has a handsome parish church, several convents, two hospitals, &c. Pop. 7600.

A'CQUI (Lat. *Aquæ Statiellæ*), a walled town of N. Italy, on the left bank of the Bormida, 18 m. from Alessandria. It derives its name from its hot sulphur springs, which were known to the Romans, and which are much frequented by invalids. The town is of great antiquity, and contains many remarkable ecclesiastical buildings. Pop. 8200.

ACRE. The word is identical with Lat. *ager*, Gr. *agros*, 'a field;' the Ger. *acker* means both 'a field' and a 'measure of land.' Most nations have some measure nearly corresponding; originally, perhaps, the quantity which one plough could plough in a day; uniformity, therefore, is not to be looked for.

The English statute A. consists of 4840 square yards. The chain with which land is measured is 22 yards long, and a square chain will contain 22 × 22, or 484 yards; so that 10 square chains make an acre. The acre is divided into 4 roods, a rood into 40 perches, and a perch contains 30¼ sq. yards. The Scotch A. is larger than the English, and the Irish than the Scotch. 121 Ir. ac. = 196 Eng. nearly; 48 Sc. ac. = 61 Eng. The following table shows the values of the more important corresponding measures compared with the English A. The German morgen below are becoming obsolete, as the German Empire has adopted the French metrical system.

English acre	1·00
Scotch	1·27
Irish	1·62
Austria, Joch	1·42
Baden, Morgen or Acre	0·89
Belgium, Hectare (French)	2·47
Denmark, Toende	5·5
France, Hectare (= 100 ares)	2·47
France, Arpent (common)	0·99
Hamburg, Morgen	2·38
Hanover, "	0·64
Holland, "	2·10
Naples, Moggia	0·83
Poland, Morgen	1·38
Portugal, Geira	1·43
Prussia, Little Morgen	0·63
Prussia, Great Morgen	1·40
Russia, Deciatina	2·70
Sardinia, Giornate	0·93
Saxony, Morgen	1·36
Spain, Fanegada	1·06
Sweden, Tunneland	1·13
Switzerland, Faux	1·62
" Geneva, Arpent	1·27
Tuscany, Saccata	1·22
United States, English acre	1·00
Würtemberg, Morgen	2·40
Roman Jugerum (ancient)	0·66
Greek Plethron (ancient)	0·23

A'CRE, ST. JEAN D', or ACCA, the Biblical *Accho*, known as *Ptolemais* in the middle ages, is a seaport on the coast of Syria, not far from the base of Mount Carmel, and contains 10—15,000 inhabitants. The harbor is partly choked with sand, yet is one of the best on this coast. A. has often been the arena of warfare, and has suffered many changes of fortune. In 1004, it was taken by the Genoese; in 1187, by the Sultan Saladin; afterwards, it became the chief landing-place of the Crusaders, the seat of a bishop and of the Order of St. John; next, it fell into the hands of the Egyptians; and in 1517 was captured by the Turks; in 1799, it was besieged by the French for sixty-one days, but was successfully defended by the garrison, aided by a body of English sailors and marines under Sydney Smith. In 1832, it was stormed by Ibrahim Pacha, son of the viceroy of Egypt, and continued in his possession till it was bombarded and taken, in 1840, by a combined English, Austrian, and Turkish fleet. See EGYPT.

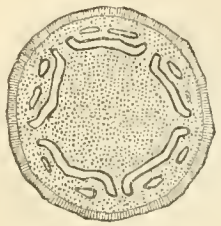
A'CRI, a town of South Italy, in the province of Consenza, 13 miles north-east of the town of Cosenza, in a beautiful and healthy situation with a fertile country around. Pop. 9500.

ACRITOCHRO'MACY (Gr. *akritos* and *chromatia*, which, when associated, imply 'inability to discriminate between colors') is a term which seems likely to supersede *Color Blindness*, *Daltonism*, *Achromatopsia*, &c.

A'CROBAT, a word derived from the Greek, and nearly synonymous with rope-dancer. It literally signifies one who walks on tip-toe (*akron*, an extremity, and *baino*, I go); and is employed to designate those who perform difficult feats, vaulting, sliding, tumbling, and dancing on a slack or tight rope, stretched either horizontally or obliquely. These feats require great skill, suppleness, and steadiness. For a long time, acrobats were contented to divert and astonish only children or the most ignorant of the populace; but the extraordinary skill of some recent performers has given this perilous art a great celebrity. Within the present century, Farioso, Madame Saqui, and Signor Diavolo have excited admiration by their marvelous agility; Blondin

was even more widely known. The acrobats of antiquity appear to have closely resembled those of our own day.

ACRO'GENOUS PLANTS (Gr., growing at the summit) are plants in which the structure of the stem is *acrogenous*—that is, in which the vascular bundles are developed simultaneously, and not in succession, the stem increasing by the coherence of the



Section of Acrogenous stem.

Tree Fern.

bases of the leaves and by elongation at the summit. In a transverse section of the stem, a circle of vascular tissue is found near the circumference, and the center is composed of cellular tissue, some portion of which frequently disappears, so that the stem, although solid when young, becomes hollow in a more advanced stage of its growth. Tree-ferns afford the finest specimens of the acrogenous stem. All A. P. have *stomata*, or breathing pores, on the surface. In general, they have a distinct stem and leaves arranged with most perfect symmetry. Some plants, in which the distinct stem is absent, are ranked with A. P., because the *thallus* has the texture of leaves, and exhibits a higher organization than in *Thallogenous Plants* (q. v.). A. P. are all *Acotyledonous* (q. v.); and under this designation are included *Ferns*, *Equisetaceæ*, *Lycopodiaceæ*, *Marsileaceæ*, *Mosses*, and *Hepaticæ*.

A'CROLEIN ($C_6H_4O_2$) is a colorless, limpid, strongly refracting liquid, lighter than water, and having its boiling-point at about 125°. It constitutes the acrid principle produced by the destructive distillation of fatty bodies, and is in part due to the decomposition of glycerine. It is best prepared by distilling a mixture of glycerine and anhydrous phosphoric acid, the object of the latter being to effect the removal of the element of four atoms of water from the glycerine ($C_6H_8O_6$), which contains the elements of acrolein ($C_6H_4O_2$) + those of four atoms of water (H_4O_4). In its state of vapor, it is extremely irritating to the eyes, nostrils and respiratory organs—a property to which it owes its name. The pungent smell given off by the smouldering wick of a candle just blown out is due to the presence of acrolein. When mixed with a solution of potash or soda, the irritating odor disappears, and is replaced by one of cinnamon; while a brown resinous substance is formed; and certain oxidizing agents, as oxide of silver, convert it into *acrylic acid* ($C_6H_4O_4$).

A'CROLITHS (Gr. *acron*, extremity; *lithos*, a stone), the name given to the oldest works of Greek plastic art, in which wood-carving is seen in transition into marble statuary. The trunk of the figure is still, in the old style, of wood, covered with the usual temple-vestments; but the extremities—head, arms, feet—which are meant to appear naked from below the drapery, are of stone.

ACRO'POLIS, 'the highest point of the city.' Many of the important cities of Greece and Asia Minor were protected by

Acropolis at Athens.

strongholds, so named. The A. occupied a lofty position, commanding the city and its evirons; inaccessible on all sides except one, which had, for the most part, artificial defences. It contained some of the most important public buildings, especially temples, besides affording a last refuge in case of a hostile attack. The A., like the castle of the middle ages, had formed the center or nucleus around which the town gradually grew. Among the most celebrated of the ancient Acropolises was that of Argos, whose name, Larissa, indicates its Pelasgic origin; that of Messenia, which bore the name of Ithome; that of Thebes, called Cadmea; that of Corinth, known as Acro-Corinthus; but especially that of Athens, which was styled pre-eminently the A. See ATHENS.

ACRO'STIC is a Greek term for a number of verses the first letters of which follow some pre-determined order, usually forming a word—most commonly a name—or a phrase or sentence. Sometimes the final letters spell words as well as the initial, and the peculiarity will even run down the middle of the poem like a seam. Sir John Davies composed twenty-six *Hymns to Astrea* (Queen Elizabeth), in every one of which the initial letters of the lines form the words ELISABETHA REGINA. The following is one of the twenty-six:

E v'ry night from ev'n to morn.
L ove's chorister amid the thorn
I s now so sweet a singer;
S o sweet, as for her song I scorn
A pollo's voice and finger.

B ut, nightingale, sith you delight
E ver to watch the starry night,
T ell all the stars of heaven,
H eaven never had a star so bright
A s now to earth is given.

R oyal Astrea makes our day
E ternal with her beams, nor may
G rosse darkness overcome her;
I now perceive why some do write
N o country hath so short a night
A s England hath in summer.

In the A. poetry of the Hebrews, the initial letters of the lines or of the stanzas were made to run over the letters of the alphabet in their order. Twelve of the psalms of the Old Testament are written on this plan. The 119th Psalm is the most remarkable. It is composed of twenty-two divisions or stanzas (corresponding to the twenty-two letters of the Hebrew alphabet), each stanza consisting of eight couplets; and the first line of each couplet in the first stanza begins, in the original Hebrew, with the letter *aleph*, in the second stanza with *beth*, &c. The divisions of the psalm are named each after the letter that begins the couplets, and these names have been retained in the English translation. With a view to aid the memory, it was customary at one time to compose verses on sacred subjects after the fashion of those Hebrew acrostics, the successive verses or lines beginning with the letters of the alphabet in their order. Such pieces were called *Abecedarian Hymns*. See *Hook's Church Dictionary*.

ACROTE'RION (Gr., the summit or extremity), a term in Arch. for a statue or other ornament placed on the apex or at one of the lower angles of a pediment. Some understand by A., the pedestal on which such ornament stands.

ACT, in the Drama, is a distinct part of the general plot or action, and its conclusion is usually marked by a fall of the curtain. An act should be, in a certain sense, complete in itself, and at the same time should form a necessary part of the whole drama. As every dramatic plot naturally divides itself into three parts—the exposition, the development, and the conclusion or catastrophe—a division into three acts would seem most natural; but in practice it has been found inconvenient to enclose extended plots in such limits, and since the time of the ancient Greek tragedy, *five* acts have generally been considered necessary. In the first act, the general nature of the drama is indicated, the characters are introduced, and the action commences. The plot should rise in interest in the second, and reach its climax in the third act. In the fourth act, the conclusion or catastrophe should be prepared, but should by no means be anticipated so as to weaken the effect of the *dénouement*, which must occupy the fifth act. This is a rather difficult task; and, accordingly, many dramas fail in the fourth act.

ACT, in the University sense, is an exercise preparatory to receiving a degree. The student who 'keeps the Act,' and who is called the 'Respondent,' reads a Latin thesis on some proposition which he has announced that he is to maintain. Three other students, who have been named by the Proctor as 'Opponents,' then try, one after another, to refute his arguments syllogistically in Latin. The practice of keeping Acts is still adhered to, as a form at least, at Cambridge.

ACT, in Law, has various meanings. In its more general acceptation it is used to denote the solemn accomplishment of some distinctive proceeding, as when a person in England, when executing a legal instrument, declares it to be his *act and deed*. Formerly, in Scotland, the word A. was frequently applied to the procedure in a litigated cause; and to this day the technical term to signify a plaintiff in Scotch pleading is *Actor*—hence also *Acts of Sederunt* (q. v.). By an A. is sometimes meant an act or proceeding, or

rather the record of an act or proceeding, of a public nature—and in this sense it is used when we speak of an *A. of Parliament* (q. v.). This use of the word appears to be derived from the Romans, who employed *Acta* to signify specially public official transactions, and oftener perhaps the records of such transactions. The *Acta Diurna* was a kind of official Roman gazette, giving an account of the public transactions and events of the day. The Germans use *Acten*, and the French *Actes*, to signify official or legal documents, or papers generally. The title *Acta* has been applied in modern times to the journals or records of learned societies: *Acta Societatis Regiæ*—the Transactions of the Royal Society. *Acta Eruditorum*, the oldest journal of erudition in Germany, was begun at Leipsic in 1680, and ceased publication in 1782, when it had extended to 117 quarto volumes. To these may be added (showing the close connection between the Roman and Scotch legal institutions and their phraseology) the *Acta Auditorum*, or the records of the proceedings of the Lords Auditors, who were a committee of the old Scotch Parliament appointed to hear causes, by way of appeal, and otherwise to exercise supreme jurisdiction. Also the *Acta Dominorum Concilii*, or ancient records of the supreme court in Scotland.

But the word *A.* has at the present day several precise legal applications, the principal of which we now proceed to mention and explain:

Act of Bankruptcy, by which is meant a certain ostensible indication of insolvency on the part of a debtor, sufficient to bring him within the operation of the bankrupt laws. Section 67 of the former Bankrupt Law Consolidation Act, 12 and 13 Vict. c. 106, defined Acts of B. in the following terms: 'That if any trader, liable to become bankrupt, shall depart this realm, or being out of this realm, shall remain abroad, or shall depart from his dwelling-house, or otherwise absent himself, or begin to keep his house, or suffer himself to be arrested, or taken in execution for any debt not due, or yield himself to prison, or suffer himself to be outlawed, or procure himself to be arrested or taken in execution, or his goods, money, or chattels to be attached, sequestered, or taken in execution, or make or cause to be made, either within this realm or elsewhere, any fraudulent grant or conveyance of any of his lands, tenements, goods, or chattels, or make or cause to be made any fraudulent surrender of any of his copyhold lands or tenements, or make or cause to be made any fraudulent gift, delivery, or transfer of any of his goods or chattels, every such trader doing, suffering, procuring, executing, permitting, making, or causing to be made any of the acts, deeds, or matters aforesaid, with intent to defeat or delay his creditors, shall be deemed to have thereby committed an A. of B.'—The modifications on this definition by recent legislation are slight, and will be found under Insolvency. The expression *A. of B.* is unknown in the phraseology of Scotch law, but the evidences of *notour bankruptcy*, as it is called, are analogous to the English A. of B. See Insolvency.

Act of God is a legal expression, and signifies any natural or accidental occurrence, not caused by human negligence or intervention; such as the consequences arising from storms, lightning, tempests, &c., and which are deemed fatalities and losses such as no party under any circumstances (independently of special contract) is bound to make good to another. It has been ruled in England that the loss must be immediate, and the necessary consequence of the accident.

Act of Grace is the name given to an old Scotch act (1696, c. 32) for the maintenance of poor persons imprisoned for debt. It is usually applied in England to insolvent acts, and general pardons, at the beginning of a new reign or on other great occasions.

Act of Indemnity is an annual act of parliament passed for omissions in taking the oaths and assurances required by law of persons admitted to any public office or employment. See Abjuration.

ACT OF PARLIAMENT is a resolution or law passed by all the three branches of the legislature—the King [or Queen], Lords, and Commons. The expression is generally used to signify the *record* of an A. of P., and such records are strictly synonymous with the term 'statutes' or 'statutes of the realm.' An A. of P. thus made is the highest legal authority acknowledged by the constitution. It binds every subject in the land, and even the sovereign himself, if named therein. And in England it cannot be altered, amended, dispensed with, suspended, or repealed, but in the same forms and by the same authority of parliament. In Scotland, however, a long course of contrary usage or of disuse may have the effect of depriving a statute of its obligation, for by the Scotch law, a statute may become obsolete by disuse, and cease to be legally binding. It was formerly held in England that the king might in many cases dispense with penal statutes; but by the statute 1 W. and M. st. 2, c. 2, it is declared that the suspending or dispensing with laws by royal authority, without consent of parliament, is illegal.

An A. of P. or statute is either *public* or *private*. A public act regards the whole community, but the operation of a private act is confined to particular persons and private concerns, and some private acts are *local*, as affecting certain places only. As the law till lately stood, the courts of law were bound *ex officio* to take judicial notice, as it is called, of public acts, that is, to recognize these acts as known and published law, without the necessity of their being specially pleaded and proved; but it was otherwise in regard to private acts; so that in order to claim any advantage under a private act, it was necessary to plead it, and set it forth particularly. But now, by the 13 and 14 Vict. c. 21, s. 7, every act made after the then next session of parliament is to be taken to be a public one, and judicially noticed as such, unless the contrary be expressly declared.

Acts of P. are also sometimes described as *declaratory*, or *penal*, or *remedial*, according to the nature of their object or provisions. Declaratory statutes are where the old custom of the kingdom has almost fallen into disuse, or become disputable, in which case the parliament has thought proper (*in perpetuum rei testimonium*, and for avoiding all doubts and difficulties) to declare what the common law is and ever has been. Penal acts are those which merely impose penalties or punishments for an offence, as in the case of the statutes relative to game. Remedial acts are such as supply some defect in the existing law, and redress some abuse or inconvenience with which it is found to be attended, without introducing any provision of a penal character. There is also a distinction of Acts of P. as being either *enlarging* or *restraining*, *enabling* or *disabling* acts.

An A. of P. begins to operate from the time when it receives the royal assent, unless some other time be fixed for the purpose by the act itself. The rule on this subject, in England, was formerly different; for at common law, every A. of P., which had no provision to the contrary, was considered, as soon as it passed (i. e., received the royal assent), as having been in force, retrospectively, from the first day of the session of parliament in which it passed, though, in fact, it might not have received the royal assent, or even been introduced into parliament, until long after that day; and this strange principle was rigidly observed for centuries. The ancient acts of the Scotch parliament were proclaimed in all the county towns, burghs, and even in the baron courts. This mode of promulgation was, however, gradually dropped as the use of printing became common; and in 1581, an act was passed declaring publication at the Market Cross of Edinburgh to be sufficient. British statutes require no formal promulgation; and in order to fix the time from which they shall become binding, it was enacted by the 33 Geo. III. c. 13, that every A. of P. to be passed after 8th April 1793 shall commence from the date of the endorsement by the clerk of parliament, stating the day, month, and year when the act was passed and received the royal assent, unless the commencement shall, in the act itself, be otherwise provided for.

An A. of P. consists of various parts—such as the title, the preamble, the enacting sections and clauses, and sometimes certain forms or schedules added by way of appendix—and it is referred to by the year of the sovereign's reign, and the chapter of the statutes of that year. The old acts of the Scotch parliament, before the union with England, are cited by the year in which they were passed, and the order of the number or chapter. See Statutes, Scotch Statutes, and Parliament.

ACTS OF SEDERUNT are ordinances of the Court of Session or supreme civil court in Scotland, made originally under authority of the Scotch Act 1540, c. 93, whereby the judges are empowered to make such rules or ordinances as may be necessary for the regulation of legal procedure and the expediting of justice. The power thus conferred was exceeded, and it became necessary to ratify several of the A. of S. in the Scotch Parliament. In so far, however, as A. of S. are confined to declarations of the purposes of the court to decide in a particular way, on an occurrence of similar circumstances, they seem to amount to little more than authoritative announcements of the intention of the court to adhere judicially to certain precedents; and for upwards of a century and a half, they have been almost exclusively confined to the regulation of judicial procedure, and to matters therewith connected. In several recent statutes, express power is given to the Court of Session to pass A. of S., for carrying the purpose of the legislature into more complete effect; and it is usually provided that the A. of S. made in virtue of such power shall be laid before parliament within a limited time. The old quorum of nine judges is requisite in passing an Act of S., 48 Geo. III. c. 151, s. 11.

ACT OF SETTLEMENT, a name given to the statute 12 and 13 Will. III. c. 2, by which the crown was limited to the family of her present Majesty, Queen Victoria. It was towards the end of King William III.'s reign, when all hopes of other issue died with the Duke of Gloucester, that, as we are told by Blackstone, the king and parliament thought it necessary again to exert their power of limiting and appointing the succession, in order to prevent another vacancy of the throne, which must have ensued upon their deaths, as no further provision was made at the Revolution than for the issue of Queen Mary, Queen Anne, and King William. The parliament had previously, by the statute of 1 W. and

M. st. 2, c. 2, enacted, that every person who should be reconciled to, or hold communion with, the see of Rome, should profess the Roman Catholic religion, or should marry a Roman Catholic, should be excluded from succession to, and be forever incapable to inherit, possess, or enjoy the crown; and that in such case the people should be absolved from their allegiance, and the crown should descend to such persons, being Protestants, as would have inherited the same, if the person so reconciled, holding communion, professing or marrying, were naturally dead. To act, therefore, consistently with themselves, and, at the same time, pay as much regard to the old hereditary line as their former resolutions would admit, they turned their eyes on the Princess Sophia, Electress and Duchess-dowager of Hanover; for upon the impending extinction of the Protestant posterity of Charles I., the old law of regal descent directed them to recur to the descendants of James I.; and the Princess Sophia, being the youngest daughter of Elizabeth, Queen of Bohemia, who was the daughter of James I., was the nearest of the ancient blood-royal who was not incapacitated by professing the Roman Catholic religion. On her, therefore, and the heirs of her body, being Protestants, the remainder of the crown expectant on the death of King William and Queen Anne without issue, was settled by statute 12 and 13 Will. III. c. 2. And at the same time it was enacted, that whosoever should thereafter come to the possession of the crown, should join in the communion of the Church of England as by law established.

This is the last limitation of the crown that has been made by parliament; and the several actual limitations, from the time of Henry IV. to the present, clearly prove the power of the king and parliament to re-model or alter the succession. It is even made highly penal to dispute such power, for by the statute 6 Anne, c. 7, it is enacted, that if any person maliciously, advisedly, and directly, shall maintain, by writing or printing, that the kings of this realm, with the authority of parliament, are not able to make laws to bind the crown and the descent thereof, he shall be guilty of high treason; or if he maintains the same by only preaching or advised speaking, he shall incur the penalties of *præmunire*.

The Princess Sophia dying before Queen Anne, the inheritance, thus limited, descended on her son and heir, King George I.; and having, on the death of the queen, taken effect in his person, from him it descended to King George II.; from him to his grandson and heir, King George III.; from him to his son, George IV., who was succeeded by his brother, William IV.; and from the monarch last mentioned the crown descended to his heiress, the daughter of his brother Edward, Duke of Kent, our present gracious sovereign, Queen Victoria.

'Hence,' Blackstone remarks, 'it is easy to collect that the title to the crown is at present hereditary, though not quite so absolutely hereditary as formerly; and the common stock or ancestor from whom the descent must be derived, is also different. Formerly, the common stock was King Egbert, afterwards William the Conqueror, and now it is Princess Sophia, in whom the inheritance was vested by the new king and parliament. Formerly, the descent was absolute, and the crown went to the next heir without any restriction; but now, upon the new settlement, the inheritance is conditional; being limited to such heirs only of the body of the Princess Sophia as are Protestants, members of the Church of England, and are married to none but Protestants.'

ACT OF TOLERATION is the name commonly given to the act of parliament 1 William and Mary, statute 1, c. 18, confirmed by 10 Anne, c. 2, by which all persons dissenting from the Church of England (except Roman Catholics and persons denying the Trinity) were relieved from such of the acts against nonconformists as prevented their assembling for religious worship according to their own forms, or otherwise restrained their religious liberty, on condition of their taking the oaths of allegiance and supremacy, and subscribing a declaration against transubstantiation; and in the case of dissenting ministers, subscribing also to certain of the Thirty-nine Articles. The clause of this act which excepted persons denying the Trinity from the benefits of its enactments, was repealed by 53 Geo. III. c. 160.

The Protestant dissenters, however, still remained, notwithstanding these provisions, subject to the obligation imposed by the Test and Corporation Acts (q.v.) on all those who were admitted to any office, of taking the sacrament of the Lord's Supper according to the rites of the Church of England; but this disability was at length removed by the 9 Geo. IV. c. 17. And to this list of concessions we are now to add the act of 15 and 16 Vict. c. 36, allowing the dissenters to certify their places of worship to, and register them with, the Registrar-general of Births, Deaths, and Marriages, instead of the Archbishop, Bishop, or Court of Quarter-sessions.

These various Acts of T. operated, however, to the exclusive benefit of *Protestant* dissenters, and afforded no relief to Roman Catholics. With respect to the latter, the progress of emancipation was slower and more reluctant. By statutes, however, of 18 Geo. III. c. 60, 31 Geo. III. c. 32, and 43 Geo. III. c. 30, most of the severer penalties and disabilities to which they were formerly subject, were removed; and by 10 Geo. IV. c. 7, commonly called the Catholic Emancipation Act, Roman Catholics were restored in general to the full enjoyments of all civil rights, being only excluded from holding ecclesiastical offices, and certain high appointments in the state. By another act of the 2 and 3 Will. IV, c. 115, it was provided that Roman Catholics should be subject in this particular to the same laws as were applicable to Protestant dissenters; the effect of which provision is to empower them to acquire and hold property for such purposes. And now, by the acts of 7 and 8 Vict. c. 102, 9 and 10 Vict. c. 59, and 21 and 22 Vict. c. 48, Roman Catholics and Jews are relieved from all enactments calculated to oppress them, and are thus practically admitted to all the privileges of the constitution.

In Scotland, toleration in religious matters is secured by various old Scotch statutes passed before the Union with England, particularly by the act 1690, c. 27; and this was followed up after the Union by the British statute 10 Anne c. 7, s. 5, which declares that 'it shall be free and lawful for all the subjects in that part of Great Britain called Scotland to assemble and meet together for divine service without any disturbance; and to settle their congregations in what forms or places they shall think fit to choose, except parish churches;' an enactment which amounts to a legal recognition of dissenters, if, indeed, it may not be called their charter in Scotland.

ACT OF UNIFORMITY is the name by which the statute 13 and 14 Car. II. c. 4, is usually described. By that statute it was enacted, that the Book of Common Prayer, as then recently revised, should be used in every parish church and other place of public worship in England, and that every schoolmaster and person instructing youth should subscribe a declaration of conformity to the Liturgy, and also to the effect of the oath and declaration mentioned in the act of 13 Car. II. st. 2, c. 1. It further enacted that no person should thenceforth be capable of holding any ecclesiastical promotion or dignity, or of consecrating or administering the sacrament till he should be ordained priest according to episcopal ordination, and with respect to all ministers who then enjoyed any ecclesiastical benefice, it directed that they should within a certain period, openly read morning and evening service, according to the Book of Common Prayer, and declare before the congregation their unfeigned assent and consent to the use of all things therein contained, upon pain of being *ipso facto* deprived of their spiritual promotions. By this statute, two thousand of the clergy, who refused to comply with its provisions, were deprived of their preferments. This statute also contained a regulation that no schoolmaster in a private house should instruct youth without having obtained a license from the Ordinary; but this regulation was repealed by 9 and 10 Vict. c. 59.

ACTS, TEST AND CORPORATION. See article TEST ACTS.

ACTA SANCTO'RUM or MA'RTYRUM (Acts of Saints or Martyrs), the collective title given to several old writings, respecting saints and martyrs, in the Greek and Roman Catholic churches, but now applied especially to one extensive collection begun by the Jesuits in the 17th c., and intended to serve as a better arrangement of the materials found in ancient works. This great undertaking, which was commenced by the Jesuit, Heribert Rosweyd of Antwerp, has considerable importance, not only in a religious and ecclesiastical point of view, but also with regard to history and archæology. After Rosweyd's death, in 1629, J. Bolland was commissioned by the order of Jesuits to continue the work; and with the assistance of G. Henschen, he prepared two volumes, which appeared in 1643. After the death of this editor (1665), the work was carried on by a society of learned Jesuits, who were styled 'Bollandists,' until 1794, when its further progress was prevented through the invasion of Holland by the French. In recent times, the undertaking has been resumed; and in 1846 the fifty-fourth volume was published at Brussels. Five or six additional volumes have appeared since. The lives are arranged in the order of the calendar. The volumes last published, of which the latest appeared in 1881, are for October. A new edition of the first 54 vols. appeared in 1863—1869. For notices of other and similar collections, see SAINTS, MARTYR and MARTYROLOGY.

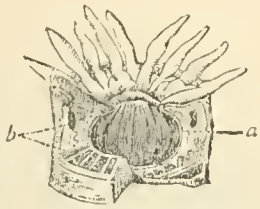
ACTÆ'A, a genus of plants of the natural order *Ranunculaceæ* (q. v.), the type of the sub-order *Actaeæ*, distinguished by the colored imbricated calyx and indehiscent succulent fruit. The genus *Actaea* has four deciduous sepals, four petals, and a single baccate carpel.—*A. spicata*, the Baneberry or Herb Christopher, is a native of the north of Europe, found in bushy places in some parts of England. It is a perennial herbaceous plant, about 1—2 feet high, with triternate leaves, and the leaflets deeply cut and serrated, the flowers in racemes, the berries black and poisonous. The root is anti-spasmodic, expectorant, and astringent, and is sometimes useful in catarrh. *Botrophis actaeoides* (*Actaea racemosa* of Linnæus) is a native of the United States, whose roots are said to possess similar qualities, and are also reputed as a remedy for the bite of the rattlesnake.

ACTÆ'ON, a mythical personage, a grandson of Cadmus. He

was trained as a hunter by Chiron. Having once surprised Diana while bathing in a fountain, he was changed by the offended goddess into a stag, and his own dogs, not knowing him, tore him in pieces. According to Euripides, Diana was jealous because Actæon had boasted that he excelled her in hunting.

ACTI'NIA, a genus of marine animals, belonging to the sub-kingdom *Cœlenterata* (See SUB-KINGDOMS, ANIMAL), and to the class *Actinozoa*, of which latter group the genus is thoroughly typical. The animals included in this genus are familiarly known as 'Sea-Anemones.' They are found attached by their bases to rocks and stones, and present the appearance of cylindrical fleshy bodies, possessing a mouth surrounded by numerous tentacles at the free extremity. These tentacles in the genus Actinia are of simple, tubular conformation. They are perforated at their

Actinia seen from above.



Section of Actinia: *a*, cavity of stomach; *b*, surrounding chambers.

tips, and also possess sucker-like discs. The mouth leads into a stomach-sac, which (as in all Cœlenterate animals) communicates freely below with the general body-cavity, and thus comes to resemble a pocket with the bottom cut out. The stomach-sac is kept in its place by a series of vertical radiating plates, named *lamellæ* or *mesenteries*, to the faces of which the reproductive organs are attached. The Actiniadæ are capable of slow movements by expanding and contracting the muscular bases of their bodies. They may be cut and divided in various ways, with the result of producing new individuals by *artificial fission*. Some species may attain a great age, as proved by the well-known case of a common Actinia (*A. mesembryanthemum*), which was taken from the Firth of Forth by Sir John G. Dalyell in 1823, made a public appearance at the Fisheries Exhibition at Edinburgh in 1882. This remarkable animal—'Grannie' by name—has at various times given birth to numerous young; and as more than one of her progeny have in turn become parents, her cognomen is not merely complimentary.

ACTINISM, the property of the sun's rays which produces chemical changes. See SPECTRUM.

ACTION, in its large and general sense, means a judicial proceeding before a competent tribunal for the attainment of justice; and in this sense it is applied to procedure, whether *criminal* or *civil*. In its more limited acceptation, it is used to signify proceedings in the *civil* courts, where it means the form prescribed by law for the recovery of a right, or what is one's due. In the law of England, the term A. used to be applied to proceedings in the courts of *common law*, as distinguished from those of *equity*, where the word *suit* was used. What, in the courts of Queen's Bench, Common Pleas, and Exchequer, before the Judicature Act of 1873, was called Action-at-law, was in the courts of Equity called a Suit in Equity. See COMMON LAW, COURTS OF, and EQUITY.

In the Scotch law, which recognizes no distinction in legal administration between law and equity, the word A. is defined comprehensively as a demand regularly made and insisted on before the judge competent for the recovery of a right. Accordingly, while in Scotland there is, as in England, a remedy for every wrong, the law recognizes and gives effect to the right of a party to claim and to have *declared* a particular interest or right, even although that interest or right may not be withheld, or called in question. It is sufficient that it is doubtful, and that the ascertainment of it is necessary for the position and purposes of the plaintiff, or *pursuer*, as the Scotch law calls the active party. This procedure is known by the name of an *A. of declarator*, which has been described as a suit in which something is prayed to be decreed in favor of the plaintiff, but nothing sought to be paid, performed, or done by the defendant. Lord Stair, in his *Institutes of the Law of Scotland*, says 'such actions may be pursued for instructing or clearing any kind of right relating to liberty, dominion, or obligation;' and he further observes, 'there is no right but is capable of declarator.' Various attempts have been made to introduce this mode of proceeding into the practice of the law in England, but as yet without success. The idea of the declarator has been said to have been derived by the Scotch lawyers from the French legal system, according to whose forms the existing administration of the Scotch law was originally moulded. In the Institutes of Justinian there are, however, indications of the partial use of this form of A. by the Roman lawyers.

We may add that the word A. is derived from the Latin *actio* (*agere*), and that the plaintiff in a suit or action was originally said to be the *actor*, which, indeed, in the recorded pleadings of the Scotch courts, his counsel or advocate still is called.

A'CTIUM (now Azio), a town and promontory on the west coast of Greece, at the entrance of the Ambraciot Bay, now the Gulf of Arta, is memorable for the sea-fight which took place near it, 2d September, 31 B. C., between Octavianus (afterwards the Emperor Augustus) and Marcus Antonius. These two had for some time ruled the Roman world between them—the former in the west, the latter in the east; it now came to a struggle for the sole sovereignty. The two armies were encamped on the opposite shores of the gulf; Octavian had 80,000 infantry, 12,000 cavalry, and 260 ships of war; Antony, 100,000 infantry, 12,000 cavalry, and 220 ships. Antony's ships were large, and well provided with engines for throwing missiles, but clumsy in their movements; Octavian's were smaller and more agile. Antony was supported by Cleopatra, Queen of Egypt, with sixty vessels, who induced him, against the opinion of his most experienced generals, to determine upon a naval engagement. The battle continued for some hours undecided; at last, Agrippa, who commanded Octavian's fleet, succeeded, by a skilful manœuvre, in compelling Antony to extend his line of battle, whose compactness had hitherto resisted all attempts of the enemy to break through. Cleopatra, whose ships were stationed behind Antony's line, apprehensive of that line being broken, took to flight with her auxiliary fleet, and Antony recklessly followed her with a few of his ships. The deserted fleet continued to resist bravely for some time, but was finally vanquished; the land-army, after waiting in vain seven days for Antony's return, surrendered to Octavian. As a memorial of the victory that had given him the empire of the world, and out of gratitude to the gods, Octavian enlarged the temple of Apollo at A., dedicated the trophies he had taken and instituted games to be celebrated every five years. He also built, on the spot where his army had been encamped, the splendid city of Nicopolis (city of victory), near where Prevesa now stands.

ACTON, JOSEPH, PRINCE, prime-minister of Ferdinand IV. of Naples, was the son of an Irish physician, and was born at Besançon in 1737. After acquiring distinction in the naval service of France and Tuscany, he gained a position in the Neapolitan government, and became the favorite of Queen Caroline. His measures, prompted by his extreme hatred of France, were cruel and intolerant, and ultimately caused a reaction against the royal family of Naples, and in favor of the French party and the Carbonari. When left unaided by English influence, A. lost the power he had so often abused, and died in 1811, deservedly contemned by all parties.

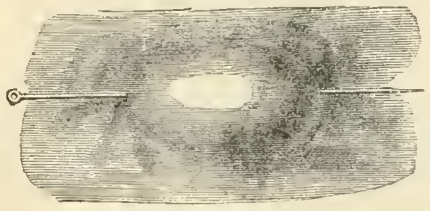
ACTS OF THE APOSTLES, the fifth book of the New Testament, the authorship or which is ascribed by tradition, and with the highest probability, to the Evangelist Luke. Beginning with the ascension of Christ, it gives an account of the spread of the Christian Church; confined, however, chiefly to the part taken therein by the Apostle Paul. Notwithstanding its title, little is said of the other apostles, with the exception of Peter. The narrative closes with the year 62 A. D., Paul being then a prisoner at Rome. The book has always been received as canonical, except by a few Manichæan heretics; but its historical character has been impugned by the Tübingen School. Spurious ACTS were put in circulation by early Christian sects.

A'CTUARY. The *Actuarii*, in ancient Rome, were clerks who recorded the *Acta* of the senate and other public bodies. The term might therefore, so far as its etymology is concerned, be applied to men of business in general. But in the constantly increasing tendency to subdivide labor and specialize functions, there has arisen, in recent times, a distinct branch of business, embracing all monetary questions that involve a consideration of the separate or combined effect of Interest and Probability, especially as connected with the duration of human life; and it is to one who devotes himself to this department of business that the name of A. has been especially assigned. The investigations and calculations of the A. supply the principles of operation for the numerous institutions now engaged in the transaction of Life-assurance, Annuity, and Reversionary business. His functions might be briefly defined as *the application of the doctrine of probabilities to the affairs of life*. There are two Societies of Actuaries in this country: 'The Institute of Actuaries of Great Britain and Ireland,' established in 1848; and the 'Faculty of Actuaries in Scotland,' established 1856.

ACU'LEUS, in Botany. See PRICKLE.

A'CUPRESSURE, a mode of arresting hæmorrhage from cut arteries. It is based on the principle of temporary metallic compression, and was first suggested to the scientific world by Sir James Y. Simpson, Bart., in a paper read before the Royal Society

of Edinburgh, December 1859. The simplest mode of practising it may be thus described: The needle is passed through the flaps or sides of the wound, so as to cross over and compress the orifice of the artery, just as in putting a flower in the lapel of one's coat, one crosses over and compresses the flower-stalk with a pin pushed twice through the lapel. The middle portion of the needle—the only part of it which is in immediate contact with the fresh surface of the wound—bridges over and compresses the artery at its bleeding orific, or perhaps a line or two more on its cardiac side. The

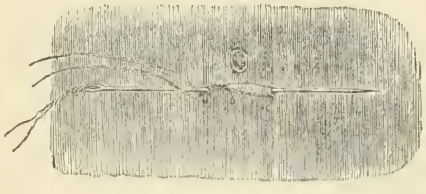


First Method.

head and point of the needle are exposed externally on the cutaneous surface of the flap or side of the wound. 'When passing the needle in this method,' says Sir J. Y. Simpson, 'the surgeon usually places the point of his left forefinger or of his thumb upon the mouth of the bleeding vessel, and with his right hand introduces the needle from the cutaneous surface, and passes it right through the whole thickness of the flap till its point projects for a couple of lines or so from the surface of the wound, a little to the side of the tube of the vessel. Then, by forcibly inclining the head of the needle towards his right, he brings the projecting portion of its point firmly down upon the site of the vessel; and after seeing that it thus quite shuts the artery, he makes it re-enter the flap as near as possible to the left side of the vessel, and pushes on the needle till its point comes out again at the cutaneous surface. In this mode, we use the cutaneous walls and component substance of the flap as a resisting medium, against which we compress and close the arterial tube. But in some wounds, a neighboring bone or other firm unyielding texture forms the best and readiest point of resistance against which to pin and compress the artery by the acupressure needle.'

This is the first and simplest mode of applying acupressure. Six other methods, however, have been suggested; and as each of them has its peculiar appropriateness as a hæmostatic agent, it will be proper to enumerate and describe them. The appliances which these other methods require are—a pin with a glass head, to admit of sufficient pressure for introduction; a needle threaded with iron wire; and a loop of inelastic iron wire, 5 or 6 inches in length. The pins and needles should be of various sizes, and they should also be bayonet-pointed; the latter form being superior to the spear-pointed, as facilitating introduction, and as being less apt to cut the tissues.

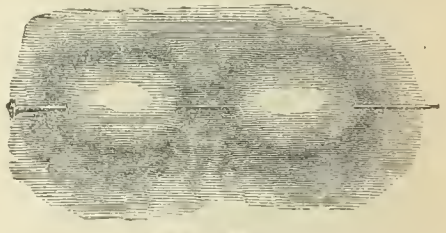
Second mode: The needle is inserted in the fresh surface at a little distance from the vessel; it is pushed on, causing its point to rise up as near the artery as possible; it then bridges over and compresses the artery; then its point is made to dip into the raw surface of the wound on the other side of the vessel; finally, it is forced on until it emerges a second time on the wound. The passive or elastic iron wire with which it is threaded enables it to be easily withdrawn. Third mode: The needle is entered on one



Third Method.

side of the artery; is pushed behind so that its point emerges on the opposite side of the vessel; a loop of inelastic wire is then passed over its point, so as to bring the wire over the track of the artery and behind the stem of the eye-end of the needle; finally, the wire is drawn sufficiently to close the vessel, and is fixed by a twist or half a twist round the needle. The needle may again be withdrawn by the wire which threads it. Fourth mode: This differs from the third only in substituting a long pin with a glass head for the acupressure needle threaded with iron wire. The pin is preferred to the wire-threaded needle, as avoiding entanglement with the wire, and consequent pain in withdrawing the needle. Fifth mode: This, which, from its inventor, Dr. Knowles, formerly house-surgeon of the Aberdeen Hospital, is also called the Aberdeen mode, has two varieties, which differ from each other only in the extent of the rotation given to the instrument by which the twist is effected. In the former variety, the instrument undergoes a half; in the latter it undergoes a quarter, rotation of a circle.

In either case, a threaded needle only, or a long pin only, is required. In the former, the instrument is inserted some lines to one side of the bleeding artery, and passed behind it; its point is then made to emerge on the surface of the wound a few lines on the other side of the vessel. Then the needle (or pin) is twisted half a rotation, so as to bring its head to the side where its point was before making the twist—the instrument being now above instead of below the artery, and pressed well down upon it. Finally, the point of the instrument is pushed into the tissues beyond the artery, so as to secure it in the proper position, and retain the twist. The latter (and preferable) variety requires only a quarter-rotation to be given to the acupressing instrument. First, the needle (or pin) is entered on one side of the bleeding artery; then pressed onward a few lines in the same direction as the length of the vessel, so that its point emerges on the surface of the wound. Secondly, a quarter-rotation is given to it, so as to place it above the artery; and it is well pressed down against the small portion of tissues between the instrument and the vessel. Thirdly, the instrument is secured, and the twist retained by sending the point into the tissues beyond the artery. Sixth mode: This was devised by Dr. Keith of Aberdeen, and requires a long pin with a duplicature of passive iron wire. The point of the pin is inserted a few lines from the artery; passed below or by the side of it; and afterwards pushed on so as to make the point emerge a few lines beyond the bleeding mouth. The duplicature of iron wire is then thrown over the point of the pin; then the two ends are crossed behind the stem of the pin, so as to take the bleeding mouth between them. The ends of the wire are then pulled tightly enough to stop the hæmorrhage; then brought forward by the sides of the pin (one on each side), and finally fixed by a half-twist in front of the pin, and close down upon it. Seventh mode: In this, a long needle is passed through the cutaneous surface pretty deep



Seventh Method.

into the soft tissues, at some distance from the vessel to be compressed; then it is made to emerge near the vessel; then it bridges over and compresses the artery; then it is dipped into the soft parts on the opposite side of the vessel; and finally, its point is brought out a second time through the common integument.

The advantages of acupressure as a hæmostatic agent (though not universally recognized, and indeed strongly denied by some practitioners) have seemed to many eminent surgeons to be these: first, it is not only the easiest of application, but it is the quickest mode yet devised for arresting hæmorrhage; second, this abridgment of the time required for arresting hæmorrhage, lessens the risk of suppuration, and other effects of the higher grades of inflammation in the stump; third, it causes no condition which must be followed by suppuration, whereas the use of the ligature has never been known to obtain immediate union, or union by primary adhesion, without the formation of pus; fourth, it has never been followed by pyæmia—a constant and distressing result in the case of the ligature; fifth, the presence of a foreign body in the wound—always a source of irritation—is of much shorter duration in the case of the needle than of the ligature, while the former does not divide and strangle the arterial coats, like the latter; sixth, the patient on whom acupressure has been practised is comforted by the assurance, that in a very few hours after the operation, all foreign matter will be removed from the wound—a consolation which he never enjoyed with the ligature.—*Proceedings of the Royal Society of Edinburgh*, vol. iv. p. 249; *Edinburgh Medical Journal*, January 1860; *Medical Times and Gazette*, February 11, 1860; *Acupressure*, 1 vol. 8vo, by Sir J. Y. Simpson (1865); and *A Practical Treatise on Acupressure*, by Mr. Pirrie and Dr. Keith (1867). [Few surgeons now use A.]

ACUPU'NCTURE (Lat., puncturing or pricking with a needle [*acus*]), is a very ancient remedy, and one practised extensively in the East, for the cure of headache, lethargies, &c. In Europe it is

principally employed to relieve neuralgic pains, and those of chronic rheumatism. Steel needles are made use of, about three inches long, and set in handles. The surgeon, by a rotatory movement, passes one or more to the desired depth in the tissues, and leaves them there from a few minutes to an hour. Their insertion is accompanied by no pain, except the first prick—a fact the quacks of the 16th c. did not fail to take advantage of. According to Jerome Cardan, they traveled from place to place practising A., and before inserting the needle, they rubbed it with a peculiar kind of magnet, either believing, or pretending, that this made the operation painless. The relief to pain afforded by this simple operation is sometimes astonishing, and the wounds are so minute as to be perfectly harmless.—The needles are sometimes used as conductors of the galvanic current to deep-seated parts, and are sometimes made hollow—on the suggestion of Dr. Alexander Wood of Edinburgh—to allow of a small quantity of some sedative solution being ejected into the tissues, by which even the terrible pain of Tic Douloureux may be almost immediately relieved. See NEURALGIA.

A'DA, a town of the Austrain empire, in Hungary, eight miles south of Zenta. Pop. (1869) 9344.

ADAFU'DIA, a town of the Felattah country, West Africa, about 400 miles south-east from Timbuctoo, in about 13° 6′ N. lat., and 1° 3′ E. long. It is situated in a dry, healthy, and fertile plain, and is surrounded by a mud wall. Pop. supposed to be about 24,000. A large trade is carried on, and slaves form a principal part of the merchandise.

ADA'GIO, a slow movement or measure of time in Music, between *largo*, *grave*, and *andante*. In our more extended compositions of instrumental or chamber music the second or third *movement* is generally marked *adagio*, and serves as a contrast with the rapid and energetic movement of the preceding and following parts of the sonata or symphony. The A. must be written in a measure of time which will afford scope for a flowing and expressive slow melody with a gracefully varied accompaniment. Without contrasted movement and a lively variety in the accompaniment, the slow air would have a monotonous or dull effect. A clear and expressive execution of the A. is a sure test of ability and good taste in the player or singer, as it demands a pure and beautiful intonation, a true reading and phrasing of the cantilena, even in its most minute details, and a careful attention to all points of effect. The finest specimens of the A. are found in the works of the old masters, Haydn, Mozart, and Beethoven, and are as distinct in their features as were the composers in their personal characteristics. In recent works, our composers have generally succeeded better in their rapid movements than in the A.

ADA'L and ADE'L. The name Adal is applied by geographers to the flat country lying between Abyssinnia and the Red Sea, from Massowa in N. lat. 15° 40′, to the Bay of Tajurra, lat. 11° 30′. Adel would seem to designate the coast-country from Tajurra to Cape Guardafui, part of which is known as the country of the Somauli.

ADA'LIA, anciently *Attalia*, the chief seaport on the south coast of Asia Minor, in N. lat. 36° 52′; E. long. 30° 45′. The streets rise like the seats of a theater, up the slope of the hill behind the harbor. Pop. 13,000.

ADAM and EVE. The narrative of the creation and fall of A. and E. is given in Genesis. To the Scriptural account the later Jewish writers in the Talmud have made many tasteless additions. They tell us that the stature of A., when first created, reached to the heavens, while the splendor of his countenance surpassed that of the sun. The very angels stood in awe of him, and all creatures hastened to worship him. Then the Lord, in order to show the angels his power, caused a sleep to fall on A., and removed a portion of every limb. A. thus lost his vast stature, but remained perfect and complete. His first wife was *Lilith*, the mother of demons; but she fled from him, and afterwards E. was created for him. At the marriage of A. and E., angels were present, some playing on musical instruments, others serving up delicious viands; while the sun, moon, and stars danced together. The happiness of the human pair excited envy among the angels, and the seraph Sammael tempted them, and succeeded in leading them to their fall, from innocence.—According to the Koran, all the angels paid homage to A., excepting Eblis, who, on account of his refusal, was expelled from paradise. To gratify his revenge, Eblis seduced A. and E., and they were separated. Adam was penitent, and lived in a tent on the site of the temple of Mecca, where he was instructed in the divine commandments by the archangel Gabriel. After 200 years of separation, he again found E. on Mount Arafat. Many other traditions of the Jews and Mohammedans respecting A. and E. may be found in Herbelot's *Bibliothèque Orientale*.—In the system of the Christian Gnostics, and Manichæans, A. is one of the highest Æons.—According to the Calvinistic theology, A. was the *covenant head* or *federal representative* of the whole human race, who were thus involved in the consequences of his breach of the *Covenant* (q. v.) which God made with him at his creation. This view is supported by reference to the parallel drawn between A. and Christ in Rom. v. and 1 Cor. xv., in the latter of which chapters Christ is called, in contradistinction to A., 'the second man,' and 'the last A.'

ADAM (of Bremen), an old historical writer, whose work entitled *Gesta Hammenburgensis Ecclesiæ Pontificum*, gives a history of the archbishopric of Hamburg from 788 A. D. to the death of the Archbishop Adalbert in 1072. This work has great historical value; in addition to its notices of ecclesiastical affairs it gives accounts of the northern Slavonic tribes, which the author collected during a visit to the Danish king Svend-Estrithson. A. was canon and *magister scholarum* at Bremen from 1067 to the time of his death, which took place in 1076.

ADAM, ALEXANDER, LL.D., an eminent scholar and teacher, was born in the parish of Rafford, near Forres, in 1741. His father was a small farmer, with limited means and a numerous family, so that young Adam had to struggle through much hardship in the pursuit of the learning for which he thirsted. While studying at the University of Edinburgh, he had to support himself by giving private lessons, for which he was paid at the rate of one guinea a quarter. He breakfasted and supped on porridge and small-beer; a penny loaf served him for dinner. Such was the stern initiation—not, indeed, a singular case in Scotland—of the brave young scholar. His patient merits, however, soon gained recognition. A.'s first public office was that of classical master in Watson's Hospital, Edinburgh; and not long after (1761), he succeeded to the head-mastership of the institution. In 1768 he was appointed rector of the High School; and this situation he filled for nearly forty years with distinguished ability and success, giving himself to its duties with singular devotion, and raising the reputation of the school beyond what it had ever been before. In some of his efforts to that end he encountered such opposition as now seems almost fabulous. He composed a new Latin grammar (1772), in which he aimed at combining the study of English and Latin; but the town-council prohibited him from teaching it. In 1791 he published his *Roman Antiquities*, the work which did most to promote his reputation, and which, though now generally superseded by more accurate and comprehensive dictionaries, was for many years the best manual of the kind in existence. His *Summary of Geography and History* appeared in 1794, his *Classical Biography* in 1800, and his *Latin Dictionary*—an abridgment of a larger work unfinished at his death—in 1805. On the 18th of December, 1809, Dr. A. died of a fit of apoplexy, the effect of intense study, by which he had been seized in his class-room five days before. 'Amidst the wanderings of mind that accompanied it,' says Professor Pillans, the writer of his biography in the *Encyclo. Brit.* (8th edit.), and his successor in his chair, 'he was constantly reverting to the business of the class, and addressing his boys; and in the last hour of his life, as he fancied himself examining on the lesson of the day, he stopped short and said: "But it grows dark; you may go," and almost immediately expired.'

ADAM, ROBERT, a distinguished architect, was born at Edinburgh in 1728. His father, William Adam of Maryburgh, in Fifeshire, was also an architect of no mean repute. After receiving a university education, Robert A. proceeded in 1754 to Italy, and thence to Dalmatia, where he devoted some time, in conjunction with Clerisseau, a French architect, to exploring and making drawings of the ruins of Diocletian's palace at Spalatro. On his return to Britain he rapidly rose to distinction, was appointed architect to the king, and obtained extensive employment. The publication, in 1764, of the results of his labors at Spalatro, contributed to his reputation. In opposition to the heavy style of architecture prevalent at the time, A. introduced a taste for lightness and decoration, which, however, tended to the opposite extreme of weakness and triviality. Those, however, who form the lowest estimate of the general character of his designs, grant him the merit of having effected great reforms in British domestic architecture generally. In 1768 A. was elected M.P. for the county of Kinross. During upwards of twenty-five years, his practice, in partnership with his brother James, was more extensive than that of any other architect of the time. In 1773, the brothers commenced to publish a series of engravings of their chief designs, which was continued for some years. Robert died in 1792, and was buried in Westminster Abbey. The most generally admired of his works is the Register House, Edinburgh. Kedleston Hall, near Derby, is regarded by some as his greatest work. Among his other principal works are the University buildings and St. George's Church, Edinburgh (both altered from the original design), the Glasgow Infirmary, the Adelphi buildings, London, the screen to the Admirality, Caen Wood House, Luton House (altered), Lansdowne House, &c.

ADAMANTINE SPAR. See CORUNDUM.

ADAMITES, a sect of fanatics who spread themselves in Bohemia and Moravia in the 15th and 16th centuries, but had no

connection with the Hussites. One Picard is said to have been the founder of the sect about 1400. He styled himself Adam, the son of God, rejected the sacrament of the supper and the priesthood, and advocated the community of women. After his death, his followers spread themselves in Bohemia under several leaders. They even fortified themselves on an island in a tributary of the Moldau, and committed depredations around. They were detested as much by the followers of Huss as by the Catholics. Ziska (q. v.) made war against them, and slew great numbers; but they were never entirely rooted out. Even as recently as 1849, when the Austrian government declared religious liberty for all its subjects, certain members of this sect appeared and endeavored to gain proselytes. The official investigation into their character which took place at that time, represents their creed as a mixture of freethinking, quietism, and communism. The members belong to the peasant or laboring class; and both men and women are generally industrious, temperate, and discreet in their ordinary course of life; but at their nightly meetings, at which they dispense with clothes, the utmost licentiousness is said to prevail.—As early as the 2d c., there was a sect of Gnostic tendency, called *Adamites*, who sought, by abstaining from all indulgence of the senses, to recall the state of innocence men were in before the fall. They therefore rejected marriage, and in order to exercise the virtue of continence, went naked. They held that for those who had once attained the state of innocence, all actions were alike indifferent—neither good nor evil. This doctrine led directly to the greatest licentiousness. Aberrations of this kind, under various disguises and modifications, have made their appearance from time to time in all ages of the world.

ADAM'NAN, Saint, a member of the early Irish Church, to whom the world is deeply indebted for the information about that remarkable community which he left to posterity. His name was properly Adam, of which Adamnan is a diminutive. It is one of the peculiarities of that early church that the genealogies of its eminent members have been preserved with a minuteness scarcely rivalled in the days of peerages. He was born in the county of Donegal about the year 625. In the words of Dr. Reeves: 'His father, Ronan, was sixth in descent from Conall Gulban, the head of one of the two great races of the Northern Hy Neill, and in virtue of his birth, claimed kin to St. Columba and many of the sovereigns of Ireland. The father of Ronan was Tinne, from whom came the patronymic of *Ua Tinne*, or grandson of Tinne, an appellative which is occasionally found coupled with A.'s name. Ronnat, the mother of A., was descended from Enna, a son of Niall, whose race, Cinel Enna, possessed themselves of the tract lying between the channels of the Foyle and Swilly, which was called the Tir Enna, or land of Enna, and answers to the modern barony of Raphoe. He was, like many of the eminent Irish clergy, a statesman as well as an ecclesiastic, and we hear of his being sent on missions from his own people to Alfred, king of Northumbria. In the year 679, he was elected Abbot of Iona. His rule over that community was not, however, destined to be peaceful and fortunate.

The views held by the Irish Church about the holding of Easter and the form of the tonsure are now pretty well known as a chapter in the history of the church. However little their own importance might be, they are significant as the object of a bitter contest in which that church resisted the rules promulgated from Rome. In his intercourse with the Saxon Church, A. had adopted the Romish or orthodox views, as they are termed, and endeavored to put them in practice in his own community. He was thwarted in this object, and it is said that mortification at the failure caused his death. He died in the year 704, on the 23d of September, which is the day of his translation in the calendar. He left behind him an account of the Holy Land, containing matters which he says were communicated by Arculfus, a French ecclesiastic who had lived in Jerusalem. It is valuable as the earliest information we possess of Palestine in the early ages of Christianity. But far more valuable in his *Vita Sancti Columbæ*, his Life of St. Columba, the converter of the Picts, and founder of Iona. Along with miracles and many other stories palpably incredible, this book reveals a great deal of distinct and minute matter concerning the remarkable body to which both the author and his hero belonged. The standard edition of the book is that of Dr. Reeves, edited in 1857 for the Bannatyne Society of Edinburgh, and the Irish Archæological Society, which (with an English trans.) forms the 6th vol. (1875) of *Scottish Historians*. Nearly all the information to be had about the early Scoto-Irish Church is comprised in that volume.

ADAM'S BRIDGE, a chain of shoals extending across the Gulf of Manaar, between Ceylon and the peninsula of Hindostan. It forms a great obstruction to vessels proceeding through the channel.

ADAM'S PEAK, the name given by Mohammedans, and after them by Europeans, to a mountain summit in the south of Ceylon, 7420 feet high (not, however, the highest of the group). The native name is Samanhela. The cone forming the summit is a naked mass of granite, terminating in a narrow platform, in the middle of which is a hollow, 5 feet long, having a rude resemblance to a human footstep. Mohammedan tradition makes this the scene of Adam's penitence, after his expulsion from Paradise; he stood 1000 years on one foot, and hence the mark. To the Buddhists, the impression is the *Sri-pada*, or sacred footmark, left by Buddha on his departure from Ceylon; while the Hindus claim it as the footprint of their god Siva. Over the sacred spot stands a wooden canopy, and multitudes of devotees, Buddhist, Hindu and Mohammedan, frequent it.

ADAMS, John, the second president of the United States of North America, was born at Braintree, in Massachusetts, on the 19th of October, 1735. His parents were descended from a Puritan family which had emigrated from England to Massachusetts in 1640. Before the Revolution, A. had distinguished himself as a jurist, and wrote in the *Boston Journal* an essay on *Canon Law and Feudal Law* (1765). He was sent by Massachusetts to the congress which commenced its sittings in Philadelphia in 1774. With Lee and Jefferson, he boldly argued for a separation from the mother-country; and Lee's proposition of a declaration of independence was carried on the 4th of July, 1776. A. and Jefferson had been appointed to draw up the Declaration of Independence, but it appears that Jefferson is the sole author of it. In succeeding years, A. was employed on many important negotiations with European powers; among others, he assisted Franklin, Jay, Jefferson, and Laurens, in 1782, in settling the conditions of peace with England. In 1785 he came to London as the first ambassador from the Union. George III. expressed his pleasure in receiving an ambassador who had no prejudices in favor of France, the natural enemy of the English crown, and A. replied: 'I have no prejudices but in favor of my native land.' He published in London his *Defence of the Constitutions of Government of the United States* (3 vols. 1787). On his return to America, in the same year, he was elected as vice-president of the United States, and on the retirement of Washington (in 1797) became president. The enmity of the democratic party, which had already been excited against him, was now increased by the measures which he judged necessary to uphold the national honor against the pretensions of France, and still more by his decided favor for a hereditary aristocracy. In 1801, when his term of four years of office had expired, his adversary Jefferson was elected by a majority of one vote. A. now retired to his estate of Quincy, near Boston, where he occupied himself with agricultural pursuits. After this retirement, he received many proofs of respect and confidence from his countrymen. When 85 years old, we find him still in his place as member of the convention appointed (1820) to revise the constitution of Massachusetts. He died on the 4th of July 1826, on the fiftieth anniversary of the day when he had proclaimed in congress the independence of the United States.

ADAMS, John Couch, discoverer, simultaneously with Le Verrier, of the planet Neptune, was born near Launceston in Cornwall, 1819. He early manifested an aptitude for mathematics; and after the usual amount of school-training, he was sent to St. John's College, Cambridge, where he attained the honor of senior wrangler, and became a mathematical tutor. In 1841, he undertook to find out the cause of the irregularities in the motion of Uranus, anticipating, indeed, his own and Le Verrier's discovery—namely, that they are due to the influence of an unknown planet. Le Verrier did not commence his researches till the summer of 1845; but on the 10th of November published the results of his calculations, demonstrating the existence of an unknown planet, declaring it to be the cause of the known disturbance, and assigning to it almost the same place as A. had done in a paper which he left with the Astronomer Royal at Greenwich Observatory in the previous October, but which he neglected to publish. Le Verrier has thus acquired, naturally, the whole honor of the discovery; but the merit of A. is not less. The researches of the latter commenced earlier; his discovery, too, was earlier; and it was only unfortunate for the reputation of the young astronomer that he omitted to publish the results he had obtained. The council of the Royal Astronomical Society showed that they appreciated the value of A.'s labors, by awarding equal honors to both. In 1858, A. was appointed to the chair of mathematics in St. Andrews, which, however, he vacated within a few months, on being nominated to the Lowndean Professorship of Astronomy, Cambridge.

ADAMS, John Quincy, the sixth president of the United States of North America, and son of the second president, was born in Massachusetts, July 11, 1767. In his boyhood he accompanied his father on an embassy to Europe, and passed a considerable part of his youth in Paris, at the Hague, and lastly in London. When his father was elected president, the younger Adams was sent on an embassy to Berlin, and traveled through Silesia. Of this country he gave a description in his letters, which were first published in the *Portfolio*, a Philadelphia journal, and afterwards translated into French and German. In his political views, A. perfectly agreed with his father, and, consequently, he was re-

called from Berlin when Jefferson was elected president in 1801. On his return to America, he was engaged as professor of rhetoric, at Harvard University, in Massachusetts, the stronghold of the federalists; but he soon left his academical post to engage again in politics, and was chosen as senator of Massachusetts. He soon became prominent as a leader of the federal party; but in later years he adroitly changed his course, and seemed inclined towards the party of Madison. By Madison he was sent as plenipotentiary to Russia, and afterwards to England. On this embassy he took a part in the negotiation of peace with England, and assisted with his counsel the deputies sent from America to Ghent. When Monroe was elected president, he recalled A. from Europe, and made him secretary of state. On the retirement of Monroe from office, A. gained the presidency, after a hard contest against Jackson, in February 1825. He had now to strive against democratic majorities; for, though he endeavored to make himself popular by betraying the schemes of his former political associates, he could never win the confidence of the growing party of democrats; and on the expiration of his term of office, he had to give place to General Jackson. A. retired to his estate of Quincy, near Boston; but in 1830 was chosen as representative of his district. He now joined the party of abolitionists, and frequently raised the whole House of Representatives against himself by his incessant petitions on the slavery question. On one occasion (in 1842), in order to assert strongly in the abstract the right to petition, he went so far as to present a petition for the dissolution of the union! This was misunderstood, and turned against him. He died at Washington during the session of congress, February 23, 1848. A. was one of the most able among American statesmen of the old school, and a skilled diplomatist. See *Memoirs of A.* (vols. i. and ii., 1874.)

ADAMS, SAMUEL, one of the leading men of the American revolution, was born at Boston, U.S., September 27, 1722. His political leanings were early manifested; on taking the degree of A.M. at Harvard College, 1743, he maintained the affirmative of the question: Whether it be lawful to resist the supreme magistrate, if the commonwealth cannot be otherwise preserved? He intended at first to become a clergyman, but afterwards commenced a small business, and was made a collector of taxes. He displayed on all occasions an unflinching zeal for popular rights, and was, by the patriotic party, placed in the legislature in 1766. A. was a member of the first congress, and signed the declaration of independence in 1776. He took an active part in framing the constitution of Massachusetts, and was for several years president of the senate of that state. He held the office of its lieutenant-governor from 1789 to 1794, and of governor from that time till 1797. He then retired from public life, and died at Boston, October 2, 1802, poor as he had lived. A.'s character was one of great courage and determination. He was, at the same time, somewhat narrow-minded and bigoted, both in religion and politics. He was prejudiced against Washington, whose conduct of the war his ignorance of military matters led him to think weak and dilatory; and the confidence reposed in Washington, as first president of the republic, seemed to A. to savor of aristocracy.

ADA'NA, a Turkish ejalet or province in the south-east of Asia Minor, derives its name from its chief city Adana, containing 25,000 inhabitants. The city is distant almost thirty miles from Tarsus, on the way to Aleppo, commands the pass of the Taurus mountains, and carries on a considerable trade between Syria and Asia Minor. Pompey peopled the territory of Adana with pirates. The Syrian kings made the place a city, under the name of *Antiochia ad Sarum*, and on the ruins of Antiochia the caliph Haroun al Raschid built Adana. The present inhabitants are mostly Turks, mixed with some Greeks and Armenians.

A'DANSON, MICHEL, a celebrated French botanist, born at Aix, April 7, 1727. He soon left the clerical profession, for which he was educated, and devoted himself to the study of natural history. In his early career, he entertained the ambition of superseding the Linnæan system by a clearer and more comprehensive method of arrangement. When about twenty-one years old, he went to Senegal in Africa, and, fearless of the unwholesome climate, stayed there five years, afterwards returning to France, with a large collection of specimens in natural history. Soon after his return, he laid before the French East India Company his plan of a colony on the African coast, in which all colonial produce was to be raised without slave-labor. But his plan was neglected. He published, in 1757, his *Histoire Naturelle du Sénegal*, and, in 1763, his *Familles des Plantes*, in which he endeavored to give a new form to botany; but he could not prevail against the established Linnæan system. His next undertaking was one on a vast scale —nothing less than a complete Encyclopædia, for which he hoped to gain the patronage of Louis XV. and the Academy; but though his bold plan was regarded with admiration, he received little substantial encouragement. This, however, did not check his enthusiasm; he proceeded with the work until he exhausted his means. During the Revolution he fell into very indigent circumstances. When invited to become a member of the National Institute, he answered that he was unable to attend for want of a pair of shoes. Afterwards, he received a pension, and until the time of his death, August 3, 1806, he was earnestly devoted to the prosecution of his plan, too vast to be carried out by an individual.

ADANSO'NIA, a genus of the natural order *Sterculiaceæ* (q.v.), sub-order *Bombaceæ*, named by Linnæus in honor of the botanist Adanson (q.v.), and distinguished by a simple deciduous calyx, a very long style, with numerous stigmas, and a woody capsule containing a farinaceous pulp. The only known species, *A. digitata*, the *Baobab*, also called the Monkey-bread Tree, is a native of the tropical parts of Western Africa, but now introduced into the East and West Indies. It is one of the very largest trees—not rising to a great height, but exceeding almost all other trees in the thickness of its trunk (20—to 30 feet). Even its branches (60—70 feet long) are often as thick as the stems of large trees, and they form a hemispherical head of 120—150 feet in diameter; their outermost boughs drooping to the ground. The leaves are digitate or 7-fid; the flowers are white and extremely large, on drooping peduncles of a yard in length. The fruit (*Monkey-bread*) is of the size of a citron. The bruised leaves (*Lalo*) are mixed with the daily food of the inhabitants of tropical Africa; and Europeans in that country employ them as a remedy for diarrhœa, fevers, and diseases of the urinary organs. The pulp of the fruit, which is slightly acid and pleasant to the taste, is eaten with or without sugar; and the expressed juice mixed with sugar is much esteemed as a beverage, being very refreshing, effectual in quenching thirst, and regarded as a specific in putrid and pestilential fevers. The bark is said to be powerfully febrifugal.

ADDA, the Latin *Addua*, a river of Lombardy, rising in the Rhætian Alps above Bormio. It flows into the Lake of Como, issuing from which below Lecco, it traverses the plain of Lombardy in a direction S.S.E., passing Lodi and Pizzighetone, and falls into the Po about 8 miles above Cremona. It formerly bounded the republic of Venice and the duchy of Milan.

ADDER, a common English name of the Viper (q.v.), but also often more vaguely used for poisonous serpents of the family *Viperidæ*. Where the name occurs in the authorized version of the Scriptures, it appears to be always in this vague sense; although the terms in the same places of the original may probably be more precise. A very venomous serpent of New South Wales (*Acanthopis tortor*) is sometimes called the *Death* or *Black A.*

ADDISCOMBE. See CADET.

ADDISON, JOSEPH, the son of an eminent clergyman of the Church of England, was born at Milston, near Amesbury, in Wiltshire, on the 1st May 1672. After a preliminary education at various schools, he entered the university of Oxford when only fifteen years of age, where he greatly distinguished himself, especially by the facility with which he wrote Latin verse. He was originally intended for the church, but various circumstances conspired to draw him aside into literature and politics; the principal of which were, his acquaintance with Dryden, who honored the young poet with his patronage, and his intimacy with Lord Somers, whose favor he gained by dedicating a poem to him on one of King William's campaigns. In 1699 he received a pension of £300 a year, and then set out on a continental tour. While in France, he perfected himself in the language of the country. On the outbreak of the Spanish war of succession, he departed to Italy, where he penned his charming 'Letter' to Lord Halifax. Towards the end of 1703, he returned home by way of Switzerland and Germany; but his expectations of a 'place' were disappointed, for the Whigs were out of office. The battle of Blenheim, however, which occurred in the next year, presented a brilliant opportunity to him, which he did not fail to make the most of. The ministry wished the victory commemorated in verse, and A. was appointed to do it. Lord Godolphin, the treasurer, was so excessively delighted with the first half of the triumphal poem, that before the rest was finished, he made A. a Commissioner of Appeals. The poet was now fairly involved in politics. He accompanied Halifax to Hanover; became under-secretary of state 1706, and in 1709 went to Ireland in the capacity of secretary to the Lord-lieutenant, where he also obtained the office of Keeper of the Records, worth £300 a year. In the same year, his friend Steele commenced *The Tatler*, to which A. soon became a frequent contributor. He also wrote a number of political articles in the *Whig Examiner*. On the 1st of March 1711, appeared *The Spectator*, the most popular and elegant miscellany in English literature. With an interruption from 6th December 1712 to 15th June 1714, during part of which time *The Guardian*, a similar periodical, took its place, *The Spectator* was continued to 20th December 1714. A.'s fame is inseparably associated with this periodical. The quality of his genius is now determined by it, rather than by the artificial rhetoric of his *Cato*. He was the animating spirit of the magazine, and by far the most exquisite essays which appeared in it are by him. In 1713 appeared *The Tragedy of Cato*, the popularity of which, considering its total want of dramatic power, was amazing. It was

generally understood to have a political as well as a poetical inspiration; but so prudently had A. expressed himself that both parties, Whig and Tory, received its frigid declamation with rapture. It was translated into various European languages; and even the monarch of French criticism, Voltaire, held Shakspeare a barbarian in tragedy compared with our author. 'All the laurels of Europe,' says Thackeray, 'were scarcely sufficient for the author of this "prodigious" poem.' Every one in England praised it except Dennis. A. was called the 'great Mr.A.' after that wonderful night in the theater, when, as Pope says, 'the

J Addison.

numerous and violent claps of the Whig party on the one side were echoed back by the Tories on the other.' This enthusiasm was a delusion which time has effectually dispelled. In 1716, A. married the Dowager-countess of Warwick, and in the following year was appointed secretary of state. For neither of his new situations was he at all suited. Lady Mary Wortley Montagu, in a letter to Pope, expressed her fear that 'a day might come when he would be heartily glad to resign both.' He was so extremely timid and awkward in large companies, that it was out of the question for him to attempt debating in parliament—a thing indispensable to one in his position. He consequently resigned in 1718. Then as to the other matter, Dr. Johnson sareastically remarks, that 'the lady was persuaded to marry him on terms much like those on which a Turkish princess is espoused—to whom the sultan is reported to pronounce; "Daughter, I give thee this man for thy slave."' No one can doubt that this marriage was a mistake on the part of A. His health had been for some time in a very precarious state; and at length, after an illness of a few months, he died at Holland House, Kensington, on the 17th of June, 1719, in the 48th year of his age, three years after what Thackeray calls 'his splendid but dismal union.' A. had appointed Mr. Tickell his literary executor, who published his works shortly after in 4 vols. quarto. Besides those to which we have incidentally alluded, he wrote *A Treatise on the Usefullness of Ancient Medals, Especially in Relation to the Latin and Greek Poets*, which, however, excited little interest. He also left an unfinished work on *The Evidences of the Christian Religion*. But the most delightful and original of all his productions is that series of sketches in *The Spectator* of which Sir Roger de Coverley is the central figure, and Sir Andrew Freeport and Will Honeycomb the side ones. Sir Roger himself is an absolute creation; the gentle yet vivid imagination, the gay and cheerful spirit of humor, the keen, shrewd observation, and fine raillery of foibles which A. has displayed in this felicitous characterization, render it a work of pure genius. But A. in prose is always excellent. He has given a delicacy to English sentiment, and a modesty to English wit which it never knew before. Elegance, which in his predecessors had been the companion of immorality, now appeared as the advocate of virtue. Every grace was enlisted in the cause of a benign and beautiful piety. His style, too, is perfect after its fashion. There are many nobler and grander forms of expression in English literature than A.'s, but there are none comparable to it in sweetness, propriety, and natural dignity. 'Whoever wishes,' says Dr. Johnson, 'to attain an English style, familiar but not coarse, and elegant but not ostentatious, must give his days and nights to the volumes of A.' His various writings, but especially his essays, fully realized the purpose which he constantly had in view; 'to enliven morality with wit, and to temper wit with morality.' They materially helped to reform the manners of their time, and created in addition, that class of readers, which has now become so prodigious in numbers, and on which all literature now depends for its support—the middle class. It must, however, be admitted, that since the beginning of the present century, their popularity has undergone a considerable decline. The chief cause of this is, that much in them relates to temporary fashions, vices, rudenesses, and absurdities which are now out of date. Yet, after making every abatement, it is certain that there are in the collected works of A. so many admirably written essays on subjects of abiding interest and importance, on characters, virtues, vices and manners, which will chequer society while the human race endures, that a judicious selection can never fail to present indescribable charms to the man of taste, piety, philanthropy, and refinement.

A'DELAAR, Cord Sivertsen, one of the greatest naval commanders of the 17th c., was born at Brevig, in Norway, in 1622, and in his twentieth year was employed in the naval service of Venice against the Turks. On one occasion he broke through a line of sixty-seven Turkish galleys which surrounded his ship, sunk fifteen, and burned several others. Frederic III., by the offer of the then unheard-of salary of 7200 dollars per annum, engaged him as admiral of the Danish fleet; and, in 1675, under Christian V., he took the command of the whole of the Danish naval force against Sweden, but died suddenly at Copenhagen before the expedition set out.

A'DELAIDE, the capital of the colony of South Australia, is situated on the Torrens, seven miles from Port Adelaide, with which it is connected by railway. The first settlement was made in 1836, but already a university has been established at A., and liberally endowed. The Torrens, which is spanned by several bridges, divides the town into North and South Adelaide. The streets of A. are broad and regularly laid out, especially in A. proper; to the south of the river, where they all cross each other at right angles. Among the public buildings, are the post-office, the government offices, the governor's house, and the town-hall. It is the seat of an Episcopal and of a Roman Catholic bishop, and has an unusual number of churches. A. also possesses a large botanical garden, covering more than 120 acres of ground. The town is surrounded by a belt of permanently reserved land, half a mile in width, called the *Park Lands*, and beyond this are the suburbs. A. is abundantly supplied with water from two reservoirs 6 or 7 m. distant. The chief manufactures are woollen, leather, iron, and earthenware goods. Its port (Port Adelaide) has a safe and commodious harbor. Pop. (1871) 27,208; (1881) 37,892.

A'DELSBERG, a district and market-town in Carniola, in the vicinity of which is a large stalactite cavern called the *A. Grotto*, through which flows a rapid stream. This cavern, the largest in Europe, is divided into the Old and the New Grotto: the former is 858 feet in length; the latter, 8550 feet in length, contains some most remarkable stalactites, among which is 'the curtain' (*vorhang*), a white semi-transparent wall. The town of A. is 22 m. N.E. of Trieste.

A'DELUNG, Joh. Christoph, a distinguished linguist and lexicographer, was born, 1732, in Pomerania, and died, 1806, at Dresden, where he had held the office of chief-librarian. His chief works are his *Wörterbuch der Hochdeutschen Mundart* (Dictionary of High German), in which he took Dr. Johnson as his model; and his *Mithridates oder allgemeine Sprachenkunde*, a work on general philology.

A'DEN, a peninsula and town on the south-west coast of Arabia. The most southern promontory of the peninsula, Cape Aden, is in N. lat. 12° 47', and E. long. 45° 9'. This peninsula, the area of which is 18—20 square miles, is doubtless of volcanic origin, and consists chiefly of a range of hills not exceeding 1776 feet in height. It is joined to the mainland by a narrow, level, and sandy isthmus. In a valley which forms the crater of a submarine volcano, stands the town of A., which is also named from the neighboring promontory, Bab-el-Mandeb. The area of the peninsula is about 5 square miles; but to provide for the growing population, an area of 34 square miles on the mainland has since 1880 been added. The town of A. is in an indescribably barren district; the heat is intense. A. suffers from want of water; and though it is sometimes called 'healthy on the whole,' other accounts make it a very hot-bed of disease. Pliny knew of the place, for which he writes 'Athana.' It was also known by the name of 'Emporium Romanum.' Up to the time of the circumnavigation of Africa, A., so favorably situated at the entrance of the Red Sea, was the chief mart of all Asiatic produce and manufactures, and even the Chinese traded here. Marco Polo and other voyagers of the middle ages told wonders of the riches and splendor of the place. In the course of time, however, it was reduced to a small village, which in 1838 contained only about 600 inhabitants, including some 250 Jews and about 50 Indian merchants. The Anglo-Indian government had long been on the outlook for a speedy route by steam from India to Europe. The explorations on the river Euphrates afforded no satisfactory results,

and ultimately the old commercial route by the Red Sea was chosen. This, of course, gave to the shores and harbors of that sea a new importance, and the English soon saw the advantages of a position like that of A. About this time, a British vessel suffered shipwreck off the coast of A., where the passengers were plundered and in other ways ill treated by the natives. A vessel was therefore despatched from Bombay, in 1838, to compel the sultan of the country to make restitution, and also to learn on what terms the Arabs would be willing to cede A. to the English. Captain Haynes, by fair promises, succeeded in gaining a cession of the country from the sultan, a weak and covetous old man. Afterwards, fearing the displeasure of some of the neighboring tribes, and partly moved by religious sheiks, the sultan repented of the transaction, but was held to his contract by force of arms; and on January 11, 1839, after a few hours' contest, A. fell into the hands of the British. Here they have a strong garrison and fortifications. In its medieval prosperity, A. had had a magnificent system of cisterns for collecting the rain-water from the circle of hills that surround it. Who built them is unknown; but it is conjectured that they had been begun about the 6th or 7th century. They had been allowed to fall into disuse, and were filled with rubbish, and in ruins; but recently a considerable number have been excavated and restored by the British government. If all restored, they seem capable of containing 30 million gallons. A. is of great importance in a mercantile and nautical point of view, having a position between Asia and Africa like that of Gibraltar between Europe and Africa. The population and resources of the place have rapidly increased since 1838, and the opening of the Suez Canal in 1869 gave it a great impetus. The annual value of its imports and of its exports range from below a million to a little above it. It has now a busy population of 30,000, composed of every nationality. Aden is a telegraphic station on the cable between Suez and Bombay, laid down in 1870.

ADENI'TIS AND ANGEIOLEUCI'TIS are the terms employed in medicine to indicate inflammation of the lymphatic glands and inflammation of the lymphatic vessels respectively. In most instances of inflammation in the absorbent or lymphatic system, the vessels and glands are simultaneously involved. Although there is plenty of evidence, from the examination of the dead body, that inflammation of the lymphatics may occur internally, it is only observed in the living subject in connection with the skin or an ulcerated surface. The disease usually originates in an open wound of almost any form, as a puncture, a cut, or a blister. This wound is directly infected by some morbid matter, as, for example, some local inflammatory product, such as the putrid secretion of a sore; but more commonly by some irritating or poisonous matter from without, or some gaseous matter. The inflammation that is thus set up in the lymphatics always extends upwards from the wound, and may be traced by lines of redness following the course of these vessels, and not of the veins, and terminating where the inflamed vessels enter a gland. In the arm, for example, they never pass the armpit, in which the axillary glands lie. The tenderness along these inflamed tracts is excessive, and extends to the next gland, which appears to arrest the further progress of the poisoned lymph, by becoming itself inflamed. The degree of inflammation of the gland may vary from slight enlargement with tenderness on pressure, to profuse suppuration. The suppuration may not take place till a week or more after the inflammation of the vessels has subsided, and may excite no rigors or other constitutional symptoms; and a patient may be quite unconscious that there is anything serious the matter with him, when half a pint or more of matter may be collecting in and around a gland in the armpit. The constitutional symptoms attending an attack of acute inflammation of the lymphatic vessels (*angeioleucitis*) are often severe, and are thus summed up by Mr. Moore in his essay 'on Diseases of the Absorbent System' in Holmes's *System of Surgery:* 'Rigors, nausea, and vomiting, heat of skin, thirst, dryness and coating of the tongue, with constipation, sleeplessness, and a feeling of languor, are usually the severest accompaniments of the disease. If the fever be typhoid, if there be profuse fetid sweats, severe muscular pains, high excitement, or dry burning heat of the skin, and marked delirium, the poison is no longer limited within the lymphatic channels, but has infiltrated the cellular tissues, and has tainted the blood. As the inflammation subsides, a cutaneous eruption or fetid discharge from the bowels comes on, and the general symptoms become those of exhaustion.'

The following observations on the treatment of inflamed absorbents are mainly taken from Mr. Moore's essay. Many of the ordinary duties of life perpetually expose manual laborers and others to this painful affection. In the way of prevention, the practice of smearing the hands with oil or grease before touching noxious fluids, is found to prevent the mischief which might arise from absorption by a cut or sore, and is a useful precaution in dissection and in post-mortem examinations; and there can be no doubt that the timely application of a layer of collodion or of court-plaster might avert many attacks of inflamed absorbents. When symptoms of this form of inflammation supervene, the wound should be thoroughly cleansed, by being laid more open, if all its parts are not freely exposed, and then put it under a stream of water, syringed, or soaked in a hot bath, as may seem most suitable. If recent or punctured, it should be sucked, and then freely touched with a pencil of nitrate of silver. If flabby, it should be treated with a stimulating lotion of sulphate of zinc or copper; if fetid, it should be wrapped in a solution of Condy's Fluid, or in chlorinated lotions; and if sloughy, it should be covered with Peruvian balsam and a poultice of linseed meal, charcoal, or yeast. A warm poultice of one of these kinds, frequently changed, is usually the most soothing application. At the same time, nitrate of silver should be two or three times drawn along the red tender lines indicating the course of the lymphatics, after which the arm should be enveloped in cotton-wool; and perfect rest in a comfortable position enjoined. Due attention must at the same time be paid to the general condition of the system, and especially to the condition of the intestinal secretions.

ADENOCELE (Gr. *adene*, a gland, and *kele*, a tumor) is the term now employed in surgery to indicate a kind of new growth in the female breast, the tissue of which closely resembles the breast-tissue itself. It is synonymous with the terms 'Chronic Mammary Tumor,' 'Pancreatic Sarcoma,' 'Mammary Glandular Tumor,' 'Hydatid Disease of the Breast,' 'Serocystic Sarcoma,' &c. The diversity of names indicates the diversity of the outward forms seen in these growths. A full account of these tumors, and of the treatment to be adopted (which consists in excision), is given in Mr. Birkett's article, 'On Diseases of the Breast,' in Holmes's *System of Surgery*.

ADE'RNO (ancient *Adranum*), a town of Sicily, 17 miles northwest from Catania. It is situated at the base of Mount Etna, close to the Simeto, on which are some remarkable cascades near the town. It is surrounded by walls, is a very clean town, and is full of convents and nunneries, mostly founded by the Normans, so that bare walls of lava and grated windows appear everywhere, and the sound of bells is almost incessantly heard. Pop. 14,000.

A'DERSBACH ROCKS, a remarkable labyrinthine group of sandstone rocks situated near the village of Adersbach, in Bohemia. The aspect of some parts of the group has been compared to that of a city ruined by a conflagration. One of the pinnacles rises to a height of 218 feet. The structure of the rocks has been produced not by any commotion of the earth, but by the influences of rain, frost, and other atmospheric changes, wearing down the soft sandstone into many fantastic forms. During the Thirty Years' War, the miserable people of Bohemia often found refuge in this locality.

ADHE'SION is the species of attraction that is manifested between two separate bodies when their surfaces are brought to a considerable extent into close contact. It is nearly allied to Cohesion (q. v.). Adhesion is seen in the case of two solid bodies when their polished surfaces are laid on one another; but it acts more powerfully between solids and fluids, owing to their intimate contact. We have instances of this in the film of water adhering to any body dipped in that fluid, and in water running down the side of an inclined vessel from which it is being poured. All solids and liquids do not exhibit this mutual attraction. Thus, though bright metals are wetted by mercury, glass and wood are not; nor does water adhere to fat. Capillary attraction (q. v.) is a special manifestation of adhesion.—The adhesion of gases to the surface of solids is described by Liebig as playing an important part in many processes. A more or less condensed atmosphere of gases surrounds every body, and every particle of a powdered or porous body; and gases, such as oxygen, have in this condition an intensified chemical action. Platinum in the state of powder condenses 800 times its volume of oxygen; and when hydrogen comes in contact with the oxygen in this state, the two gases combine, though, when free, they require the application of flame before they will combine.

ADHESION, in Pathology, is when two surfaces of a living body become united. If they have been separated by the cut of a sharp instrument, and are immediately and accurately placed in apposition to each other, they may adhere at once without any apparent bond of union. But, generally, the blood-vessels of the part pour out, between the surfaces, a fluid, consisting of the watery part of the blood holding fibrine in solution. The liquid part of this is reabsorbed or escapes from the wound, leaving the fibrine, in which first cells are developed, and then blood-vessels: it is now a living tissue, and forms a uniting medium between the sides of the wound.

Serous membranes, as the pleura, pour out this fluid when inflamed; and hence the adhesions so often the result of pleurisies.—If two granulating (see GRANULATIONS) surfaces be kept in contact, the opposite granulations may fuse together, and the wounds unite by secondary adhesion.

ADIA'NTUM. See MAIDENHAIR.

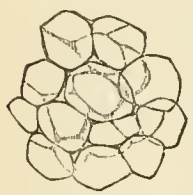
A'DIGE, after the Po, the most important river in Italy, rises in

the Rhætian Alps. Various streamlets descend from these mountains, and, uniting at Glarus, form the Etsch, which is, properly speaking, the beginning of the A., and the name by which the entire river is known in Germany. From Glarus it flows east into the Tyrol, then, after a slight *détour* to the south-east, it flows due south past Trent and Roveredo, into Lombardy, and, passing Verona, takes a south-eastern sweep, discharging its waters into the Adriatic, between the mouths of the Po and the Brenta. In ancient times (when it was called the *Athesis*), it had a more northerly *embouchure*. It is very rapid, and subject to sudden swellings and overflowings, which cause great damage to the surrounding country. The two most remarkable inundations on record are those which occurred in 1721 and 1724. During the Italian wars, its banks were repeatedly the scenes of bloody engagements. Its length is about 250 miles; its breadth in the plain of Lombardy, 650 feet; its depth, from 10 to 16 feet. It is navigable as far as Trent, but the navigation is rendered extremely arduous, on account of the swiftness of the current. The A. is a transit-river for the trade of Germany and Italy.

A'DIPIC ACID ($C_{12}H_8O_8.2HO$) is a dibasic acid of the oxalic series, having the general formula $C_{2n}H_{2n-2}O_8$; and is obtained in the form of white, opaque, hemispherical nodules (which are probably aggregations of small crystals), by the oxidizing action of nitric acid on oleic acid, suet, spermaceti, and other fatty bodies. The name is derived from the Latin *adeps*, fat, and must not be confounded with that of a similar acid of the same group, known as *Sebacic Acid*.

ADIPOCE'RE (Lat. *adeps*, fat, and *cera*, wax), a substance resembling a mixture of fat and wax, and resulting from the decomposition of animal bodies in moist places or under water. Human bodies have been found, on disinterment, reduced to this state. Lean beef kept under running water for three weeks, was found reduced to a fatty substance. A piece of a liver that has suffered what is called fatty degeneration, if immersed for some time in water, is said to become exactly like A.

A'DIPOSE TISSUE is a peculiar kind of animal membrane or tissue, consisting of an aggregation of minute spherical pouches or vesicles filled with fat or oil. The tissue itself is organic and vital, the vesicles secreting the fatty matter from the capillary blood-vessels with which they are surrounded; the secreted product, or fat (q.v.), is inorganic, and devoid of vitality. The adipose tissue differs from cellular or filamentous tissue in having the vesicles closed, so that the fat does not escape even when fluid. A dropsical effusion, which infiltrates the filamentous tissues, does not affect the adipose tissue. There is a considerable layer of adipose tissue immediately under the skin; also around the large vessels and nerves, in the omentum and mesentery, around the kidneys, joints, &c.


Adipose Tissue, magnified.

A'DJECTIVE is the name of one of the classes into which grammarians have divided words. An adjective is so called, not so much from its *being added* to a substantive, as because it *adds* to the meaning, or more exactly describes the object, than the simple substantive or general name does. The effect of an adjective is also to limit the application of the name to which it is joined. Thus, when *tall* is joined to *man*, there is more meaning conveyed; there are more properties suggested to the mind by the compound name *tall man*, than by the simple name *man;* but *tall man* is not applicable to so many individuals as *man*, for all men that are not tall are excluded.—Nouns, or names of things, are often used in English as adjectives; thus, we say, a *silver chain*, a *stone wall*. In such expressions as 'Income Tax Assessment Bill' *Income* plays the part of an adjective to *Tax*, which is, in the first place, a noun, the two together then form a sort of compound adjective to *Assessment;* and the three, taken together, a still more compound adjective to *Bill*, which, syntactically, is the only noun in the expression. This usage seems peculiar to English.—Languages differ much in their way of using adjectives. In English, the usual place of the adj. is before the noun. This is also the case in German; but in French and Italian, it comes after. In these languages, again, the adj. is varied for gender, number, and, in the German, for case. In English it is invariable; and in this simplicity there is a decided superiority; for in modern languages these changes in the adj. serve no purpose. The only modification the Eng. A. is capable of is for degrees of comparison.

ADJUDICA'TION is a technical term used in the practice both of the English and Scotch law, but with a totally different meaning in the two systems. In the law of England the term A. is commonly used to denote the judicial determination at a certain stage of the proceedings in bankruptcy. The procedure is regulated by 32 and 33 Vict. c. 71. The petition prays that the trader may be adjudged a bankrupt, and, after proof of the petitioning creditor's debt, and of the Act of Bankruptcy (q. v.), which must have been committed within twelve months before the issuing of the fiat, an A. is made by the court that the party is bankrupt. Formerly, a trader might be adjudicated bankrupt summarily, and without previous petition for A.—namely, where, after filing a petition for arrangement with his creditors, he appeared not entitled to the benefit of the arrangement. See BANKRUPTCY. In *Insolvency*, which differs from bankruptcy in this respect, that it is not confined in its operation to traders, or to any particular class of men, but applies to the community at large, the A. is made by the debtor delivering into the London Bankruptcy Court, if the debtor resides or carries on business within the district of that court, or in the Bankruptcy Court of the district within which he resides or carries on business, a declaration admitting his inability to pay his debts, which may be used as the ground of an A. by his creditors, if the court think it requisite; or if the creditors neglect to pass a resolution for liquidation or composition, or resolve in favor of bankruptcy; or if after the passing of a resolution for liquidation or composition, the court shall for some sufficient cause adjudge the debtor bankrupt. This A. authorizes the discharge of the prisoner from custody as to all debts and sums of money due or claimed to be due to his several creditors. See INSOLVENCY.

The distinction between bankruptcy and insolvency has for some time been generally disapproved in England; and it may now be held as practically abolished. The Insolvent Debtors Court is abolished, and its jurisdiction transferred to the Bankruptcy Court. Insolvent persons can now be adjudged bankrupts in every case in in which their creditors wish that, or the court think it proper.

In the law of Scotland, A. signifies a process by which creditors may attach heritable or real property of their debtors. It applies to real estate in its most extensive signification, including not only feudal rights, but all rights or interests affecting or connected with land, such as bonds and mortgages, and also annuities, and all rights 'having a tract of future time,' life-interests, reversions, rights of lease, offices of dignity or jurisdiction, personal rights to lands, a certain class of personal bonds, rights of patronage, stock of any chartered bank, with, where the process of arrestment (the process, in the Scotch law, for attaching personal estate; see ARRESTMENT) is excluded, the husband's right in his wife's real estate, fair, harbor, and ferry duties, entailed estates during the life of the heir, and the like.

The arrangements for the equitable administration of the law are regarded by various orders of the Scotch courts and by different statutes.

There are various other forms of the A. in the Scotch law, one of the most important and useful of which is called the A.-in-implement, a form of legal proceeding devised for the completion of defective titles to landed property.

ADJU'STMENT, in the Law of Insurance, is the ascertaining the exact amount of indemnity which the party insured is entitled to receive under the policy, and fixing the proportion of the loss to be borne by each underwriter. The nature and amount of damage being ascertained, an endorsement is made on the back of the policy, declaring the proportion of loss falling on each underwriter; and on this endorsement being signed by the latter, the loss is said to have been adjusted. After an A. has been made, it is usual for the underwriter at once to pay the loss. As a question of law, however, it does not appear to have been decided how far the A. is conclusive and binding upon the underwriters. In the opinion of some mercantile lawyers, the A. is mere presumptive evidence against an insurer, and it is, notwithstanding, open to the underwriter to show facts which, if proved, would have the effect of relieving him from liability.

A'DJUTANT, as the derivation of the word implies (*adjuvare*, to help), is the title of an officer who assists the commanding-officer of a garrison or regiment in all the details of duty. He receives orders, and promulgates them to the several companies; he inspects escorts and guards before proceeding on their duty; attends to the drill of recruits, is accountable for the keeping of the regimental books, and ought to note every infraction of established rules. An *Adjutant-general* performs analogous duties for the general of an army. He keeps an account of the strength of each regiment, distributes the orders of the day to the brigade-majors, and sees the troops drawn up for action. The *Adjutant-general of the Forces* is an officer of high rank at the Horse-Guards. To him all communications are addressed, regarding leave of absence, discharging, recruiting, &c. Besides the adjutant-general at the Horse-Guards, there are deputy and assistant adjutants-general for special military districts.

ADJUTANT (*Ciconia Argala*), a bird closely allied to the Stork, made by some naturalists the type of a separate genus, *Argala*. Adjutant is the popular name given to it by the English in India—*Argala* the native name. It is a native of the warmer parts of India. It is of large size, and has very long legs; in its erect attitude, it is about five feet high; its extended wings measure fourteen or fifteen feet from tip to tip; its head and neck are nearly bare; a

sausage-like pouch hangs from the under part of the neck; the bill is of enormous size. It is very voracious, swallows a cat or a leg of mutton quite readily, and is of great use in devouring snakes,

Indian Adjutant.

lizards, and all sorts of offal. It sometimes catches birds upon the wing. The beautiful Marabou feathers are obtained from the under side of the wings of this bird, and of another very similar species which inhabits Senegal.

ADJYGU'RH, a town of British India, in the North-West Provinces, province of Allahabad, 69 miles west-north-west from Rewah. It has a fortress, situated on a very steep hill, and accessible only by well-defended paths. The hill, which is of granite, is isolated, and separated from the north-western edge of a plateau by a very deep and impassable ravine. Within the walls of the fort are two great masses of ruins of temples, resembling in architectural character those of Southern India, and covered with the most elaborate sculptures. A. was for a short time the capital of a small Mahratta state, was taken by the British under Lieutenant-colonel Martindell, in 1809, after an obstinate resistance, and restored to its previous possessors, who were Rajpúts. The native line of rajahs became extinct in 1855. Except the summit of the hill, occupied by the fort, which is healthy, A. is very subject to malaria. The fort is 860 feet above the town, which is 480 feet above the sea. Pop. about 5000.

AD LI'BITUM (in Ital., *a piacere*, or *a piacimento*) is a musical term which implies that the part so marked may be performed according to the taste of the performer, and not necessarily in strict time. When there is an accompaniment to the music thus marked, it must strictly follow the ad libitum time of the principal performer. Sometimes the words, *colla parte*, meaning with the leading part, are written over the accompanying parts. Ad Libitum also frequently means, that a part for a particular instrument or instruments, in instrumental scores or pianoforte arrangements, may either be played or entirely left out; thus: 'Overture arranged for the pianoforte as a duet, with ad libitum accompaniments for the violin, flute, or violoncello.'

ADMINISTRA'TION, in Polities, in its widest sense, is equivalent to the executive government of a state, as distinguished from its permanent constitution, and embraces not only the political ministry, but all the offices of judicature, &c. In a more restricted sense, as used in England, it designates the Privy Council (q. v.), and more especially that select committee of it known as the Cabinet or Ministry (q. v.).

ADMINISTRATION and ADMINISTRATOR. An administrator, in the law of England, is the person to whom, in default of an executor named in the will, the ordinary or bishop of the diocese commits the administration or distribution of the estate of a person dying intestate.

ADMINISTRATION OF CHARITIES falls in the last resort to the sovereign as *parens patriæ;* and in the case of any charity being dilapidated or abused, the attorney-general will file an information in the Court of Chancery. The A. of C. is now, however, chiefly regulated by 16 and 17 Vict. c. 137, by which the crown is empowered to appoint commissioners and inspectors for the purpose. The act contains a reservation of the rights of the Church of England; and it does not extend to the universities, or to such charities as are partially dependent on voluntary contributions. Charities for Roman Catholic purposes were also excluded from its operation for two years, and this term has been extended by subsequent enactments.

ADMINISTRATOR-IN-LAW. In the Scotch law, a father is A.-in-L. for his children, and as such, is their guardian during minority. This power in the father ceases by the child's discontinuing to reside with him, unless he continues to live at the father's expense; and in the case of daughters, it ceases on their marriage.

A'DMIRAL, the title of the highest rank of naval officers. The word is generally supposed to have been derived from the Arabic *Emir* or *Amir*, a lord or chief (*Amir-al-Mumenim*, 'Commander of the Faithful;' *Amir-al-Omra*, 'Commander of the Forces'). Thus the early English form was *Amiral* or *Ammiral* (occurring once in *Par. Lost*); and so it is still preserved in French. In Spanish the word is *Admirante* or *Almirante;* in Italian, *Ammiraglio*. The term seems to have been introduced into Europe during the Crusades, and to have been first used in a definite sense by the Sicilians, and afterwards by the Genoese. About the end of the 13th c. it came into use in France and England. The first English Admiral of the Seas (*Amiral de la Mer du Roy d'Angleterre*) of whom there is record was William de Leybourne, 1286. His office, however, was not that of a commander, but embraced those general and extensive powers afterwards associated with the title of Lord High Admiral of England; that is, both the administrative functions now vested in the *Lords Commissioners of the Admiralty* (five in number), and the judicial authority belonging to the present *High Court of Admiralty*. The office of Lord High Admiral was last filled by H.R.H. the Duke of Clarence, afterwards William IV. It had previously been in commission from 1708 to 1827. On his resignation in 1828, the office was again put in commission. See ADMIRALTY, COURT OF.

In the British navy, the admirals are distinguished into three classes: Admirals, Vice-Admirals, and Rear-Admirals; the admiral carrying his color at the main, the vice-admiral at the fore, and the rear-admiral at the mizzen mast-head. In former times each grade was subdivided into three sections, known as Admirals (or Vice or Rear-Admirals) of the Red, of the White, and of the Blue, respectively. The flag hoisted by the admiral (thence called a flag-officer) agreed in color with his section; and all the ships under his command carried ensign and pendant of the same hue; but the distinction was otherwise without practical effect, and is now abolished. *Admiral of the Fleet* is a higher rank, conferred at the will of the sovereign. The rates of full or sea pay of flag-officers are as follows: Admiral of the fleet, per day, £6; admiral £5; vice-admiral, £4; rear-admiral, £3. An admiral commanding-in-chief receives £3 a day additional at home, and £4, 10s. abroad, as table-money. In 1878 there were 65 flag-officers in the British navy: viz., 3 admirals of the fleet, 16 admirals, 16 vice-admirals, and 30 rear-admirals. In the same year, the number of flag-officers retired and on reserve half-pay was upwards of 150. The admiral of the fleet takes rank with a field-marshal, admirals with generals, vice-admirals with lieutenant-generals, and rear-admirals with major-generals. See ADMIRAL in AM. SUPP.

ADMIRALTY COURT. This court—whose functions are now exercised by the Probate, Divorce and Admiralty Division of the High Court of Justice, constituted in 1873-75—was created to try and decide maritime causes. Formerly, the maritime courts of England were divided into the *Instance Court* and the *Prize Court*—separate tribunals, though usually presided over by the same judge. In the Prize Court, the judge's authority to hear and decide questions as to prizes of war was under a special and separate commission, issued at the commencement of each war; and the court itself existed only during the war, or until the litigations to which it had given rise were brought to a conclusion. In this respect it differed from the Instance Court, which was a permanent institution. The jurisdiction in question of booty of war, and the distribution thereof, has now, however, been conferred on the A. C. itself, and the Prize Court, and its jurisdiction and practice were regulated by 27 and 28 Vict. c. 25. By another statute, jurisdiction relating to the attack and capture of pirates is vested in the A. C. in this country, and in the vice-A. courts abroad (13 and 14 Vict. c. 26, 27). Whilst there was a Lord High Admiral, the judge of the A. C. usually presided in virtue of a patent from him; but since the office has been intrusted to commissioners, the judge holds a direct commission from the crown under the great seal. By 3 and 4 Vict. c. 65, s. 1, the Dean of the Arches is authorized to sit for the judge of the A. C., in certain cases; and all barristers and solicitors were admitted in 1859 to practice in both courts. The proceedings of the A. C., like those in the ecclesiastical courts were originally based on the civil law, and upon this account it was usually held at Doctors' Commons. But it was merely as the basis of the earlier mercantile codes, such as the Rhodian laws and those of Oleron, and by no means exclusively, that the civil law is of authority in these courts. Questions of the utmost nicety in the law of nations fall to be decided by maritime courts in time of war; and it was as an A. judge that many of the most remarkable of Lord Stowell's famous judgments were pronounced. The appeal from the A. C., which was originally to the king in Chancery, and afterwards to certain commissioners of appeals, consisting chiefly of the privy council, and not of judges delegated

by that body, is now to the court of appeal created by the Judicature Act of 1873—1875. The jurisdiction of the vice-A. courts in the colonies and foreign dominions of the queen has been extended and defined, and their procedure regulated by statutes of recent date. Appeals from these courts formerly lay to the A. C. in England, and were also competent to the queen in council; but like those from the A. C. itself, they are now carried to the Court of Appeal, like all other matters. The civil jurisdiction of the A. Courts was greatly extended by 3 and 4 Vict. c. 66, and later statutes to 27 and 28 Vict. c. 25. It now extends generally (and the county courts also exercise part of it) to disputes between part-owners of a ship, suits for mariners and officers' wages, suits for pilotage, suits on bottomry and respondentia bonds, and relating to salvage, wreck, collision of ships, &c. County courts are expressly prohibited from entertaining questions of prize, questions arising under the act for the suppression of slave-trade, or questions of A. jurisdiction by way of appeal. In criminal matters, the A. C. formerly took cognizance of piracy and other offences on the sea, or on the coasts beyond the limits of any county, and, concurrently with the common law courts, of certain felonies committed in the main stream of great rivers below the bridges. The criminal jurisdiction of the A. is regulated now by the Criminal Law Consolidation Acts generally. All offences mentioned in those acts committed within the jurisdiction of the A. shall be dealt with, inquired of, tried, and determined in any county or place in England or Ireland in which the offender shall be in custody, in the same manner in all respects as if they had been actually committed in that county or place. Since the passing of these enactments, the criminal jurisdiction of the A. C. may be regarded as obsolete. There is a separate Court of A. in Ireland. The A. C. of Scotland has been abolished, and its ordinary jurisdiction transferred to the Court of Session, the Court of Justiciary, and the sheriffs; questions of prizes, captures, condemnations, and the like, being vested exclusively in the High Court of A. in England.

A'DMIRALTY DROITS are a portion of the hereditary revenues of the crown, arising from enemies'-ships detained in the prospect of a declaration of war, or coming into port in ignorance of the commencement of hostilities, or from such ships as are taken by non-commissioned captors, the proceeds of wrecks, the goods of pirates, and the like. The proceeds of the Droits of A. are now paid into the Exchequer for the public use.

ADMIRALTY ISLAND lies on the N. W. coast of N. America, between 57° 2′ and 58° 24′ lat. N., and 134° 52′ and 135° 30′ long. W. It is about 80 miles long, well wooded and watered. It is inhabited, and belongs to the United States.

ADMIRALTY ISLANDS, a group of about 40 islands, to the N.E. of New Guinea, between 2° and 3° lat. S., and 146° 18′ and 147° 46′ long. E. They were discovered by the Dutch in 1616. The largest is about 50 miles long from E. to W. They abound in cocoa-nut trees, and are inhabited by a race of tawny frizzle-headed savages.

ADO'NIS, a mythical personage, whose beauty as a child so attracted the love of Venus and Proserpine, that they quarreled about the possession of him. Jupiter, appealed to, settled the

Adonis.

dispute by deciding that A. should spend part of the year with Venus and part with Proserpine, so that he lived eight months of the year in the upper world, and four in the under. A. was afterwards killed by a boar while hunting, and Venus, coming too late to his rescue, changed his blood into flowers.—A yearly festival was celebrated in honor of A., and consisted of two parts—a mourning for his departure to the under world, and a rejoicing for his return to Venus. This festival, widely spread among the countries bordering on the Mediterranean, was celebrated with peculiar pomp at Alexandria. Connected therewith were the Gardens of A., as they were called. Before the festival, wheat, fennel, and lettuce, were sown in earthen, and even in silver pots, and forced by heat; intended to indicate, doubtless, by their brief bloom, the transitoriness of earthly joy. The myths connected with A. belong originally to the east. They display a worship of the powers of nature conjoined with that of the heavenly bodies, and A. himself appears to be the god of the solar year. The similarity of the name to the Phœnician *Adon*, which signified 'lord,' is unmistakable; and this word Adon was specially applied to the king of heaven, the sun.—In reference to the brilliant beauty ascribed to A., a beautiful man is called 'an Adonis.'

ADONIS, a genus of plants of the natural order *Ranunculaceæ* (q. v.), in which the flower has 5 sepals and 5—10 petals without scales at the base, and the fruit consists of awnless pericarps. The species are all herbaceous—some of them annual and some perennial. Several are natives of Europe, but only one, *A. autumnalis*, sometimes called Pheasant's Eye, is a doubtful native of Britain. Its bright scarlet petals have obtained for it the name of *Flos Adonis*, their color having been fancifully ascribed to their being stained with the blood of Adonis. It is a well-known ornament of our gardens; in which also *A. æstivalis* frequently appears, and *A. vernalis*, a perennial species common upon the lower hills of the middle and south of Germany, with early and beautiful flowers.

Adonis autumnalis.

ADO'PTIAN CONTROVERSY, The, was an echo of the Arian controversy, and originated about the end of the 8th c. in Spain, the country in which the doctrine of Arius had longest held out. Elipandus, Archbishop of Toledo, and Felix, the learned Bishop of Urgel, advanced the opinion that Christ, in respect of his divine nature, was doubtless by nature and generation the Son of God; but that as to his human nature, he must be considered as only declared and adopted, through the divine grace, to be the first-born Son of God (Rom. viii. 29), just as all holy men are to be adopted as sons of God, although in a less lofty sense. The flame of controversy thus kindled, spread into the Frankish empire, the special domain of 'Catholic' Christianity, and gave occasion to two synods, one held at Ratisbon (792), and another at Frankfort (794), in which Charlemagne took part in person, and which condemned Adoptianism as heresy. The Catholic doctrine of the unity of the two natures of Christ in one divine person, and the consequent impossibility of there being a twofold Son—an original and an adopted—was upheld by Alcuin and the other learned men of Charlemagne's court. At a subsequent synod at Aix-la-Chapelle, Felix, yielding to compulsion, recanted his opinions, without, as it would seem, being convinced. Elipandus adhered fanatically to his views, which were, in after-times, defended by Folmar (1160), Duns Scotus (d. 1308), Durandus (d. 1322), the Jesuit Vasquez (1606), and the Protestant divine Calixtus (1643).

ADOPTION (Lat. *adoptio*). A legal institution of much importance in both of the classical nations of antiquity. A., in the stricter sense, in the Roman Law, applied only to the case in which a person in the power of his father or grandfather was transferred to that of the person adopting him. Where the person adopted was already emancipated from the paternal power (*patria potestas*), and was regarded by the law as his own master (*sui juris*), the proceeding was called adrogation (*adrogatio*). A., however, was also used as a generic term comprehending the two species; and in Greece, where there was nothing corresponding to the paternal power of the Romans, this distinction did not obtain. At Athens, the adopted child was transferred from his own family and parish or tribe (*demos*), into those of the adoptive father, whose property he inherited in the absence of legitimate children, and whose sacred rights he was bound to maintain. Only Athenian citizens could be adopted, so that not only the next of kin, but the whole community were interested in preventing fraudulent adoption. With this view, registration in the demus of the adoptive father was requisite, in order to entitle the son to the rights of citizenship as a member of it. In Rome, the adopted child assumed the name, and became bound to discharge the religious duties, of the adoptive father, which usually consisted in sacrifices to the *penates* or other divinities. These observances were for the most part connected with the *gens* or tribe to which the individual and his family belonged; and Savigny has even denied the existence of *sacra* peculiar to the family. A. was effected under the authority of a magistrate, the prætor at Rome, or the governor (*præses*) in the provinces. Adrogation originally required a vote of the people in the *Comitia Curiata*; but under the emperors, it became the practice to effect it by an imperial rescript. A patrician was sometimes adrogated into a plebeian family for political purposes. Clodius the enemy of Cicero, was so adrogated, in order that he might be eligible to a tribuneship of the people. If a father, having children in his power, was adopted, both he and his children passed into the power of the adoptive father. It was requisite that the adoptive father should have no children at the time, and no reasonable prospect of having any. He was also required to be older than the person adopted. Females could not be adrogated, nor, from their

not sharing in the paternal power, could they adopt in any form. An opposite rule has prevailed where the institution has been received in modern times. A. was unknown to the law of the Teutonic nations; and though most of the states of the continent have borrowed it from the Roman law, it has never existed as an institution either in England or Scotland. The patrimonial benefits of A. may, however, be conferred by deed; and there is no illegality in any one assuming the name, arms, and other distinguishing characteristics, and corresponding responsibilities, of a person who does not belong to his family. In France, A. is recognized only in a very modified form (*Code Civil*, art. 343, *et seq.*).

ADOU'R, a river in France, rises near Tourmalet, in the department of the Upper Pyrenees, waters in its course of 200 miles the department Gers, and the fertile part of the department Landes, and enters the Atlantic below Bayonne. It receives several tributaries, and is navigable to the extent of 80 miles. Bagnères-de-Bigorre, celebrated for its hot baths, is situated on the A.

A'DOWA, a town of Abyssinia, the capital of Tigré, 145 miles north-east from Gondar. It is situated partly on the slope and partly at the base of a hill, on the left bank of the Hasam, a feeder of the Atbara, which is a large branch of the Nile. The houses are of the conical form common in Abyssinia, regularly disposed in streets, and mingled with gardens and trees. A. is the chief entrepôt of trade between the interior of Tigré and the coast. It has an extensive transit trade, in which gold, ivory, and slaves are articles of importance. It has also manufactures of cotton fabrics, and iron and brass wares. Pop. estimated at about 8000.

A'DRA (ancient *Abdera*), a seaport town of Spain, in the province of Granada, and 49 miles south-east from Granada. It is situated on the shore of the Mediterranean, at the mouth of the Adra. The ancient Abdera, founded by the Phœnicians, was on a hill, at the base of which the modern town stands, in a situation unhealthy on account of swamps. The port is not good, being much exposed to the west. The houses are generally of one story. There is one tolerably wide street, the rest are narrow and ill paved. From the watch-tower of A., in former times, a tocsin sounded the alarm on the approach of African pirates. Lead mines in the neighborhood give employment to many of the inhabitants, and trade to the port. Among the other exports are grapes, wheat, and sugar. Fishing and the distillation of brandy are carried on. Pop. (1877) 11,320.

A'DRIA, in the province of Rovigo, Northern Italy, is situated between the river Po and the Adigé, contains about 15,000 inhabitants, and is chiefly remarkable as being one of the oldest cities in Europe. According to tradition, it was founded by the Pelasgi, 1376, B.C. In the time of the Romans, A. was one of the most frequented harbors in the Adriatic Sea; but by the continual deposition of alluvium on the east coast of Italy, it has been gradually separated from the sea, from which it is now almost ten miles distant. It still retains several interesting remains of Etruscan and Roman antiquity; but its wine, formerly so celebrated, is now deplorably bad.

A'DRIAN, the name of six popes, none of them very remarkable. A. IV. was by birth an Englishman, the only one of that nation that ever sat in the papal chair. His name was Nicolas Breakspeare. He was a native of Langley, near St. Albans, became first a lay-brother or servant in the monastery of St. Rufus, near Avignon, and in 1137 was elected abbot. His zeal for strict dicipline raised a combination to defame his character, and he had to appear before Eugenius III. at Rome. Here he not only cleared himself of all charges, but acquired the esteem of the pope, who appointed him cardinal-bishop of Albano in 1146. On the death of Anastasius in 1154, he was raised to the papal see. A. was at first on friendly terms with the Emperor Frederic I.; but his high notions of the papal supremacy, which he carried as far as even Gregory VII., led to the beginning of that long contest of the popes against the house of Hohenstaufen, which ended in the destruction of the dynasty. He was about to excommunicate Frederic, when he died at Anagni, 1159 It was in A.'s time that the doctrine of Transubstantiation (q.v.), advanced by Petrus Lombardus, was established.

A'DRIANOPLE, the second city in the Turkish empire, was founded by the Emperor Hadrian on the left bank of the navigable river Hebrus (now Maritza). Here the sultans ruled from 1366 to 1453, when Constantinople was made the capital. The city has now about 90,000 inhabitants, the half of whom are Turks. Two palaces, forty mosques, twenty-four public schools, twenty-two baths, and the numerous gardens laid out on the banks of the Maritza, may be named as the principal features of A. Its trade consists in opium, oil of roses, with silk and other manufactures.—The Russian-Turkish war was here concluded, September 19, 1829, by the Peace of A., which left the Porte in possession of Wallachia, Moldavia, and the conquests made by Russia in Bulgaria and Roumelia. On the other side, Russia got possession of the whole of the coast of the Black Sea, from the mouth of the Kuban, in lat. 45° 15′, to the haven of St. Nichola, lat. 42°, with the territories of the Caucasus, and the greater part or the pachalic of Akalzik. After the capture of the Turkish army defending the Shipka Pass in January 1878, the Russians entered A. unopposed by the Turks.

ADRIA'TIC SEA, a large arm of the sea, extending, in a north-westerly direction, between the east coast of Italy and the west coast of the opposite continent, being connected with the Ionian Sea by the Strait of Otranto. In the north, it forms the Gulf of Venice, and in the north-east, the Gulf of Trieste; while, on the Italian side, it forms the bays of Ravenna and Tremiti, and the narrower and deeper Gulf of Manfredonia. On the other side, the coasts of Illyria, Croatia, Dalmatia, and Albania are steep, rocky, and barren, and begirt with a chain of almost innumerable small rocky islands. The chief bay in this side is that of Quarnero, lying south of the peninsula of Istria. The most considerable rivers flowing into the A. S. are the Adigé and the Po, which are continually depositing soil on the coast, so that places once on the shore are now inland. The extreme saltness of the A. is probably owing to the comparatively small quantity of fresh water poured into it by rivers. Navigation in the A. is safe and pleasant in summer, but in winter the north-west gales are formidable, on account of the rocky and dangerous coasts on the east. Trieste, Ancona, and Sinigaglia are the chief places of commerce.

ADU'LÉ, an ancient town on the Red Sea, was the port of Axum, and is noticed chiefly on account of an inscription, of some importance relative to the ancient geography of those regions, the *Monumentum Adulitanum*, first published, in the 6th c., in the *Topographia Christiana* of Cosmos Indicopleustes. The modern town is called Zulla.

ADU'LLAMITES. An attempt, in the year 1866, by the government of Earl Russell and Mr. Gladstone, to carry a measure which would have brought about a sweeping reduction of the elective franchise, gave occasion to a large number of the more moderate Liberals to secede from the Whig leaders, and vote with the Conservatives. The designation of *Adullamites* was fastened on the new party, in consequence of Mr. Bright having, in the course of debate, likened them to the political outlaws who took refuge with David in the cave of Adullam (1 Samuel, xxii. 1, 2); a comparison taken up by Lord Elcho, who humorously replied, that the band congregrated in the cave was hourly increasing, and would succeed in delivering the house from the tyranny of Saul (Mr. Gladstone) and his armor-bearer (Mr. Bright).

ADULTERATION OF FOOD, &c. The more important adulterations will be noticed under the various articles. See also FOOD.

ADU'LTERY (Lat. *adulterium*) has been well defined as 'the voluntary sexual intercourse of a married person with a person other than the offender's husband or wife.' (*Bishop on Marriage and Divorce*, § 415.) By the Roman law, there was no A. unless the woman was married, and the same was the rule in Athens. It was in this limited form also that A. was recognized by the Mosaic law. By the canon law, the husband and wife were placed on the same footing; and this view has been adopted by all the nations of modern Europe. In the American state of New Jersey, it has been decided that a married man does not commit this crime in having connection with an unmarried woman. (Bishop, *ibid.*) But such has not been the prevalent doctrine in America; and it has never been doubted that the offence necessary to found the sentence of divorce is committed by unlawful sexual intercourse equally whether the *particeps criminis* were married or single. A. was recognized as a crime even before Moses (Gen. xxxviii. 24), and it is probable that in affixing to it the punishment of death (Lev. xx. 10), he followed the prevailing custom. A very remarkable law was introduced for the trial of A., by causing the woman suspected to drink the bitter waters of jealousy (Numb. v. 26). In Rome, the Julian law, enacted in the time of Augustus (17 B.C.), revised the previous legislation on the subject, and imposed special penalties, consisting of forfeiture of goods and banishment, both on the adulteress and the paramour. The husband, in certain cases, was permitted to kill the latter, and the father might sometimes kill both. A constitution of Constantine, the authenticity of which has been doubted, made A. a capital offence on the man's part. Whatever Constantine's law was, it was confirmed by Justinian, who further condemned the wife to be whipped, and imprisoned in a convent for the rest of her days, unless relieved by her husband within two years (*Novel.* 134, c. 10). The offence was visited in Athens with punishments closely resembling those of the earlier Roman legislation. In many continental countries, A. is still treated as a criminal offence, but in none of them does the punishment now exceed imprisonment for a limited period, which is frequently accompanied with a fine. Lord Coke says, that by the law of England in early times, A. was punished by fine and imprisonment (3 *Inst.* 306). During the Commonwealth, it was made a capital offence (*Scobel's Acts*, part ii., p. 121); but this law was not confirmed at the Restoration. In Scotland, the records of the Court of Justiciary show that capital

punishment was frequently inflicted. At the present day, it is punishable in Great Britain only by ecclesiastical censure; and even this may be regarded as in desuetude. But when committed by the wife, it was regarded as a civil injury, and, till the passing of the stat. 20 and 21 Vic. c. 85 and 59, formed the ground of an action of damages for criminal conversation (commonly known as an action of *crim. con.*) by the husband against the paramour. No corresponding action was competent to the wife, either in England or America; and her only remedy consisted in obtaining a separation or divorce. In Scotland, A. forms a ground for dissolution of the marriage, at the suit of the injured party. See SEPARATION, DIVORCE. See also ADULTERY in AM. SUPP.

A'DVENT, or Time of Advent (Lat. the approach, or coming), a term applied, by the Christian Church, to certain weeks before Christmas. In the Greek Church, the time of A. comprises forty days; but in the Romish Church, and those Protestant Churches in which A. is observed, only four weeks. The origin of this festival, as a Church ordinance, is not clear. The first notice of A., as an appointment of the Church, is found in the Synod of Lerida (524 A.D.), at which marriages were interdicted from the beginning of A. until Christmas. The four Sundays of A., as observed in the Romish Church and the Church of England, were probably introduced into the calendar by Gregory the Great. It was common from an early period to speak of the coming of Christ as *fourfold:* his 'first coming in the flesh;' his coming at the hour of death to receive his faithful followers (according to the expressions used by St. John); his coming at the fall of Jerusalem (Matt. xxiv. 30); and at the day of judgment. According to this fourfold view of A., the 'gospels' were chosen for the four Sundays, as was settled in the Western Church by the *Homilarium* of Charlemagne. The festival of A. is intended to accord in spirit with the object celebrated. As mankind were once called upon to prepare themselves for the personal coming of Christ, so, according to the idea that the ecclesiastical year should represent the life of the founder of the Church, Christians are exhorted, during this festival, to look for a spiritual advent of Christ. The time of the year when the shortening days are hastening towards the solstice—which almost coincides with the festival of the Nativity—is thought to harmonize with the strain of sentiment proper during A. In opposition, possibly, to heathen festivals, observed by ancient Romans and Germans, which took place at the same season, the Catholic Church ordained that the four weeks of A. should be kept as a time of penitence; according to the words of Christ: 'Repent, for the kingdom of heaven is at hand.' During these weeks, therefore, public amusements, marriage-festivities, and dancing were prohibited; fasts were appointed, and somber garments were used in religious ceremonies. The Protestant Church in Germany has also abstained from public recreations and celebrations of marriage during A. It was perhaps a natural thought to begin the ecclesiastical year with the days of preparation for the coming of Christ. This was first done by the Nestorian Church in the East in the 6th c.; the example was soon followed in Gaul, and afterwards became general throughout the west.

ADVERB; ADVERTISEMENT. See AM. SUPP.

A'DVOCATE (Lat. *advocatus*). An A. is generally defined 'the patron of a cause,' though it does not appear that the 'patrons' who, in ancient Rome, assisted their clients with advice and pleaded their causes, were ever called by that name. Even in the time of Cicero, the term *advocatus* was not applied to the patron or orator who pleaded in public, but rather, in strict accordance with the etymology of the word, to any one, who in any piece of business was *called in* to assist another. There can be no doubt, however, that the forensic orators and jurisconsults of the later period of the republic, who followed law as a profession, and received fees (*honoraria*) for their services, occupied a position closely analogous to that of the A. of modern times, and thus it has been said that the profession is older than the name. The occupations of a jurisconsult and a forensic orator seem to have differed pretty much as those of a consulting and a practising counsel do with us. They might be exercised separately, but were generally combined; and thus Cicero speaks of his master, Scævola, as 'the most eloquent of the learned, and the most learned of the eloquent' (jurisperitorum eloquentissimus, eloquentium jurisperitissimus, *De Or.*, i. 39). Ulpian defined an A. to be any person who aids another in the conduct of a suit, or action (*Dig.* 50, *tit.* 13), and in other parts of the digest it is used as equivalent to an orator (see also Tacit. *Annal.*, x. 6), so that the word would seem gradually to have assumed its modern meaning. The office of the A. or barrister who conducted the cause in public, was, in Rome, as with us, altogether distinct from that of the procurator, or, as we should say, attorney or agent, who represented the person of the client in the litigation, and furnished the A. with information regarding the facts of the case. The distinction between these two occupations, however, obvious and important as it seems to us, does not everywhere prevail; and in many of the states of Germany, in Geneva, in America, and in some of our own colonies, as, for example, in Canada, they are united in the same person. In England and Ireland, advocates are called *Barristers*, under which title will be found a statement of the duties and responsibilities which the A. undertakes to his client, and of the state of the profession in these countries. In Scotland, as in France, the more ancient name has been retained. See ADVOCATES, FACULTY OF.

In France, the *avocat* and *avoué* correspond very nearly to the barrister and attorney in England. The advocates do not form a corporation, in the technical sense, but are a free society or association (*ordre*), which has the power of protecting its members, and of exercising internal surveillance and discipline over them. Neither do they exercise any ministerial functions like those which public authority has conferred, under certain conditions and responsibilities, on avoués and notaries. The French A. is simply a free man, who has graduated in law, and possesses the privilege of addressing the tribunals. The advocates who practise in each court form a separate college, admission to which can be obtained only with the approval of those who are already members. Enrolment on the books of the college does not confer the title of A., for this title belongs to every licentiate who has taken the oaths before a court; but it gives the right of communicating (*droit de communiquer*) with the other members of the body, without which the exercise of the profession would be impossible. As a necessary consequence of this arrangement, erasure of the name of any individual from the list is equivalent to a prohibition to practise. The French A. possesses the same privileges as to irresponsibility for his advice, and for the facts contained in his instructions, which belong to members of the corresponding branch of the legal profession in this country. He is also entitled to plead covered (see BARRETTE), and as he has no action for his fees, they are, as with us, paid in advance. The French advocates have, on several occasions, resisted, as an encroachment on their privileges, the attempt to compel them to grant receipts for their fees. It further belongs to the etiquette of the bar of France that, in communicating articles of process to each other, no acknowledgment shall be exchanged; and we are told, with honest pride, that during the many centuries that this custom has existed, not one single instance of its abuse has occurred.

In Belgium, in Geneva, and also in those of the German states by which the Code Napoleon has been received, the organization and discipline of this branch of the legal profession are similar to those which prevail in France. In the other German states, with the exception of Saxony, the formation of the advocates into a body has been perseveringly resisted by the governments. A general assembly of German advocates was attempted at Mayence in 1844, and in Hamburg in 1846; and in the latter city, it actually took place in the following year, but it led to no permanent results.

ADVOCATE, LORD. The L. A. for Scotland, called also the King's or Queen's A., is the public prosecutor of crimes, senior counsel for the crown in civil causes, and a political functionary of very great importance in the management of Scottish affairs. He may issue warrants for arrestment and imprisonment in any part of Scotland, and possesses many other discretionary and indefinite powers. Previous to the Union, the King's A. had a seat in the parliament of Scotland *ex-officio;* and since that event, he has been almost invariably a member of parliament. He is appointed by the crown, and his tenure of office ceases with that of the administration of which he is a member. As first law-officer of the crown for Scotland, the L. A. when in parliament, is expected to answer all questions relating to the business of Scotland, and to take the superintendence of legislation for that portion of the United Kingdom. Notwithstanding his multifarious official duties, the L. A. accepts ordinary practice at the bar, and, indeed, is usually the most extensively employed practitioner connected with the party in power. He is assisted in the duties of public prosecutor by the solicitor-general, and by four junior barristers, called advocates-depute, appointed by himself. The L. A. and solicitor-general are alone entitled to plead within the bar, and they are the only barristers in Scotland who have the distinction of silk gowns. When the L. A. declines to prosecute, it is competent for a private party to do so; and in this case the concurrence or 'concourse,' as it is called, of the L. A., which is granted as a matter of course, must be obtained. Such a proceeding, however, is scarcely known in practice in Scotland. The best historical account of this important, and, in many respects anomalous office, with which we are acquainted, is contained in the judgment of the late Lord Medwyn in King's A. against Lord Douglas, December 24, 1836. In England, the sovereign pursues in his own name; and such was the practice in Scotland also, till about the middle of the 16th c., when we find Queen Mary prosecuting by her advocate; probably in imitation of the French custom. For some time after the institution of the College of Justice in 1532, the A. for the crown was always one of the judges of the Court of Session, and as in France the king's advocates were also at the same time judges, this coincidence has

been mentioned by Sir George Mackenzie in proof of the French origin of the office; but a combination of offices, now held to be incompatible, was not then uncommon. Lord Medwyn informs us that among the original fifteen ordinary judges, was Sir Adam Otterburne, who was King's A. from 1525 to 1538, and also provost of Edinburgh from 1524 to 1535. So late as 1686, Sir George Lockhart, when president of the court, was ordered by a letter from King James VII. to officiate as his A. in parliament. It is not certain that the King's A. was originally authorized to act as public prosecutor in crimes; but he certainly possessed that power in 1587 (c. 77), and it seems to be implied in an earlier statute (1579, c. 78). It was indeed, as Lord Medwyn remarks, less of an anomaly that a judge of the Court of Session should act as the representative of the crown in criminal than in civil causes, seeing that the former were adjudged in another court. The King's A. is first mentioned as *Lord* A. in the record of the Court of Justiciary in 1598. But although it was not till the institution of the College of Justice that this office was placed on its present footing, we have mention of its existence in 1479; but the King's A. was not then one of the officers of state, a dignity, indeed, which he does not seem to have attained till 1540. In 1582, the salary of the L. A. was only £40 Scots. His present salary is £2387, and he is entitled to perquisites which raise his emoluments greatly above that sum. The L. A.'s deputes have £700 a year, and his legal secretary £500. The crown-agent, who is a Writer to the Signet (q. v.), and who performs in reference to crown causes pretty much the same duties that fall to an attorney or agent in ordinary litigation, receives £1400. As to the relation in which the L. A. stands to the public prosecutors of crimes in the inferior courts, see PROCURATOR-FISCAL. The L. A., though not a privy-councillor, is, by courtesy, addressed as the Right Honorable during his tenure of office.

ADVOCATES, FACULTY OF, in Scotland. The constitution of this body, like the name by which its members are known, was unquestionably derived from France. The profession seems to have existed in Scotland from a very early time; and in 1424 (c. 45) a statute was passed for securing the assistance of A. to the poor. The words of the statute are remarkable, and its spirit, when we consider the period, highly creditable to the humanity and enlightenment of the Scotch. 'And gif thère bee onie pure creature, for faulte of cunning, or dispenses, that cannot, nor may not follow his cause, the king, for the love of God, sall ordaine the judge before quhom the cause sulde be determined, to purwey and get a leill and a wise advocate, to follow sik pure creatures causes; and gif sik causes be obteined [gained], the wranger [wrong-doer] sall assyith baith the partie skaithed, and the advocatis coastes and travel.' This institution has remained with little alteration to the present time (see POOR'S ROLL). But though existing as a profession, the A. of Scotland did not form a Faculty or society till the institution of the Collége of Justice (q. v.) in 1532. At first, their number was limited to ten, but there is now no limit. The number on the rolls of the body is about 370; but the number of those who practise does not exceed 120. Even of these a very small fraction live by the practice of the profession. From the improvements which have been made in the sheriff-courts, and from other causes, the amount of litigation in the Court of Session has greatly diminished since the beginning of the present century, and the continued accession of new members to the Faculty of A. is to be accounted for only by the fact that the Bar is still regarded as the regular avenue to public and official life in Scotland. Two examinations are imposed on candidates for admission, the one in general scholarship, the other in law; the first, however, being dispensed with in case the intrant shall produce evidence that he is a Master of Arts of any British university, or that he has attained such degree in a foreign university as, in the opinion of the Dean of Faculty and his council, affords evidence of the same amount of scholarship as that afforded by the degree of Master of Arts of a Scottish university. Should no such degree be possessed, an examination takes place before a committee of the Faculty, assisted by three or more persons of learning (generally professors in the university of Edinburgh), on the following subjects: 1. Latin; 2. Greek, or (in the intrant's option) any *two* of the following languages—namely, French, German, Italian, Spanish; 3. Ethical and Metaphysical Philosophy; 4. Logic, or (in the intrant's option) Mathematics. If the intrant be found qualified in general scholarship, he may, after the expiry of a year, go in for his private examination on law. The examinators, however, cannot take him on trial if, during the year before such examination, he have been engaged in any trade, business, or profession, either on his own account, or as assistant to, or in the employment of another. Proof of attendance on the law-classes in the University of Edinburgh is also requisite. An advocate is entitled to plead in every court in Scotland, civil, ecclesiastical, or criminal, superior or inferior; and also before the House of Lords. A party may manage his own cause in the Court of Session (q. v.), so far as oral pleading is concerned, but with exception of defences, every paper in process must be signed by an advocate. There is a widow's fund belonging to the body, which is also regulated by statute. The supreme judges of Scotland, and principal sheriffs, are always, and the sheriff-substitutes generally, selected from the bar. The fees on admission to the Faculty of A. are about £340.

ADVOCATES' LIBRARY. This library, which belongs to the Faculty of Advocates in Edinburgh, was established by Sir George Mackenzie in 1682. It had at first no fixed fund; the Faculty, from time to time, set apart sums for its maintenance, and donations were made for its use, not only by advocates, but by others. By the copyright law of 1709, it obtained, along with eight other libraries, the privilege of receiving a copy of every new book. This privilege is still continued to the A. L. (5 and 6 Vict., c. 45, s. 8), although withdrawn from the other Scottish libraries; and to this is mainly owing the complete character of the collection in British books. It is comparatively deficient in foreign literature and science; for the Faculty have no other funds at their disposal than the fees derived from 'intrants,' and the sum they are able to devote to the maintenance of the library is quite inadequate. The number of volumes is estimated at about 250,000; the catalogue (7 vols. 4to) was printed between 1867 and 1878. It is particularly rich in law; in Scottish history and antiquities; in the works of the fathers and schoolmen, and in theology generally. The Spanish department is particularly valuable. Notwithstanding the unsuitable nature of the building for library purposes, the improvements made in 1871, especially in the lower library, have added much both to its appearance and the convenience of all who have to do with it. Although the library belongs strictly to the Faculty of Advocates, yet, under their liberal management, it has in a great degree the character of a public institution. Any stranger arriving in Edinburgh is admitted to see the library; and with an introduction, any one may resort to it to consult books. Books may even be borrowed through the members of the Faculty, who are remarkably liberal in this respect. Thomas Ruddiman and David Hume both held the office of librarian or 'keeper of the A. L.'

ADVOCATION, a form of process in the law of Scotland, to remove a cause from an inferior court to the supreme court, either for the purpose of review, or that the cause might be conducted in the Court of Session. Final judgments of inferior courts were brought under review of the Court of Session by lodging a written note of A. with one of the depute-clerks of Session or his assistant (1 and 2 Vict. c. 86). A certified notice of this proceeding put a stop to all further steps in the original cause. Caution used to be found for the expenses incurred, or which might be incurred, in the Court of Session. See CAUTION and JURATORY CAUTION. As a rule, A. was competent unless debarred by statute or confirmed practice; but no cause was advocated unless exceeding the value of £25 (16 and 17 Vict. c. 80, s. 22). A. was incompetent in actions limited to particular courts by express statute, e.g., by the Small Debt Acts, Road Acts, &c. Every case in which the claim exceeded £40 might be removed into the Court of Session, so soon as an order allowing a proof had been pronounced, should either party be of opinion that it ought to be tried by jury. The process of advocation was abolished in 1868, and all similar proceedings are now called appeals from the Sheriff Court, and it is not now necessary for the appellant to find caution for expenses before taking or prosecuting his appeal. This appeal cannot be taken after six months from the date of final judgment. It may be taken within twenty days after judgment, and thereafter may be taken up to six months, provided the decree has not been in the meantime extracted or implemented (31 and 32 Vict. c. 100, s. 64).

ADVOCATUS DIABOLI, the Devil's Advocate. In the Romish Church, when it is proposed that a deceased person shall be canonized, an examination of his past life takes place. In this process, one party holds the office of accuser, or *advocatus diaboli*; and it is his duty to bring forward all possible objections against the proposed canonization; while, on the other side, the *Advocatus Dei* (God's Advocate) undertakes the defence. Hence the term A. D. has been applied to designate any person who brings forward malicious accusations.

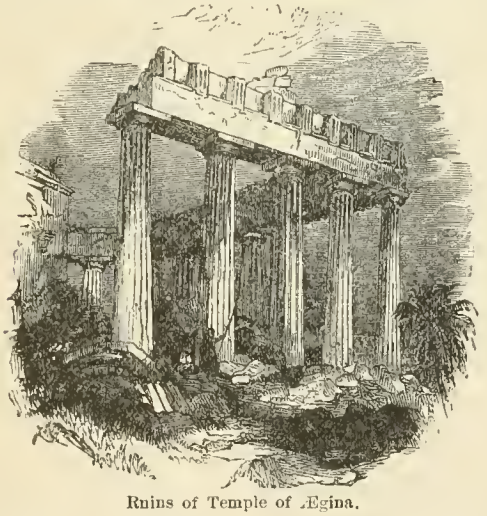
ADVOWSON. The right of presentation to a church or ecclesiastical benefice in England. Advowsons are either *appendant* or *in gross*. Lords of manors were originally the only founders, and, of course, the only patrons of churches; and so long as a right of patronage continues annexed or appended to the manor, it is called an A. appendant. Such rights are conveyed with the manor as incident thereto, by a grant of the manor only, without adding any other words. But where the property of the A. has been once separated from the property of the manor by legal conveyance, it is called an *A. in gross*, or at large, and is annexed to the person of its owner, and not to his manor or lands. Advowsons are further divided into *presentative*, *collative*, or *donative*. The first is where the patron has the right of presentation to the bishop or ordinary, and may demand of him to institute his clerk, if he find him canonically qualified. This is the most usual A. The second or collative A. is where the bishop and patron are one and the same

person. In this case, the bishop cannot present to himself, but he does by the one act of collation the whole that is done in common cases by both presentation and institution. The third or donative A. is when the sovereign, or a subject by his license, founds a church or chapel, and ordains that it shall be at the sole disposal of the patron, subject to his visitation only, and not that of the ordinary, and vested in the clerk by the patron's deed of donation, without presentation, institution, or induction. 'This is said to have been anciently the only way of conferring ecclesiastical benefices in England; the method of institution by the bishop not being established more early than the time of Archbishop à Becket, in the reign of Henry II.'—*Kerr's Blackstone*, vol. ii. p. 20.

Æ'DILES, Roman magistrates, who had the care of public buildings (*ædes*), especially the temples, and also attended to the cleansing and repairing of the streets, the preparations for funerals, public games and spectacles, the inspection of weights and measures, the regulation of markets, &c.—At first there were only two Æ., who were chosen from the plebeians, and styled *Æ. plebis;* afterwards, two others, styled *Æ. curules*, were chosen from the patricians (366 B.C.), and Julius Cæsar appointed a new order of *Æ. cereales* to take charge of the public granaries.

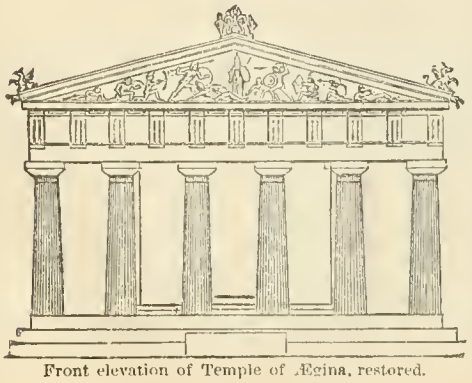
ÆGI'NA, now written Egina, an island forming part of the kingdom of Greece, of about forty square miles, in area, in the ancient Saronicus Sinus, now the Gulf of Egina. It is mountainous, with deep valleys and chasms; and the coast affords only one haven on the north-west. The modern town of Egina stands on the site of the ancient town, at the north-west end of the island. The island contains about 7000 inhabitants, who are chiefly occupied in trade, navigation, and agriculture. The soil produces the best almonds in Greece, with wine, oil, corn, and various fruits. Partridges abound in such numbers that the people find it necessary to thin them by destroying their eggs. The most ancient name of the island was Œnone, and, according to tradition, the Myrmidons dwelt in its valleys and caverns. In ancient times, the people of Æ. had considerable importance in Greece; and their fleet distinguished itself for valor in the battle of Salamis. Their prosperity excited the envy of the Athenians, who made the island tributary, and afterwards expelled altogether the original inhabitants. The language, manners, and style of art among the ancient people of Æ were Dorian.

ÆGINETAN SCULPTURES. The small island of Ægina



Ruins of Temple of Ægina.

holds an important position in the history of Grecian art. A



Front elevation of Temple of Ægina, restored.

severely natural character belongs to its works of sculpture, of which several have been discovered in modern times. On an eminence in the eastern part of the island stand the ruins of a temple, usually called the Temple of Jupiter Panhellenius, but now believed to have been a temple of Pallas or Minerva. Among these ruins a series of statues were excavated by a company of Germans, Danes, and Englishmen, which, in 1811, were purchased by Louis, then crown-prince of Bavaria, and are now the most remarkable ornaments of the Glyptothek at Munich. They are of various heights, and were evidently intended to decorate the tympana of the temple beside which they were found. The group that seems to have been designed for the hinder tympanum is superior in preservation, and represents a combat of Greeks and Trojans for the body of a fallen hero. The other group is the contest of Telamon with Laomedon. The figures are true to nature, as in the old Greek style, with the structure of bones, muscles, and even veins, distinctly marked; but the faces have that unpleasant, forced smile which is characteristic of all sculpture before the time of Phidias.

Minerva, with Ægis. From an ancient statue.

Æ'GIS, the shield of Jupiter, which had been fashioned by Hephæstus (Vulcan). When Jupiter was angry, he waved and shook the Æ., making a sound like that of a tempest, by which the nations were overawed. The Æ. was the symbol of divine protection, and became, in course of time, the exclusive attribute of Jupiter and Minerva.

Æ'GLÉ, a genus of plants of the natural order *Aurantiaceæ* (q. v.), distinguished by a five-toothed calyx, linear elongate mucronate, anthers, and a many-celled fruit. *Æ. Marmelos*, the tree which produces the *bhel* fruit of India, has ternate petiolate, ovato-oblong leaves and the flowers in panicles. It is found from the south of India to the base of the Himalaya Mountains. The fruit is delicious, fragrant and nutritious. In an imperfectly ripened state, it is an astringent of great effect in cases of diarrhœa and dysentery; and as such has lately been introduced into English medical practice. The root, bark, and leaves, are also used as medicinal. The Dutch in Ceylon prepare a perfume from the rind of the fruit; and the mucus of the seed is employed as a cement for many purposes.

ÆGOSPO'TAMI or ÆGOSPO'TAMOS (Gr. Goat-river), in the Thracian Chersonese, is famous for the defeat of the Athenian fleet by the Lacedæmonians under Lysander, which put an end to the Peloponnesian War and to the predominance of Athens in Greece, 405 B.C.

Æ'LFRIC, or A'LFRIC, a distinguished Saxon ecclesiastic of the 10th c., regarding whose age, writings, and personality even, there has been a great difference of opinion amongst antiquaries. He appears to have been the son of the Ealdorman or Earl of Kent; but early manifesting a devotional spirit, he entered the monastery of Abingdon, the members of which belonged to the Benedictine order. Towards the close of the 10th c., he became a priest in the cathedral of Winchester. He was next appointed Abbot of St. Albans, then Bishop of Wilton, and finally Archbishop of York, although others appear to think him that Æ. who was Archbishop of Canterbury. Æ., Archbishop of York, died in 1050; Æ., Archbishop of Canterbury, in 1005. The writer Æ., whether of York or of Canterbury, was a man of superior attainments for his time, of excellent character, and one whose religious convictions were less disfigured by superstition than those of his contemporaries. The principal works ascribed to Æ. are—1. A Latin and Saxon glossary, printed at Oxford in 1659; 2. A Saxon version of most of the historical books of the Old Testament; 3. A charge to his clergy; 4. Two volumes of Saxon homilies; 5. A Saxon grammar in Latin.

ÆMILIAN PROVINCES. See EMILIAN PROVINCES.

ÆMI'LIUS PAULUS. The most remarkable of this name was the son of the consul Æ. P., who fell in the battle of Cannæ, 216 B.C. Young Æmilius inherited his father's valor, and enjoyed an unwonted degree of public esteem and confidence. In 168 B.C. he was elected consul for the second time, and intrusted with the war against Perseus, king of Macedon, whom he defeated in the battle of Pydna. During the war, his two younger sons died; and Æ. is said to have thanked the gods that they had been chosen as victims to avert calamity from the Roman people.

ÆNE'AS, the hero of Virgil's *Æneid*, was, according to Homer, the son of Anchises and Venus, and was ranked next to Hector among the Trojan heroes. The traditions of his adventures before and after the fall of Troy are various and discordant. Virgil gives the following version: Æneas, though warned by Priam in the night when the Greeks entered Troy, to take his household gods, and flee from the city, remained in the contest until Priam

fell, when, taking with him his family, he escaped from the Greeks, but, in the confusion of his hasty flight, lost his wife Creusa. Having collected a fleet of twenty vessels, he sailed to Thrace, where he began building the city of Ænos, but was terrified by an unfavorable omen, and abandoned his plan of a settlement here. A mistaken interpretation of the oracle of Delphi now led him to Crete; but from this place he was driven by a pestilence. Passing the promontory of Actium, he came to Epirus, and then continued his voyage to Italy and round Sicily to the promontory of Drepanum on the west, where his father, Anchises, died. A storm afterwards drove him to the coast of Africa, and landing near Carthage, he was hospitably received and entertained by Queen Dido. His marriage with Dido was prevented by Jupiter, who sent Mercury with a command that Æneas must return to Italy. Accordingly, he sailed away, leaving the disappointed queen, who committed suicide. During his stay in Sicily, where he celebrated the funeral of his father, the wives of his companions and seamen, weary of long voyages without certainty of finding a home, set fire to his fleet. After building the city Acesta, he sailed for Italy, leaving behind him the women, and some of the men belonging to his fleet. On landing in Italy, he visited the Sibyl at Cumæ, and received intimations of his future destiny. Then, sailing along the Tiber, and landing on the east side of the river, he found himself in the country of Latinus, king of the Aborigines. Lavinia, the daughter of Latinus, had been destined to marry a stranger; but her mother had promised to give her in marriage to Turnus, king of the Rutuli. A war ensued, which terminated in the marriage of Æneas with Lavinia. Their son, ÆNEAS SYLVIUS, as the ancestor of the kings of Alba Longa, and also of Romulus and Remus, was regarded as the founder of the Roman empire. It is hardly necessary to add that all these statements are merely mythical, having no historical basis.

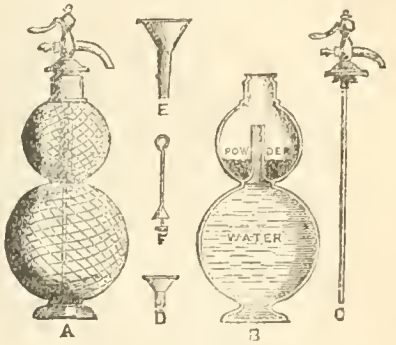
ÆO'LIAN HARP, a very simple musical instrument which produces harmonic sounds when placed in a current of wind. It is formed by stretching eight or ten strings of catgut, all tuned in unison, over a wooden shell or box, made generally in a form sloping like a desk. The sounds produced by the rising and falling wind, in passing over the strings, are of a drowsy and lulling character, and have been beautifully described by the poet Thomson, as supplying the most suitable kind of music for the *Castle of Indolence*.

ÆO'LIANS, one of the principal races of the Greek people, who were originally settled in Thessaly, from which they spread and formed numerous settlements in the northern parts of Greece and in the west of Peloponnesus. In the 11th c. B.C., some part of them emigrated to Asia Minor, where they founded, on the N. W. coast, in Mysia, and the adjacent isles, more than thirty cities; among them, Smyrna, and Mitylene in the island of Lesbos, where the Æolian dialect of the Greek language chiefly developed itself in the forms employed in the poetry of Alcæus and Sappho. The Æolian shared the fate of the other Grecian colonies in Asia Minor. First oppressed by the Lydian kings, then deprived of their independence by the Persians, they became a portion of the great empire founded by Alexander, and, passing through a stage of subjection to the dynasty of the Seleucidæ, were ultimately absorbed in the Roman empire.

Æ'ON, a Greek word signifying an age, and also eternity. The Gnostics spoke of Æons, in a peculiar sense, as powers that had emanated from God before the beginning of time, and existed as distinct entities or spirits. They were called Æons either as partaking of the eternal existence of God, or because they were thought to preside over the various ages and transformations of the world. See GNOSTICISM.

A'ËRATED BREAD is prepared by a process patented about twenty years ago, and is now coming into use in large cities. In ordinary bread-making, wheat-flower is moistened with water and worked into dough, to which common salt and yeast are added. The latter causes the flour to ferment or decompose, when carbonic acid is given off at every part; and when the fermented dough is placed in an oven, the bubbles of carbonic acid gas expand, and cause the formation of the spongy mass characteristic of good loaf-bread. The process of preparing A. B. consists in placing the flour in a strong enclosed iron box, and moistening it with carbonic acid water, prepared as stated under A. WATERS. The dough is then worked up by machinery for ten minutes or so inside the box, from which it is dropped into moulds, which form it into loaves. It is then placed in an oven, when the carbonic acid, previously introduced with the water within the dough, expands, and forms a light palatable bread. The advantages which this method of working bread possesses are—1. There is a saving of the whole of the waste caused by fermentation, which admits of more bread being made out of a sack of flour than by the old process. 2. The process, instead of occupying eight or ten hours, is completed in half an hour. 3. The cost of machinery and gas is less than that of yeast used in the old process. 4. The dough requires no handling to knead it and form it into loaves. 5. The bread is absolutely pure—it is simply flour, water, and salt. Finally, should the whole of the bread in the kingdom be thus made, a very considerable saving would be effected in the consumption of flour. See UNFERMENTED BREAD.

AËRATED WATERS are employed largely as refreshing, refrigerant beverages to allay thirst during warm weather, and during feverish conditions of the animal frame. The most common A. beverage is *Carbonic acid water*, generally spoken of as Soda-water, though it seldom contains any soda. It is prepared on the large scale by placing whiting, chalk, or carbonate of lime (CaO,CO_2) in



Gazogène.

a lead vessel with water and sulphuric acid (SO_3), when the sulphuric acid combines with the lime to form stucco or sulphate of lime (CaO,SO_3), and carbonic acid (CO_2) is evolved as gas. The latter is received in a reservoir, and is thereafter forced into water, so that the latter dissolves about five times its own volume of the gas. The water then constitutes a brisk sparkling liquid, with a pungent, but pleasant acidulous taste. On the small scale, and for family use, carbonic acid water may be conveniently prepared in the apparatus known as the *gazogène* or *seltzogène*. The complete apparatus is seen at A, and dissected at B and C. In proceeding to use the vessel, the lower globe at B is filled with water by means of the long funnel E, taking care that no water runs into the smaller and upper division. The powders, consisting of bicarbonate of soda ($NaO,HO,2CO_2$) and tartaric acid (T), are then placed in the upper globe by means of the small funnel D, and care is taken, by plugging up the tube communicating with the lower part by the stopper F, that no powder passes into the larger globe. The long tube, C, is then inserted into the globes, and screwed well in. The apparatus is inclined till water from the lower globe enters and fills the upper globe about one-third; then it is placed erect, and allowed to be at rest for two hours, when, if the screw stop-cock at the upper part be opened, the carbonated water will flow out readily into any vessel placed to receive it. The explanation of the action which goes on in the vessel is, that tartaric acid and bicarbonate of soda have no action on each other so long as they are dry; but whenever water is admitted, the tartaric acid combines with the soda and water to form tartrate of soda and water ($NaO,HO,\overline{T}$), and at the same time, carbonic acid (CO_2) is given off, and descending the tube into the lower globe, dissolves in the water contained therein. Occasionally, bisulphate of potash is used instead of the tartaric acid, to save the greater expense of the latter.—The gazogènes can likewise be used in the preparation of true soda-water, or *Eau de Vichy*, by adding a little carbonate of soda to the water in the lower globe before charging with carbonic acid. *A. wine* may be obtained by placing white wine with a little sugar-candy in the lower globe instead of water. *Sparkling lemonade* is procured when the carbonic acid water is run into a tumbler containing a little syrup of sugar; and *A. fruit-beverages*, when the water charged with carbonic acid is received in a glass containing about a table-spoonful of any of the fruit-syrups.

The less common A. W., prepared on the large scale, are—1. *A. soda-water* (true soda-water), obtained by adding 15 grains of crystallized carbonate of soda to each bottle before it is charged with the carbonic acid water; 2. *A. potash-water*, by employing in a similar way 20 grains of bicarbonate of potash; 3. *A. Selters-water*, when carbonate of soda and chloride of sodium (common salt) are dissolved in carbonic acid water; 4. *A. Carrara-water*, when finely divided Carrara marble is dissolved in the acid-charged water; 5. *A. lime-water*, when other forms of lime than the Carrara marble are used; 6. *A. magnesian-water*, when magnesia, or the carbonate of magnesia, is used; and *A. chalybeate-water*, when a compound of iron is dissolved in the carbonic acid water. The latter beverage has lately been employed in medicine, as an easy means of introducing iron into the blood, and with good effect. A. Carrara and lime waters are now administered in cases where the bony structure requires to be strength-

ened; and A. magnesia-water is a very agreeable mode of giving a patient a dose of magnesia. The well-known effervescing draughts called *soda-powders*, and *seidlitz-powders*, are two other kinds of A. drinks. In the former, bicarbonate of soda and tartaric acid are added to water in a tumbler, and a refreshing draught instantaneously prepared. *Seidlitz-powders* contain tartrate of soda and bicarbonate of soda in one paper, and tartaric acid in the other; and when both are added to water, effervescence ensues, and the liquid is then partaken of.

A. W. likewise occur naturally. Water, as it is drawn from a spring, tastes differently from the same water after being boiled and cooled; and this is due to the unboiled water containing the gases oxygen, nitrogen, and carbonic acid—especially the latter—dissolved in it. Spring-water is therefore a natural A. beverage. Rain-water has a mawkish, insipid taste, mainly because of the minute quantity of gas therein dissolved; but when that rain-water trickles down the mountain-side, and is dashed from ledge to ledge of rock, it absorbs and dissolves the gases from the air, and is thus naturally aërated. Many waters are aërated in a natural but peculiar way, which confers upon them important medicinal properties; and these will come before us under their more popular title of *Mineral Waters*.

AË'RIAL POISONS. See MIASMA.

AËRODYNA'MICS is that branch of science which treats of air and other gases in motion. It examines first the phenomena of air issuing from a vessel, which correspond in many respects with those of water. See HYDRODYNAMICS. Much depends, as in the case of water, upon the nature of the orifice, whether a mere hole in the side of the vessel, or a tube or adjutage. Another subject of A. is the motion of air in long tubes, where the resistance of friction, &c., has to be ascertained. That resistance is found to be nearly in porportion to the square of the velocity, to the length of the tube, and inversely to its width. A. examines also the velocity of air rushing into a vacuum, of wind, &c. The instrument used for the latter purpose is called an anemometer. See WINDS. Air is found to rush into a void space at the rate of from 1300 to 1400 feet per second. One of the most important inquiries in A. is the resistance offered to a body moving in air, or—which is the same thing—the pressure exerted by air in motion upon a body at rest. The law may be stated, with sufficient accuracy for practical purposes, as follows: *The resistance or pressure is proportional to the square of the velocity.* We might conclude from reason, without experiment, that such would be the case; for if one body is moving through the air four times faster than another of the same size, not only will it encounter four times as many particles of air, but it will give each of them four times as great an impulse or shock, and thus encounter 4×4, or sixteen times as much resistance.

This resistance is greatly increased by another circumstance, especially with great velocities. The air in front of the moving body becomes accumulated or condensed, and a partial or even entire vacuum is formed behind it. With a velocity of 1700 feet per second, for instance, the resistance is found to be about three times as great as the simple law of the square of the velocity would give. By the operation of these laws of resistance, a heavy body let fall with a parachute attached to it, comes, after a certain time, to move with a velocity approaching more and more nearly to a uniform motion.

A'ËROLITES (Gr. *aer*, air, and *lithos*, stone), or METEORIC STONES, FIREBALLS, and SHOOTING-STARS, are now classed together as being merely varieties of the same phenomenon. Aërolites that fall during the day, are observed to be projected from a small dark cloud, accompanied by a noise like thunder, or the firing of a cannon; at night, they proceed from a fireball, which splits into fragments with a similar sound. It is believed that the dark cloud that accompanies the fall of aërolites by day, would be luminous at night; and smoking, exploding fireballs have sometimes been seen luminous even in the brightness of tropical daylight. The connection between aërolites and fireballs is thus established. Fireballs, again, cannot be separated from shooting-stars, the two phenomena being sometimes blended, and also being found to merge into one another, both with respect to the size of their their disks, the emanation of sparks, and the velocities of motion.

There are numerous records and stories in all ages and countries of the fall of stones from the sky; but until recent times, they were treated by philosophers as instances or popular credulity and superstition. It was not till the beginning of the 19th c. that the fact was established beyond a doubt.—According to Livy, a shower of stones fell on the Alban Mount, not far from Rome, about 654 B.C. The fall of a great stone at Ægospotami, on the Hellespont, about 467 B.C. is recorded in the Parian Chronicle (q. v.), and mentioned by Plutarch and Pliny. It was still shown in the days of Pliny (d. 79 A.D.), who describes it as of the size of a wagon, and of a burned color. In the year 1492 A.D., a ponderous stone, weighing 260 lbs, fell from the sky near the village of Ensisheim, in Alsace; part of it is still to be seen in the village church. An extraordinary shower of stones fell near L'Aigle, in Normandy, on the 26th April, 1803. The celebrated French philospher, M. Biot, was deputed by government to repair to the spot and collect the authentic facts; and since the date of his report, the reality of such occurrences has no longer been questioned. Nearly all the inhabitants of a large district had seen the cloud, heard the noises, and observed the stones fall. Within an elliptical area of seven miles by three, the number of stones that had fallen could not be less than two or three thousand; the largest were 17 lbs. in weight. These are only a few out of hundreds of instances on record.

As was natural with objects of such mysterious origin, meteoric stones have always been regarded with religious veneration. At Emesa, in Syria, the sun was worshiped under the form of a black stone, reported to have fallen from heaven. The Holy Kaaba of Mecca, and the great stone of the pyramid of Cholula, in Mexico, have all the same history.

The existence of such bodies once admitted, led to assigning a meteoric character to strange ferruginous masses found in different countries, and which had no history, or were only adverted to in vague tradition. Of this kind is the immense mass seen by Pallas in Siberia, now in the Imperial Museum at St. Petersburg. The largest known is one in Brazil, estimated at 14,000 lbs.

One constant characteristic of meteoric stones is the fused black crust, like varnish, with which the surface is coated. From the circumstance of this coat being very thin, and separated from the inner mass by a sharply defined line, it is thought to indicate some rapid action of heat, which has not had time to penetrate into the substance of the stone. This view is favored by the fact that the stones are found in a strongly heated, but not incandescent state, when they fall. Their specific gravity ranges from two to seven or even eight times that of water.—As to their chemical composition, the predominating element is iron, in a native or metallic state, generally combined with a small proportion of nickel. According to Humboldt, the aërolites that fell in the neighborhood of Agram, in Croatia, in 1751, the Siberian stone, and specimens brought by that philosopher from Mexico, contain 96 per cent. of iron; while in those of Sienna the iron scarcely amounts to 2 per cent., and, in some rare instances, metallic iron is altogether wanting. A writer in the *Quarterly Review*, No. CLXXXIII., thus sums up the result of all the chemical analyses hitherto made: 'We find the actual number of recognized elements discovered in aërolites to be nineteen or twenty—that is, about one-third of the whole number of elementary substances (or what we are yet forced to regard as such) discovered on the earth. Further, all these aërolitic elements actually exist in the earth, though never similarly combined there. No new substance has hitherto come to us from without; and the most abundant of our terrestrial metals, iron, is that which is largely predominant in aërolites, forming frequently, as in some of the instances just mentioned, upwards of 90 parts in 100 of the mass. Seven other metals—copper, tin, nickel, cobalt, chrome, manganese, and molybdena—enter variously into the composition of these stones. Cobalt and nickel are the most invariably present; but the proportion of all is trifling compared with that of iron. Further, there have been found in different aërolites, six alkalies and earths—namely, soda, potash, magnesia, lime, silica, and alumina; and in addition to these carbon, sulphur, phosphorus, and hydrogen. Finally, oxygen must also be named as a constituent of many aërolites, entering into the composition of several of the substances just mentioned. As respects the manner of conjunction of these elements, it is exceedingly various in different aërolites. A few there are, especially examined by Berzelius and Rose, containing olivine, augite, hornblende, and other earthy minerals; and closely resembling certain crystalline compounds which we find on the surface of the earth.'

Besides those solid masses of considerable size, numerous instances are on record of showers of dust over large tracts of land; and it is remarkable that such dust has generally been found to contain small hard angular grains resembling augite. Stories of the fall of gelatinous masses from the sky are ranked by Humboldt among the mythical fables of meteorology. It has been supposed that such fables may have originated in the very rapid growth of gelatinous algæ, as *Nostoc* (q. v.).

Fireballs and Shooting-stars.—From the height and apparent diameter, the actual diameter of the largest fireballs is estimated by Humboldt to vary from 500 to 2800 feet; others allow a diameter of about a mile. Shooting-stars are much smaller, their weight varying from 30 grains to 7 lbs. In most cases of luminous meteors, a train of light many miles in length is left behind. One or two instances are on record where the train of the fireball continued shining for an hour after the body disappeared. The *heights* of shooting-stars are found to range from 15 to 150 miles, at the points at which they begin and cease to be visible. Their *velocities* vary from 18 to 36 miles in a second. When it is remembered that the velocity of Mercury in its orbit is 26·4 miles in a second, of Venus 19·2, and of the Earth 16·4, we have in this fact a strong confirmation of the planetary nature of meteorites.

One of the most remarkable facts connected with shooting-stars is, that certain appearances of them are *periodic*. On most occasions they are *sporadic*—that is, they appear singly, and traverse the sky in all directions. At other times, they appear in swarms of thousands, moving parallel; and these swarms are periodic, or recur on the same days of the year. Attention was first directed to this fact on occasion of the prodigious swarm which appeared in North America between the 12th and 13th of November, 1833, described by Professor Olmsted of New Haven. The stars fell on

Shower of Shooting-stars witnessed in North America.

this occasion like flakes of snow, to the number, as was estimated, of 240,000 in the space of nine hours, and varying in size from a moving point or phosphorescent line to globes of the moon's diameter. The most important observation made was, that they all appeared to proceed from the same quarter of the heavens—the vicinity, namely, of the star γ, in the constellation Leo; and although that star had changed greatly its height and azimuth during the time that the phenomenon lasted, they continued to issue from the same point. It was afterwards computed by Encke, that this point was the very direction in which the earth was moving in her orbit at the time. Attention being directed to recorded appearances of the same kind, it was observed with surprise that several of the most remarkable had occurred on the same day of November, especially that seen by Humboldt at Cumana in 1799, and by other observers over a great extent of the earth. The November stream was again observed in the United States in 1834, between the 13th and 14th, though less intense. Though often vague, and in some years altogether absent, this phenomenon has recurred with such regularity, both in America and Europe, as to establish its periodic character.

Another periodic swarm of considerable regularity is that appearing between the 9th and 14th of August, and noticed in ancient legends as the 'fiery tears' of St. Lawrence, whose festival is on the 10th of that month. There are other periodic appearances; and Humboldt gives the following epochs as especially worthy of remark: 22d to 25th of April; 17th of July; 10th of August; 12th to 14th of November; 27th to 29th of November; 6th to 12th of December.

It remains to notice briefly the various opinions that have been advanced as to the origin of aërolites, and the theory of meteors in general. The hypotheses that have been formed in answer to the question—Whence come those solid masses that fall upon the earth?—are of two kinds; some ascribing to them a telluric origin, and others making them alien to the earth. Of the first kind, is the conjecture that they may be stones ejected from terrestrial volcanoes, revolving for a time along with the earth, and at last returning to it. Another theory, which at one time found considerable favor, supposed that the matter of which aërolites are composed existed in the atmosphere in the form of vapor, and was by some unknown cause suddenly aggregated and precipitated to the earth. These conjectures are untenable in the face of the facts of the phenomena stated above, and are now completely given up.

In seeking a source beyond the earth, the moon readily presented itself. Olbers was the first to investigate, 1795, the initial velocity necessary to bring to the earth masses projected from the moon. This 'ballistic problem,' as Humboldt calls it, occupied during ten or twelve years the geometricians Laplace, Biot, Brandes, and Poisson. It was calculated that, setting aside the resistance of air, an initial velocity of about 8000 feet in a second, which is about five or six times that of a cannon-ball, would suffice to bring the stones to the earth with a velocity of 35,000 feet. But Olbers has shown, that to account for the actual measured velocity of meteoric stones, the original velocity of projection must be fourteen times greater than the above. It is against this lunar theory, that we have no proof of active volcanoes now existing in the moon; and with the improvement of the telescope, the probability of the contrary is increasing. It is, accordingly, giving place to the planetary theory, which we noticed at the outset—a theory which harmonizes better with the tendency of physical research and of speculation generally.

The discussion of hypotheses as to the genesis of the recognized planets out of portions of the gradually contracting vaporous mass of the sun; the continued discovery of hitherto unobserved planets between the orbits of Mars and Jupiter; the countless multitudes of comets that are observed traversing our system in all directions, and undergoing appreciable alteration both of consistency and orbit;—all prepare us for the idea, that matter may exist in the inter-planetary spaces, in every variety of form and condition. To account for the phenomena of meteors as above described, we must suppose that there are both detached masses, each revolving in an independent orbit, and giving rise to *sporadic* meteors; and also connected systems, forming rings or zones round the sun. The intersection of the earth's orbit by such zones or streams, would account for the periodic swarms of meteors; and if we suppose the asteroids composing it to be irregularly grouped, we see a reason why the same stream should not be always of equal intensity. There may even be periodicity in this respect too. Between 1799 and 1833—two of the most brilliant manifestations of the November stream on record—there elapsed 34 years; and the next brilliant appearances were in 1866 and 1867, as Olbers had predicted.

What causes the luminous and ignited condition of aërolites? Terrestrial magnetism was at one time suggested as the exciting cause. It is now recognized, however, that the atmosphere extends, although in a very rare condition, to at least a height of 200 miles, and the ignition is believed to be caused by friction between the rapidly moving body and the air. As to meteors unattended by aërolites, we may suppose that some are merely deflected from their path by the proximity of the earth, are rendered luminous through a short arc, and continue their course with altered orbit, while the greater part are soon burnt up and fall to the earth in impalpable dust. See METEORS.

AËRONAU'TICS, the art of navigating the air. See BALLOON.

AËROSTA'TICS. This branch of science treats of the equilibrium and pressure of air and other gases, and of the methods of measuring it by the barometer and other instruments. The expansive force or pressure of atmospheric air varies with time and place. In a medium condition of the atmosphere, and near the sea-level, barometrical observations give the pressure or weight equal to that of a column of mercury, 30 inches high, or of a column of water about 34 feet high. This makes the mean pressure of the atmosphere nearly 15 lbs. on every square inch. This mean pressure of the atmosphere is generally taken as the unit or measure of expansive or elastic forces generally; any particular pressure is said to be equal to so many atmospheres. Aërostatics also investigates the phenomena of the compression of gases; in other words, the relation between the elasticity and the density or volume of a gas. According to the law of Mariotte, the expansive force of one and the same body of gas is proportional to its density; or, which is the same thing, the expansive force of a body of gas under different degrees of compression, varies inversely as the space which it occupies. If its elastic force, at one stage, be measured by 50 lbs., when compressed into half the space, that force will be 100 lbs. Connected with this is the investigation of the variation of density and pressure in the several vertical strata of the atmosphere. It is obvious that the weight of the atmosphere must diminish as we ascend, as part of it is left below; and it results from Mariotte's law, that, at different distances from the earth's surface, increasing in arithmetical progression, the atmospheric pressure diminishes in geometrical progression. This principle furnishes the means of measuring heights by the Barometer (q. v.).

The elastic force of air and other gases is very much increased by heat; and consequently, when allowed, they expand. It is found that a rise of temperature of 1° of Fahrenheit, causes any gas to expand $\frac{1}{480}$ of its own bulk; and this expansion is uniform. If adding 10° to the temperature of a body of gas increases its bulk 3 cubic inches, an addition of 20° will give an increase of 6 inches; of 50°, 15 inches, and so on. This law was discovered by Gay-Lussac, and has been verified by subsequent investigators. Both it, however, and that of Mariotte, can be looked upon as only nearly true, and that within certain limits.

AËROSTATIC PRESS. This is a machine used for extracting the coloring-matter from dye-woods and such like. A vessel is divided by a horizontal partition pierced with small holes. Upon this the substance containing the color is laid, and a cover, also perforated, is placed upon it. The extracting liquid is then poured on the top, and the air being drawn from the under part of the vessel by a pump, the liquid is forced through the substance by the pressure of the atmosphere.

Æ'SCHINES, an Athenian orator, second only to Demosthenes, whose contemporary and rival he was. Philip of Macedon was then pursuing his designs for the subjugation of the several Greek states to his own sway; and while Demosthenes advocated the policy of opposing him before it was too late, Æ. was the head of the peace-party. Æ. was a member of more than one embassy sent by the Athenians to deal with Philip; and Demosthenes accused him of receiving bribes from the Macedonian monarch, and of betraying the cause of Athens and of her allies. There is no proof that this was the case; and perhaps Æ. was deceived by the wily Philip into believing that he meant no harm to the liberties of Athens, and that peace was the best policy for his countrymen. The result justified the sagacious fears of Demosthenes, and condemned the selfish, isolating policy of Æ. When it was proposed to reward Demosthenes with a golden crown, for his patriotic exertions in defence of his country, Æ. brought an accusation of illegality against the proposer, Ctesiphon. Demosthenes replied, and Æschines being vanquished, and having thus incurred the penalty attached to an unfounded accusation, was obliged to retire from Athens. He finally established a school of eloquence in Rhodes, which enjoyed a high reputation. On one occasion, he read to his audience in Rhodes his oration against Ctesiphon; and some of them expressing their astonishment that he should have been defeated in spite of such a powerful display, he replied: 'You would cease to be astonished if you had heard Demosthenes.' The oration against Ctesiphon and two others are the only authentic productions of Æ. that have come down to us. He was born 389 B.C., and died at Samos 314 B.C.

ÆSCHYLUS, the father of Greek tragedy, was born at Eleusis, in Attica, 525 B.C. We have but scanty notices of his life. He fought in the battles of Marathon, Salamis, and Platæa, witnessed the fall of Darius and Xerxes, and shared in the exulting sentiments which afterwards pervaded liberated Greece. Of the seventy or ninety tragedies ascribed to Æ., only seven have been preserved —*Prometheus Bound*, the *Seven against Thebes*, the *Persians*, *Agamemnon*, the *Choëphori*, *Eumenides*, and the *Suppliants*. These are sufficient to prove that Æ. was the creator of the Greek drama in its higher form. He introduced action in place of the perpetual chorus, and dramatic dialogue to supersede the long narrations of his predecessors Thespis and Chœrilus. Scenic effects, masks, and dresses, were other improvements introduced in the plays of Æ. The plots of his pieces are very simple, and display no ingenuity of construction or solution. His general tone is elevated and earnest, and shows a preference of strong for gentle emotions. Destiny is represented in its sternest aspect; gigantic heroes, Titans, and gods, rather than men, appear on the scene, and the lofty grandiloquence of the language is in accordance with the characters. In the choruses, the language is often turgid and obscure. For some reason, not well known, Æ. left his native city, and went to Sicily, where he was honorably received by King Hiero. Here he died at Gela, 456 B.C., and the inhabitants of the city raised a monument to his memory. In the poetical translation by Blackie, the non-classical reader may get a very tolerable notion of the grandeur and fire of this greatest of all ancient dramatists.

ÆSCULA'PIUS appears in Homer as an excellent physician, of human origin; in the later legends, he becomes the god of the healing art. The accounts given of his genealogy are various. According to one story, he was the son of Coronis and the Arcadian Ischys. Apollo, enraged by the infidelity of Coronis, caused her to be put to death by Diana, but spared the boy, who was afterwards educated by Chiron. In the healing art, Æ. soon surpassed his teacher, and succeeded so far as to restore the dead to life. This offended Pluto, who began to fear that his realm would not be sufficiently peopled; he therefore complained to Jove of the innovation, and Jove slew Æ. by a flash of lightning. After this he was raised to the ranks of the gods by the gratitude of mankind, and was especially worshiped at Epidaurus, on the coast of Laconica, where a temple and grove were consecrated to him. Here oriental elements, especially serpent-worship, seem to have been mingled with the rites and ceremonies. From Epidaurus the worship of the healing god extended itself over the whole of Greece, and even to Rome. According to Homer, Æ. left two sons, Machaon and Podalirios, who, as physicians, attended the Greek army. From them the race of the Asclepiades descended. Hygieia, Panaceia, and Ægle are represented as his daughters. His temples usually stood without the cities in healthy situations, on hillsides, and near fountains. Patients that were cured of their ailments, offered a cock or a goat to the god, and hung up a tablet in his temple, recording the name, the disease, and the manner of cure. Many of those votive tablets are still extant. The statue of the god at Epidaurus, formed of gold and ivory by Thrasymedes, represented Æ. as seated on a throne, and holding in one hand a staff with a snake coiled around it, the other hand resting on the head of a snake; a dog, as emblem of watchfulness, at the foot of the deity: Praxiteles and other sculptors represented the god as an ideal of manly beauty, and closely resembling Jupiter; with hair thrown up from the brow, and falling in curls on each side. The upper part of the body was naked, and the lower was covered by a mantle falling in folds from the shoulders. He had sometimes a laurel-wreath on his head, and a cock or owl at his feet; or was attended by a dwarf-figure named Telesphorus.—ASCLEPIADES, the followers of Æ., who inherited and kept the secrets of the healing art; or, assuming that Æ. was merely a divine symbol, the Asclepiades must be regarded as a medical, priestly caste who preserved as mysteries the doctrines of medicine. The members of the caste or medical order, were bound by an oath—the *Hippocratis jusjurandum*—not to divulge the secrets of their profession. In Rome, 292 B.C., when a fatal pestilence prevailed, the Sibylline books commanded that Æsculapius must be brought from Epidaurus. Accordingly, an embassy was sent to this place, and, when they had made their request, a snake crept out of the temple into their ship. Regarding this as the god Æ., they sailed for Italy, and, as they entered the Tiber, the snake sprang out upon an island, where, afterwards, a temple was erected to Æ., and a company of priests appointed to take charge of the service and practice the art of medicine. Hippocrates is said to have descended from the Asclepiades of Cos, who traced their descent, on their mother's side, from Hercules.

ÆSOP, an ancient Greek writer, whose name is attached to the most popular of the existing collections of Fables. His history is very uncertain, and some critics have even denied his existence. First among these is Luther, in his preface to the *German Æsop*, 1530. We are told, however, on the authority of Herodotus (ii. 134.), Diog. Laertius (i. 72), and Plutarch (*Sept. Sap. Conviv.*, and *De Sera Num. Vind.*), that Æsop lived in the latter half of the 6th century B.C.; that he was a slave at Samos; that, on receiving his freedom, he visited Crœsus and Pisistratus, by the former of whom he was commissioned to distribute some money among the citizens of Delphi, and that, on his refusal to pay it, in consequence of a dispute, he was thrown over a precipice by the infuriated mob. We are further informed that the Athenians erected a statue to him from the chisel of Lysippus. Whether this person was the author of the existing Æsopean collection or not, we know, from Aristophanes, and other authorities, that fables bearing his name were popular in the most brilliant period of Athenian literature. The conjecture of Bentley, however, seems well founded, that these fables were transmitted entirely through oral tradition. Socrates (*Phædo*, p. 61) turned such of them as he could remember into verse, of which Diog. Laertius has preserved a specimen; and the same was done by Demetrius Phalereus, 320 B.C. The only Greek version, however, of which any entire fables remain, and which, as shown by Bentley, has furnished materials to subsequent collections, is that of Babrius (q.v.), a writer of some mark, who is supposed to have lived in the age before Augustus. Of the fables now bearing the name of Æsop, there are three sets, the first from a MS. of the 13th c., published at Florence in 1809; the second, a collection by Maximus Planudes, a monk of the 14th c., containing a life (supposed to have been the work of Planudes, till it was found in the earlier MS.) of Æsop, full of fabulous particulars; and the third a collection published in 1610, from MSS. found at Heidelberg. All these are contained in the edition of Schneider, Breslau, 1810. The resemblance between some of the fables, and the personal peculiarities attributed in common to Æsop and to the Arabian fabulist Lokman, have led some persons to conclude, that the two men were identical; and others, that the fables attributed to them in common belong to the same eastern source. See PHÆDRUS.—A Roman actor of this name, CLAUDIUS ÆSOPUS, a contemporary and friend of Cicero, was as eminent in tragedy as Roscius was in comedy.

ÆSTHE'TICS, a term invented about the middle of last century by Baumgarten, a professor of philosophy in the university of Frankfort-on-the-Oder, to denote the science of the Beautiful, particularly of Art, as the most perfect manifestation of the Beautiful. It has the merit of being at once comprehensive and clear, and has therefore been pretty widely adopted, of late years, by critics both in France and England.

The Beautiful (Gr. *to kalon*) was a favorite subject of contemplation amongst the ancients. The name of Plato is inseparably associated with it, but in his philosophizings, he nowhere separated the Beautiful from the Good. Aristotle, again, from the immense acquaintance which he possessed with objects of art, deduced the most admirable laws and rules (Canons of Criticism), so that his *Poetics*, according to Schiller, constitute a true Rhadamanthine

tribunal for poets. But the results he arrived at are regarded by the *apriori* school of æstheticians as empiricism rather than science. Baumgarten they hold to be the first who considered the subject from the true scientific point of view, and therefore entitled to be called the founder of the philosophy of art. All sensuous apprehension, not in one form or manifestation only, but in every possible form or manifestation, was included in his view of the subject, and this conception he expressed by the word Æsthetics, from the Greek *aisthanomai*, I feel, indicating not absolute or objective knowledge of things, but such as is conditioned subjectively by the play of our sensibilities. The term is thus not confined to the limits of the Beautiful, though in point of fact we employ it in this partial signification. Beauty was, with Baumgarten, the result of the highest and purest æsthetic perception, to the realization of which the finer portion of our nature aspires; and to trace which through the whole sphere of art, was the work of æsthetic philosophy (*Sinnenerkenntniss*). Kant subsequently, from his point of view, carried out this theory of the æsthetic faculty in his critical treatise on the power of the Judgment. Everything he conceived may be regarded æsthetically as well as absolutely, in reference to ourselves as well as in reference to nature. An object may be in harmony with our sensibilities, as well as in harmony with the totality of material phenomena; or it may not be in harmony with the former, and yet truly accord with the latter. So, too, with the judgment. It may choose to apprehend things in their adaptation to man, or in what is called the teleological point of view—that is, their final end or objective adaptation to each other. Hence the æsthetical judgment considers objects as beautiful, agreeable, or useful; while the teleological judgment strives to reach their absolute design, and remains indifferent to personal predilections. Why certain objects excite in us a purely selfish interest, and others a purely unselfish pleasure, Kant does not venture to determine, for he never investigates the objective quality of the Beautiful, but confines himself strictly to its influence upon the feelings and desires. Schelling was the first to undertake this inquiry after Schiller had paved the way for him in his treatise on Æsthetics. The latter, perhaps the most lucid and intelligible of German æstheticians, in a note to his twentieth letter on Æsthetic Culture, explains his conception of the new science as follows: All things that can ever be objects of perception may be considered under four different relationships: A fact can relate directly to our sensuous condition—that is its physical quality; or to the understanding—that is its logical quality; or to the will—that is its moral quality; or to the entirety of our different powers, rather than to any particular manifestation of these—that is its æsthetic quality. There is a culture for the health, for the understanding, for morality, and for taste or beauty; the last of which has for its design to bring out the totality of our sensuous and spiritual powers in their greatest possible harmony. Schiller's idea of the Beautiful is necessarily as comprehensive as his conception of the sphere of Æsthetics. He will not admit that it is the result of a mere limited experience, taught us through the operation of phenomena, animate and inanimate, on our senses, but of pure abstract reflection. It is, therefore, a transcendental idea. It originates in the perfect union of matter and spirit. From this it follows, that 'Beauty can be exclusively neither mere *life*, as some ingenious observers have maintained, nor mere *form*, as has been decided by some speculative philosophers and philosophizing artists' (for instance, Burke and Raphael Mengs).

Passing over Schelling's transcendental speculations, which are couched in a style not very intelligible to the English mind, we come to the theory of Hegel. Like that of Schelling, it also proceeds from the so-called metaphysics of the Beautiful. It is the absolute ideal realizing itself. Nothing is truly beautiful except this. Nothing, therefore, which exists can be termed such. Out of the sphere of the pure reason we have only an eternal aspiration. In the finite mind, the absolute ideal is always striving to realize itself, but never completely succeeds. There is only a ceaseless approximation. Hegel then traces the growth and development of the Beautiful, the first form of whose existence is *natural* Beauty, and, as Vischer justly adds, the Beauty unfolded in history. But this Beauty, whether of nature or history, is rare, accidental, fugitive, and tarnished by intermixture with the not-beautiful. This deficiency or limitation arises from its being unconscious of itself. The Beautiful is, so to speak, as yet in its infancy. It does not know either that it is or what it is. It first passes into self-recognition in the dawn of human intelligence, and its conscious realization of itself increases in proportion to the culture of the race or the individual. The highest finite realization of it is Art; for though the form of art be material, it is matter shaped according to an idea. The artist looks on the form simply as the objective embodiment of the idea—every remnant of rude nature being stripped off. Form, though springing out of matter, is thus a deliverance from matter, and the particular Arts may consequently be regarded as the gradual working of the mind out of materialism. The formative Arts—Architecture, Sculpture, Painting—are silent, heavy, still partly material. Music is an advance on these. It breathes in a higher region. The materialism of Sound becomes all but ideal. Poetry is a further advance. It is the pathway of the intellect to pure thought. Æsthetics, in this point of view, is a science, based on a knowledge of the historic development of the Beautiful. It wanders through its whole kingdom, of which Art is only a province, though, as has been seen, the richest and most valuable.

Such was the aspect in which Hegel regarded the new science. He fused it into his historico-transcendental metaphysic, and so stirred up regarding it the old quarrel which had agitated the latter. Realists made their appearance, who vigorously assailed the principles of Fichte, Schelling, and Hegel, in their various applications to Philosophy, Theology, and Æsthetics. The reaction was and is most conspicuous in the second of these, but has as certainly manifested itself in the others also. It is denied that the Ideal conceived by man is superior to the Real, as it is in itself. It is man who lowers it by his inadequate apprehension of its harmony and perfection. The greatest artist does not strive to outshine or even to reach the beauty of nature, but to surpass himself in it. The whole historic theory of Hegel is likewise rejected, after severe and searching criticism, from a rationalistic point of view. Hegel conceives the first effort of art to have arisen from a longing on the part of the human spirit to emancipate itself from the thraldom of matter. This is the idealistic view of its beginning. Kugler, on the other hand, affirms that it arises from 'the necessity which man is under to bind his thoughts to one firm spot, and to give to this memorial a form which may be expressive of the thought.' The origin of Art is thus made retrospective, not prospective. This may be considered the realistic view of its beginning. So the question stands at present in Germany.

In France, the founder of the Eclectic School of Philosophy, Victor Cousin, has eloquently expounded the Platonic view of Æ. In the second part of his treatise *Du Vrai, du Beau, et du Bien* (On the True, the Beautiful, and the Good), he has a chapter on 'the Beautiful in Objects,' in which, after discussing the principal theories of the materialists and geometricians, and pointing out what he conceives to be the errors and limitations of such theories, he proceeds to a consideration of physical, intellectual, and moral beauty, endeavors to discover the quality or qualities in which they agree, from this rises to the apprehension of an ideal beauty whose realization he finds in God. 'God,' says Cousin, 'in whom is combined absolute unity with infinite variety, is necessarily the realized ideal of all beauty.'

Speculations on this subject in Britain have been mostly limited to the Beautiful in form and color. We have not in general sought, like the Germans, to discover the *idea* of the Beautiful, but the Beautiful itself. Our criticism may, and indeed does seem meagre and unphilosophical to them, but it is at least clear, and its purpose obvious. We have put to ourselves this question: Are there, or are there not, constant qualities in certain objects which make them what we call Beautiful? Does Beauty arise from anything inherent in these, or does it depend upon accidents in us, such, for instance, as the complex and numberless phenomena of Association? Is it objective or subjective?

The first publication on this subject of any consequence—if we except Lord Shaftesbury's *Characteristics*, in which there is set forth a 'rapturous Platonic doctrine' impossible to criticise, because unintelligible—was Dr. Hutcheson's *Inquiry* (1725). In this work, the existence of an 'internal sense,' through which we either obtain a perception of the Beautiful or are made in some way conscious of its presence, was maintained. The notion of a sixth sense has been very severely criticised by Jeffrey in his celebrated article on Beauty.

Certain explanations and modifications of this theory were made by the followers of Hutcheson, but nothing really new was brought out till Edmund Burke published his *Treatise on the Sublime and the Beautiful* (1756). There is no work upon the subject so popular or so worthless. Every one has heard of it, large numbers have read it, and yet the fundamental principle is weak and absurd. He confounds the beautiful with the luxurious. 'All objects appear beautiful which have the power of producing a peculiar relaxation of our nerves and fibres, and thus inducing a certain degree of bodily languor and sinking!'

Sir Joshua Reynolds, a contemporary of Burke, maintained a very remarkable theory of the Beautiful, which he borrowed from the celebrated Père Buffier, and illustrated at great length. Beauty was conceived to be the mean between two extremes. This doctrine is open to the fatal objection that the most ordinary is therefore the most beautiful, and that, consequently, the greatest poem or the finest landscape must be that which is the most commonplace. Nevertheless, Sir Joshua does not hesitate to push his theory to extremities, declaring that if what we term the deformed or monstrous were only more common than what we call the beautiful, they would exchange names and sensations—a statement which may safely be left to refute itself.

The next work on this subject that excited any measure of popular attention was Alison's *Essays on the Nature and Principles of Taste* (1790). The theory propounded by this writer is generally known as the theory of Association. The most powerful exposition of the Association theory is that given by Jeffrey, in his famous article in the *Encyclopædia Britannica*, and in his critique on Alison in the *Edinburgh Review* (1811). According to Jeffrey: 'These emotions (that is, those excited by the contemplation of certain objects) are not original emotions, nor produced directly by any qualities in the objects which excite them; but are reflections or images of the more radical and familiar emotions to which we have already alluded, and are occasioned not by any inherent virtue in the objects before us, but by the accidents, if we may so express ourselves, by which these may have been enabled to suggest or recall to us our own past sensations or sympathies.' In his defence of this theory, Jeffrey is obliged to consider those of Stewart and Payne Knight, the former of which is partly, and the latter entirely, opposed to his own. His argument in connection with landscapes, is quite conclusive; but when he assails Knight's doctrine as to the intrinsic beauty of colors, it ceases to be satisfactory. This writer maintains that colors possess an original and primitive beauty; Jeffrey denies this, and attempts to prove that our perception of the beauty of color, arises from association alone. He also refuses to believe that there is any intrinsic beauty in form, and accepts Slison's analysis of beauty with reference to Greek architecture. It arises, 1st, from the association of utility; 2d, of security; 3d, of the skill of the architect; 4th, of magnificence; 5th, of antiquity; 6th, of Grecian greatness. This theory of association, however, is no longer held by any who think on the subject. It may be ingenious, but it is not satisfactory. Ruskin, Blackie, and others have nearly destroyed its popularity. Prof. Blackie is a Platonist in theory, but his elaboration of that theory is entirely original. 'Beauty,' he says, 'does not consist in one element, but in many elements.' The late Sir William Hamilton distinguishes Beauty into Absolute and Relative. 'In the former case,' he says, 'it is not necessary to have a notion of what the object ought to be before we pronounce it beautiful; in the latter case such a notion is required.' He defines the beautiful to be that 'whose form occupies the imagination and the understanding in a free, full, and consequently an agreeable activity.

AFFIDA'VIT, an oath in writing, or a written declaration made before a magistrate, or other person legally authorized to administer an oath, the truth of which is confirmed either by an oath sworn, or a solemn affirmation emitted in terms of 18 Vict. c. 25, and the other statutes referred to under AFFIRMATION. Where evidence is required in England to be laid before a court or a judge, it is usually reduced to the form of an A., in place of being delivered orally, as in jury trial. An A. ought to set forth the matter of fact only, and not to declare the merits of the cause, of which the court is to judge (21 Car. I. B. R.). The name and designation of the party making the A. are written at length, and he signs it at the foot. When the paper is shown to him, he is required to swear or affirm that its contents are true, and that the name and handwriting are his. Affidavits in all the English courts must be taken and expressed in the first person of the deponent. The *Jurat*, with which the A. closes, specifies the officer before whom, the place where, and the time when it was sworn, and this is signed by the officer or magistrate. When an A. is sworn in open court, that circumstance is mentioned, and no officer is named. In Scotland, voluntary affidavits are not generally received as evidence, because they are *ex parte* statements, no opportunity being afforded for cross-examination. To this rule, however, there are exceptions. Claimants are required by the Bankrupt Statute to lodge their claims with A. or oaths of verity; and there are other similar statutory provisions. An A. is sometimes required also at common law, as in applications for warrants *in meditatione fugæ*. By 5 and 6 Will. IV. c. 62, various unnecessary oaths and affirmations were abolished, and declarations substituted in lieu thereof, and voluntary and extra-judicial oaths and affidavits were suppressed. The oath of allegiance, and all oaths in courts of justice, were expressly exempted from the operation of the statute; and by 6 and 7 Vict. c. 43, this exemption was extended to ratifications by married women. The Lord Chancellor of England is empowered by 6 and 7 Vict. c. 82, to grant commissions for taking affidavits, affirmations, and declarations in Scotland. See AFFIDAVIT in AM. SUPP.

AFFI'NITY (Lat. *affinitas*), the relationship created by marriage between the husband and the blood-relations of the wife, and between the wife and the blood-relations of the husband. The relations of the wife stand to the husband in the same degree of A. in which they stand to the wife by blood or consanguinity, and *vice versâ*. But between the relations of the two parties by A. there is no A. Thus, there is no A. between the husband's brother and the wife's sister; and by our law, there is no impediment to their marriage. The question as to whether those who are related by A. stand in all respects in the same position as regards marriage with those connected by blood, is one on which much difference of opinion at present prevails. Marriage between a man and the sister of his deceased wife is at present forbidden by statute (5 and 6 Will. IV. c. 64); but an attempt is annually made in parliament to obtain its repeal. See MARRIAGE.

AFFINITY. Chemical A., or chemical attraction, is the force which produces all chemical phenomena. It differs from the attraction of gravitation in acting, not between masses, but between atoms, and only when the atoms are at insensible distances. It differs also from cohesion, which unites the particles of the same substance, while A. unites atoms of different substances. The compounds thus formed are new bodies, often bearing no resemblance in appearance or other properties to the elements which combine to produce them. Thus, water results from the combination of two gases.

The strength of chemical A. is different between different substances. Sulphuric acid combines with lime, and forms gypsum; but if potash is added, the sulphuric acid leaves the lime, and combines with the potash. As a sort of choice is here manifested, it is called a case of *elective* A. These elective affinities, however, are often altered by a change of temperature, or other accompanying circumstances.

AFFIRMA'TION a solemn declaration, which, in the case of members of certain religious persuasions, is admitted in lieu of an oath. By 3 and 4 Will. IV. c. 49, 3 and 4 Will. IV. c. 82, and 1 and 2 Vict. c. 77, it is provided that Quakers, Moravians, and Separatists (q. v.) who, from conscientious scruples, refuse to take an oath in courts of justice, may, both in civil and criminal cases, make a solemn A., according to a prescribed formula. For Quakers and Moravians the formula is: 'I do solemnly, sincerely, and truly declare and affirm.' In the case of Separatists, this A. further bears to be emitted 'in the presence of Almighty God.' The penalties of perjury are imposed on those who shall be proved to have affirmed falsely. The statute of 1855 extended the privilege to all persons who refuse to be sworn from conscientious motives; and that of 1869 extended the right of making an A. in a court of justice to all on whose conscience an oath would not be binding. See OATH. See also AFFIRMATION in AM. SUPP.

AFFRE, DENIS AUGUSTUS, Archbishop of Paris, who fell in the insurrection of June, 1848 (b. 1793). At the time of the Restoration, he was professor of theology at the seminary of St. Sulpice; and on account of his prudent and temperate character, was made Archbishop of Paris by the government of Louis Philippe in 1840. Though not yielding a blind submission to all the measures of the government, he abstained from all offensive opposition. When Louis Philippe became an exile, and a republic was proclaimed, the archbishop kept aloof from political strife, but displayed earnest care for the public welfare. During the insurrection in Paris, 1848, he climbed upon a barricade in the Place de Bastille, carrying a green bough in his hand, as a messenger of peace, and wished to persuade the insurgents to lay down their arms. He had scarcely uttered a few words, when the insurgents and the troops commenced firing again, and he fell, mortally wounded by a musket-ball, coming apparently from a window above. He was carried by the insurgents into the house of a priest, and the next day was removed to his palace, where he died June 27, 1848. He was the author of several theological writings, and of a work on Egyptian hieroglyphics.

AFGHANISTA'N, the land of the Afghans, formerly known by the names of Drangiana and Ariana, lies between lat. 28° and 38° N., and in long. from 62° to 73° E. Afghan is a Persian name; the inhabitants style themselves *Pushtanch* (plural of *Pushtu*). Their country is bounded on the N. by Turkestan; on the E. by Peshawur and Sinde; on the S., by Beloochistan; and on the W., by the Persian highlands of Khorassan. The population is variously estimated on at from four to nine millions. In the N. E., the alpine region of the Hindu Kush, a wild mountain isthmus cleft by numerous ravines, and towering up into the clime of perpetual ice, unites the highest masses of land in Eastern with those in Western Asia, and presents formidable obstructions to communication between the territory Oxus and that of the Indus. In the E., the Soliman Mountains abruptly divide the country from the flat regions of the Punjab, and the plains of the lower Indus. There are only two passes leading through the highlands of A. to the Indus: that in the north, formed by the deep valley of the Cabul River, has strong positions of defence at Jelalabad and Peshawur, not far from the Khyber Pass; while that in the south, the Bolan Pass, forms a way of communication with Sinde. The Hindu Kush and Ghor Mountains, which continue the range westward, forming the Paropamisus of the Greeks, have been little explored. The elevated terraces of Cabul and Ghiznee slope gently down towards the south-west. Though the climate has generally a continental character, yet the differences of elevation, and unequal distribution of water, render it various. The date-palm ornaments the oases in the sandy desert to the south-west, and in

the deep sheltered valleys of the east the cultivation of cotton and sugar succeeds; but the high terraces of Cabul and Ghiznee (8000—9000 feet above the level of the sea) are exposed to a severe winter, with heavy falls of snow. The vine flourishes here in company with apricots, apples, pears, plums, cherries, and fields of European corn. Tulips, aromatic herbs, rhubarbs, tobacco, and asafœtida are extensively grown; and in the well-watered valleys, pomegranates and oranges, with a profusion of roses, display the luxury and splendor of an Indian clime. A. is rich in minerals; iron and copper especially are abundant.

The population of A. is very far from being homogeneous. An elaborate paper on Afghan ethnology in *Nature*, 1880, estimates that of a total population of 6,145,000, about 3,520,000 are Afghans proper and Pathans, both being of the old Persian or Iranian stock. *Pukhtu* or *Pushtu*, the language of the Afghans, is an Indo-Persian tongue; of this name the word *Pathan* is a corruption. Next come the Tajiks, also Iranians, of whom there are about 1,000,000. The remainder is constituted of Hindkis (of Hindu stock), Hazaras (Mongolo-Tartars), Kataghans and Kizlbáshes (Turki), Baloches (Iranian), Badakshis, Kohistanis, and Siáh-Posh (all Aryan). The Afghans are Sunnite Mohammedans. The Tajiks and the Hazaras speak Persian and are Shiahs. The Kizlbashes speak Turki. The Hindkis speak Hindustani and are of Brahminical faith.

The Afghans claim descent from King Saul, and profess to be *Bani-Israel;* and their physiognomy used to lead travelers to believe in a Jewish connection. The Afghans seem to have been in their present seats in the 13th c., and for a century and a half were under Mongol rule. They first appeared as an independent power during the internal discords of Persia after the death of Nadir Shah. Ahmed Khan, of the race of Abdalli (1747—1773), took advantage of these feuds, and liberated A. from Persian rule. His success founded the Dourance dynasty. When his son Timur died, in 1793, a contest for the throne took place between the brothers Zemaun, Mahmud, and Shah Sujah, which ended in the success of Mahmud, who, however, was compelled to abdicate the throne in 1823, and died in 1829. The empire now fell into the hands of three brothers, of whom the oldest, Dost Mohammed, ruled at Cabul, the most important of the three divisions of the country, where he had a revenue of 1,400,000 dollars, and an army of 18,000 men. Still, the country was in an unsettled state; for Dost Mohammed was at war with Lahore in the east, and in the west the Persians had invaded Herat. On the 1st of October 1838, the governor-general of India (Lord Auckland) declared war against A., on the grounds, that Dost Mohammed had unlawfully attacked the British ally, Runjeet Singh; that the military operations of the Afghans had betrayed a hostile purpose towards India; and that Shah Sujah, as the rightful heir to the Afghan throne, had placed himself under British protection. The British forces advanced through the Bolan Pass to Candahar, where Shah Sujah formally claimed possession of the country. On the 21st of July, the army encamped before Ghiznee, and after some hard fighting, that fortress was taken. On the 7th of August, Shah Sujah, with the British forces entered Cabul, and the conquest was regarded as complete. It was a gross mistake of the nature of the country and the character of the people. The land had been invaded, but was by no means conquered. Dost Mohammed had surrendered to the English, but his son, Akbar Khan, was actively engaged in a conspiracy, of which Sir Alexander Burnes and the envoy Macnaghten were not aware until it was too late. At the beginning of winter, when help from India was impossible, the outbreak took place at Cabul, when Burnes, Macnaghten, and several British officers were slain. It was then agreed that the invaders should leave the country; while, on the other hand, Akbar Khan and his confederates stipulated to provide an escort, and make other necessary arrangements for the retreat. Depending on these promises, the British army left Cabul on the 6th of January 1842, in order to return by the Khyber Pass into India; but neither escort nor provisions were supplied by the Afghan leaders, and the severity of the season increased the misery of the retreat. The fanatical tribes of the districts harassed the flanks and rear of the army, and slew women and children as well as men. Out of a host of 16,000—or, if we include women and children, about 26,000—only one man (Dr. Bryden) escaped to carry the dismal tidings to General Sale, who still held his position at Jelalabad.

Almost against his own will, the new governor-general, Lord Ellenborough, sent other forces into Afghanistan. General Nott marched from Candahar to Ghiznee, which was again taken after a slight resistance, and then proceeded to meet the army which, under General Pollock, had marched through the Khyber Pass to Cabul. Here the force of Akbar Khan was defeated and routed, and the place was as far as possible desolated. The English officers and their ladies who had surrendered themselves as prisoners to Akbar Khan, were restored to liberty; and soon afterwards, the troops marched back to India. It was believed now that the Afghans were deprived of all power to confederate against the government of India; but this conclusion was too hasty, for in 1846 they formed an alliance with the Sikhs against the British; and the disturbances in the Punjab were not quelled without several sanguinary engagements. After the decisive battle of Gujerat (February 21, 1849), the Sikhs were forsaken by the Afghans; and Dost Mohammed, with about 16,000 men, fled over the Indus. After this period, Dost Mohammed devoted his attention almost exclusively to the consolidation of his dominions. He died in 1863, appointing Shere Ali, one of his younger sons, as his heir. At first the choice was acquiesced in by the sixteen sons of Dost Mohammed, a large number of whom were governors of provinces; but disputes followed, which for many years kept A. in a state of anarchy. See CABUL. The British government of India had recognized Shere Ali at his accession, and when in 1868, after his long struggle with his brothers, he obtained possession of Cabul, and became *de facto* ruler of the greater part of Afghanistan, direct assistance was given him to secure the position for which he had fought so hard. Sir John Lawrence, then Indian viceroy, sent him first two, and afterwards four lakhs of rupees with 3500 stand of arms. The next viceroy of India, Lord Mayo, met the Ameer in state at Umballa, in March 1869. It was then explained to him that Her Majesty's government had no desire to interfere with the affairs of A., except to check civil war, and by so doing, to secure the peace and prosperity of the country. This intimation was accompanied by another large present. In the same year, the Ameer conceived the idea of invading Bokhara (q. v.) and attacking the Russians, but was restrained by English advice. After 1869, Shere Ali endeavored to secure tranquillity in Afghanistan. He was alive to the strife that had been been occasioned by intrusting power to relatives, and he endeavored to replace the members of his family as much as possible by strangers. He also indicated very distinctly that he did not intend to select as his heir his son Yakoob—who, at an early age, had shown great ability as governor of Herat, and had, on many occasions, given his father most valuable assistance—but a younger son, Abdullah. The claims of Yakoob to share in the government of A. were ignored, and the result was that, in 1870, he headed a rebellion against his father; but in the following year a reconciliation was effected through the intervention of England. In 1869, it was settled between England and Russia, that all the provinces between the Oxus and the Hindu Kush should be treated as part of A. In 1878, in consequence of new Russian diplomatic relations to A., Shere Ali was invited to receive a British mission. The refusal of the Afghans to admit the missior which had advanced to the mouth of the Khyber Pass, led, after some fruitless negotiations, to war. Hostilities began by the forcing of the entrance to the Khyber towards the end of November. There was some severe fighting in the passes, but the invaders were everywhere successful. Before the end of December, Jelalabad was occupied without resistance, and Candahar a little later. Shere Ali, who had fled, died early in 1879; and Yakoob Khan, proclaimed Ameer, made peace in May.

It was provided that there should be a British resident at Cabul; and that Britain should defend A. against foreign aggression, the Ameer receiving a subsidy. The Kuram, Pishin, and Sibi Valleys became British territory, and the Khyber and Michni Passes came under British control. But in September of the same year the revolted troops of the Ameer surrounded and attacked the British Residency. The Resident, Sir Louis Cavagnari, and his staff, with almost the whole of their Indian guard, were slain after a desperate but bootless struggle. Measures were immediately adopted by the Indian government for punishing the outrage. The Ameer put himself under British protection, and abdicated his sovereignty; and after some fighting Cabul was occupied by English troops in the beginning of October. The war was maintained in a desultory way; and it was not till the middle of 1880 that peace negotiations were again fairly undertaken. Progress seemed to have been made when Abdurrahman, son of Dost Mohammed's eldest son, and long under Russian protection, was proclaimed Ameer of Cabul. A few days afterwards England was startled by the intelligence that an English force had met with a very severe defeat near Candahar at the hands of Ayoob Khan, Yakoob's brother. The disaster was avenged on the 1st September, when General Roberts, marching from Cabul, routed and dispersed Ayoob's army; and shortly thereafter the English troops began to be withdrawn from A., leaving till 1881 a force in Candahar and its neighborhood.

AFFRIQUE, SAINT, a town of the dep. of Aveyron, France, on the Sorgue, a tributary of the Tarn, 31 miles south-south-east from Rhodez. It is situated in a beautiful valley, between two mountains, and is surrounded by meadows, orchards, and vineyards. The streets are broad, but the houses are mostly old and mean. It has woollen and cotton manufactories and tanneries. There is a considerable trade in wool; and a principal article of trade is the celebrated *Roquefort Cheese*, made from ewe-milk, chiefly in the mountain pastures around the neighboring village of Roquefort. About 10,000 cheeses are made annually. They are kept in cellars by the cheesemongers to ripen. This kind of cheese was sent to

ancient Rome, and is highly praised by Pliny. Pop. (1876) 5572.

AFIUM-KARA-HISSAR (*Opium Black Castle*), a city of Asia Minor, in the pashalic of Anatolia, 170 miles east-by-north from Smyrna. It stands near the Akar, partly on level ground, and partly on a rising ground among rocks. Above the city, towers an isolated rock of 300—400 feet in height, almost precipitous on most sides, and very steep on that by which alone it is accessible. The summit has in former times been fortified. The streets of the city are very narrow. Most of the houses are of stone, and well built. A great trade is carried on, the city being an entrepôt between Smyrna and Europe on the one hand, and Armenia, the countries on the Euphrates, and Persia on the other. The products both of Europe and the East are to be found in its markets. A principal article of trade is opium, produced in the neighborhood, and from it the city derives its name. There are here and in the neighborhood manufactures of felts, carpets, arms, and saddlery. The saddlery of A. was formerly in request throughout the whole Turkish Empire, but the demand for it has greatly fallen off. The pop. is supposed to be about 60,000.

AFRICA, the second in point of size of the great divisions of the globe, has long been truly the 'dark continent,' the land of mystery; but of late much has been done to open it to us by the enterprise of explorers, the zeal of missionaries, the perseverance of commercial speculation, and the military aggressions of Europeans. The chief hindrances are found in the fewness of the accessible points on the coast, the pestilential climate of the marshy lowland bordering on the sea, the barrenness of vast tracts like the desert of Sahara, and the barbarism and sanguinary character of the natives.

The valley of the Nile was known in the earliest period of history as the nursery of commerce, arts, and sciences; but while Egypt was flourishing, the rest of A. was almost totally unknown, and was vaguely spoken of as Libya. The Greeks and the Romans penetrated into A., probably as far as the Niger; but they had scarcely any definite knowledge of the countries lying beyond Numidia, while South A. was entirely unknown. The tradition that Jewish and Tyrian merchants, on their voyages to Ophir, explored the east coast of A., is dubious; but another account, that, in the time of Pharaoh-Necho, the Phœnicians circumnavigated A., seems to be well authenticated; and it is probable that the Carthaginians had a better knowledge of parts of the interior than we have in the present day. For a history of the older discoveries in A., we may refer to works on discoveries and travels in Africa by Murray (1817) and Leyden (1799); and to E. H. Bunbury's *History of Ancient Geography* (1880).

The 15th c. was marked by an extension of geographical knowledge in A. as elsewhere. Henry the Navigator sailed round the formidable Cape Nun (*non plus ultra*); Diaz and Vasco de Gama discovered the Cape of Good Hope; and both the western and the eastern coasts were partly explored by several European voyagers. The older travels and discoveries may be arranged in the following order: In the 14th c., the travels of the Arabian Ebn Batuta in the north of A. In the 15th c., the Portuguese discoveries of Madeira, Cape Blanco, Senegal, Guinea, Benin, the Cape of Good Hope, &c., and the navigation of the east coast by the Portuguese Covilham, who first traveled in Abyssinia. In the 16th c., the travels of Leo Africanus through Barbary and Sahara to Abyssinia; the travels of the German Ranwolf in North A., and Windham's voyage to Guinea, which was followed by several other expeditions in 1554 and 1562. In 1570 and 1600 the Portuguese visited Monomotapa, then a powerful state near the Mozambique coast. In the 17th c., the Englishmen Jobson and Thomson, in their journey to Timbuktu, opened British commerce with A., and the slave-trade immediately followed. In 1662, we find a French colony on the Senegal, and many exploring journeys to the interior were made by Renouard and others. In 1624, the Jesuit Lobo endeavored to find a way from the equator through the interior as far as Abyssinia. Thevenot's journey to Egypt in 1652, the English occupation of Cape Coast in 1664, Brue's voyage to Senegambia, and several other visits to the western coast, mark the progress made in the latter half of the 17th c.

In the course of the 18th c., various additions were made to our store of information on A. In the year 1788, the African Society was founded in London, and, under its direction, Ledyard and Lucas were sent to explore the Niger, and were followed by Major Houghton. The English colony of Sierra Leone was founded in 1790. The French expedition to Egypt, towards the close of this century, gave a new impulse to researches in A.

In the 19th c., the most various motives have co-operated in favor of an extended knowledge of this vast continent. The captains of English cruisers, employed to suppress the slave-trade, have supplied some valuable information; the governors of the colonies and private merchants have contributed their share; and enterprising travelers from all sides of the coast have endeavored to strike out paths to the interior. The works published on A. since the year 1800 are consequently very numerous. A few of the more important may be mentioned. In 1802—1805, Lichtenstein traveled in the district north of the Cape of Good Hope, and first furnished information regarding the Bechuana tribe. The travels of Mungo Park from Timbuktu to Bussa are familiar to every one. In 1809, Burckhardt was sent out by the African Society, and his explorations, rich in manifold results, occupied the years 1812—1816. To the French we are indebted for much valuable information concerning Marocco, Algeria, and the neighboring parts of Sahara. The labors of Oudney, Clapperton, Denham, and Lander, in the Sahara and Sudan are memorable by the discovery of Lake Tchad and the course of the Niger. Since about 1840, our knowledge of South A. has received many important additions from the missionaries stationed there, especially Moffat; while David Livingstone, who, from 1843 to 1873, was engaged in trying to open the countries north of the Cape of Good Hope, penetrated in 1849 as far as Lake N'gami, in 20° S. lat.; and in 1853, ascending the Leeambye (Zambesi) northward for several hundred miles, succeeded in crossing the continent to Loando on the west coast. Having retraced his steps to the point of the Zambesi from which he had started, the adventurous traveler next followed that stream till he reached the east coast, at Quilimane, in 1856.

From 1859 to 1863 was spent in various explorations of Lake Nyassa and the neighboring regions. Again setting out in 1866, he found, in the region south of Lake Tanganyika, the river Chambezi. This river, which is specially known by this name ere it falls into Lake Bemba or Bangweolo, is known between that lake and lake Moero as the Luapula, and further on in its course as the Lualaba; and was by Livingstone traced through these lakes and as far as 4° S. lat. Livingstone's belief was that this basin, now known to be the upper Congo, contained the headwaters of the Nile. In 1871, along with Stanley, he found the river Rusizi flowing into the north of Lake Tanganyika. His last enterprise consisted in further exploration of these regions and new efforts to find the Nile sources. He died at Ilala, beyond Lake Bemba, in May 1873. Burton and Speke, crossing the Border Mountains from Zanzibar, in 1857, discovered Lake Tanganyika; and the former then journeying to the north-east, discovered the southern part of the Great Victoria Nyanza, which he supposed to be the head reservoir of the Nile. A second expedition, undertaken by Speke and Grant in the end of 1860, penetrated as far north as Gondokoro on the White Nile, and added vastly to our knowledge of the eastern equatorial regions of Africa. At Gondokoro, Speke and Grant were met by Mr. (now Sir Samuel) Baker. Baker, accompanied by his heroic wife, pushed on to the south, and discovered in 1864, west of the Victoria, another great lake, which he called the Albert Nyanza. He returned in September 1873 from a second expedition—of a military character—undertaken in 1869, at the expense of the Pasha of Egypt, to suppress slavery in the upper regions of the Nile. The geography, language and manners of the inhabitants of Abyssinia, Sennaar, and Kordofan have also during late years been greatly illustrated by the efforts of various European travelers. The researches of Dr. Barth and his companions (1850—1855)—investigating the same central division of the continent as Clapperton and Denham—and Dr Schweinfurth's travels (1868—1871) in unexplored regions, have enriched our store of knowledge regarding this land of mystery. In 1874–5, Lieutenant Cameron surveyed the lower half of Lake Tanganyika, and walked across tropical Africa from east to west, all but determining the source of the Congo. Mr. Stanley explored the Victoria Nyanza and its affluent the Shimiyu in 1875–6. Then striking the Lualaba at Nyangwe in the end of 1876, he forced his way down the stream; and arriving at the mouth of the Congo in autumn 1877, demonstrated that the Lualaba and the Congo are identical. In 1877–79, Major Serpa Pinto crossed the region lying between Benguela and Durban in Natal; and in 1880, the country between Nyassa and Tanganyika was traveled over by Mr. Joseph Thomson. See ALBERT NYANZA, NILE, NYANZA, NYASSA, SPEKE, TANGANYIKA, and ZAMBESI. See also AFRICA in AM. SUPP.

A. lies between lat. 37° 20′ N. and 34° 50′ S., and long. 17° 30′ W. and 51° 30′ E. It is of an irregular triangular form, with the vertex towards the S., having the Mediterranean on the N., the Isthmus of Suez, Red Sea, and Indian Ocean on the E., and the Atlantic on the W. The formation of the Suez Canal has nominally converted Africa into an island. The coast-line is marked by few indentations or projections; the most important gulf being that of Guinea, on the W.; and Capes Bon, Verd, Good Hope, and Guardafui, the extreme points respectively on the N., W., S., and E. The greatest length of the continent, taken from north to south, is about 4985 miles; its greatest breadth, from east to west, 4615; and its area, including the adjacent islands, not less than 11,854,000 square miles.

What is known of the physical features of A. may be shortly sketched under the following heads:

1. The triangular region south of Cape Guardafui and the Gulf of Guinea is mostly a high table-land, having fringes of mountains crowning its edges. Between the coast and the beginning of the

AFRICA
British Miles
0 100 200 300 400 500 600 700 800 900 1000
Geographical Miles
0 100 200 300 400 500 600 700 800 900 1000
ATLANTIC OCEAN
INDIAN OCEAN
SAHARA or GREAT DESERT
SOUDAN
GUINEA
ABYSSINIA
ARABIA
PERSIA
EGYPT
NUBIA
LIBYAN DESERT
BARBARY
ALGERIA
TUNIS
TRIPOLI
FEZZAN
BARCA
MOROCCO
CAPE COLONY
MADAGASCAR
GULF OF GUINEA
ARABIAN SEA
Longitude West 30 20 10 0 of Greenwich
Longitude East 10 20 30 40 50 60 70 of Greenwich

elevation runs a belt of lowlands, varying from 50 to 300 miles in breadth. The Lupata range, seen running parallel with the coast, forms the eastern crest of the table-land. Between 3° and 4° S. lat., it reaches, in the snow-clad Kilimandjaro and Kenia, the height of 20,000 feet. The mountainous country of Abyssinia is the eastern prolongation of the plateau and its elevated crest; in the summit of Abba Yared, at the northern extremity, it rises to 15,000 feet. At the south, the hills of Cape Colony rise in stages from Table Mount to the summits of the Nieuwveld and Sneeuwberg, in the N. of the colony, which are estimated at 7000—10,000 feet; the spaces between the ranges being shrubby *kloofs* or valleys, and broad elevated terraces or *karroos*. From the elevated crest that runs parallel to the west coast from Cape Colony to Valfish Bay, Mr. Galton describes the country as sloping slightly inwards, thus giving a cup or basin shaped appearance to the interior of the continent. Towards the N. W. the border of the table-land rises in the Cameroons to the height of 13,000 feet. Its northern boundary is not determined; but it is likely that the valley of the western branch of the Nile penetrates into it, dividing it into two portions, an eastern and a western. A mountain seen lying south from Lake Tchad is supposed to be one of its northern outposts.

2. North and north-west of the great triangular table-land lies Sudan or Central Nigritia, under which name may be comprehended the countries watered by the Senegal, Gambia, and Niger, along with the coast of Lower Guinea; and the basin of Lake Tchad. In the west of this section is a mountainous table-land of no great elevation, in which the rivers above named take their rise; the Kong Mountains, which run parallel to the Guinea coast, are a branch of this elevation. Eastward of the Niger, the country is hilly, alternating with rich, often swampy plains. In the basin of Lake Tchad is a vast alluvial plain, one of the largest on the globe, and of great fertility.

3. Between Sudan and the cultivated tract which borders the Mediterranean, stretches the Sahara or Great Desert. It extends south nearly to the Senegal, the northern bend of the Niger, and Lake Tchad, northward to the Atlas range in Marocco and Algeria, and towards Egypt it reaches to the Mediterranean. Its average breadth from N. to S. is about 1000 miles. Its length from the Atlantic to the western edge of the valley of the Nile is 2000. Over a great part of this region, rain never falls, and everywhere it is rare; it is thus condemned to sterility. It consists partly of tracts of fine shifting sand, which frequent storms of wind raise into the air, so as often to overwhelm travelers. But the greater part of the surface consists of naked but firm soil, composed of indurated sand, sandstone, granite, and quartz-rocks, often rising into ridges or hills. The desolation is interrupted at intervals by patches, sometimes of considerable extent, covered with bushes and coarse grass, and often of great beauty and fertility. These *oases*, or *wadies*, as they are called, which are occasioned by subterranean springs, are most numerous and fertile in the eastern portion of the Desert. The easiest route across the Desert to Sudan runs from Tripoli through the kingdom of Fezzan to Lake Tchad. Fezzan enjoys periodic rain from the moist winds of the Mediterranean, which extend further into the continent here than elsewhere. The portion of the Desert lying east of the route above described is called the Libyan Desert. It is chiefly in this region that the oases are susceptible of cultivation; the tracts of vegetation in the western portion are fit for little else than pasture, mainly for goats and sheep. The principal production of the more fertile oases is dates; but other fruits and grain are also cultivated. Gum-arabic is another production. Some of the larger oases support thousands of inhabitants living in villages. Commerce is carried on across the Desert by various routes by means of caravans, consisting of from 500 to 2000 camels, with their attendants. The distance between the wells sometimes exceeds ten days' journey; and when a well is found dry, men and animals are in danger of perishing. The inhabitants consist of independent tribes of Moors, Berbers, and Arabs.

4. The Atlas region, comprehending the mountainous countries of Marocco, Algeria, and Tunis. The northern slope towards the Mediterranean, called the Tell, is, in aspect, climate, and productions, similar to the opposite coast of Europe; the southern side merges gradually into the Sahara. Some parts of the chain are considerably above the snow-line, and the highest summits may reach 13,000 feet.

5. The region bordering on the Red Sea, consisting of Abyssinia, Nubia, and Egypt. Abyssinia, we have seen, is the mountainous termination of the great southern plateau. Between this and the Mediterranean extends the low valley of the Nile, separated from the Red Sea on the east by a rugged mountainous region, and from the Libyan Desert on the west by a low ridge of limestone and sandstone.

Regarding the hydrography of A., much is still to be ascertained. Livingstone's discoveries have shown that the portion which, until recently, was termed the 'unexplored territory,' is anything but the barren and riverless desert that we imagined. But as hardly one of its streams has been traced throughout its entire course, while nearly the entire tributaries of these are very imperfectly known, we must wait for the result of further explorations, before positive statements can safely be made. Those of the south, which mostly rise in the neighboring highlands, are, in many instances, little better than mountain-torrents, having short and rapid courses; and the embouchure, generally in the delta form, is commonly obstructed by a bar of sand. The Orange River, for instance, is filled with sand at its mouth.

Rivers.—The great rivers of A. are the Nile, the Niger, the Zambesi, the Orange, the Congo, the Senegal, and the Gambia. See articles NILE, NIGER, &c. The first of these is formed by the junction of two rivers—the White Nile (Bahr-el-Abiad) and the Blue Nile (Bahr-el-Asrak). The former has its sources in the great equatorial lakes, including those called the Victoria Nyanza and the Albert Nyanza, skirts the eastern edge of Kordofan, and passes into Nubia, where it is joined by the Blue Nile at Khartum, after the latter has broken through the highlands of Abyssinia. The single stream then sweeps circuitously through Nubia in a succession of cataracts, and descending into Egypt, reaches the Mediterranean through the far-famed Delta. The second of the great rivers, the Niger, Joliba, or Quorra—for it goes by these and other names in different parts of its course—rises in the Kong Mountains of Guinea, about 9° 25′ N. lat., 9° 45′ W. long., and flows first N.E. till it reaches Timbuktu, where it bends E. for a short distance, and then descends in a S.E. direction into the Gulf of Guinea. Its length is estimated at 2500 miles; and its navigability has been ascertained for a distance of upwards of 400 miles; but its banks are very pestilential. Its principal tributary is the Tchadda or Benué. At the extreme west of the mountains of Kong, and not far from the source of the Niger, rises the Senegal, which flows with a crescent sweep to the N.W. through Senegambia, and enters the Atlantic north of Cape Verd. The Gambia, a smaller river, runs in a similar direction, and falls into the sea south of Cape Verd. The Congo, proved by Stanley to be identical with the river called at various parts of its course the Chambezi, Luapula, Lualaba, &c., runs northwards to a point about 2° north of the equator, and thence south-west towards its embouchure in the Atlantic at Cape Padrone. Its whole course is about 2900 miles. The Orange River flows west with many windings through what is popularly termed 'the country of the Hottentots;' while the Zambesi, explored almost throughout its entire course by Livingstone, is rich in affluents, and runs in an easterly direction, entering the channel of Mozambique about 18° S. lat.

Lakes.—The lakes of A. are, as yet, no better known to us than its rivers. *Tchad, Chad*, or more correctly, according to Dr. Barth, *Tsad*, the chief lake of Sudan or Central A., has a circumference of about 200 miles, with a depth varying from 8—15 feet, and an elevation of 850 feet above the sea-level. Though it has no outlet, its waters are cool and clear, and abound with fish. Besides a multitude of temporary streams, it is the recipient of several large rivers. The chief is the Shary or Asu, from the south-east. *Dembea* or Tzana, in Abyssinia, through which the Blue Nile flows, is about 65 miles long, and 30 broad, and lies 6000 feet above the sea-level. Lake N'gami, in Southern A., the center of the internal drainage of the country between the Orange and the Zambesi, is about 2500 feet above the sea-level, 70 miles long, and 20 broad. North of the Zambesi, between the parallels of 10° and 14° S., and about 350 miles inland from the coast of Mozambique, lies Lake Nyassa, at an elevation of 1200 feet above the sea-level. The discoveries of Tanganyika and the Victoria Nyanza by Speke, and of the Albert Nyanza by Baker, have been already noticed, and will be found fully described in their proper place. It is now satisfactorily ascertained that the source of the Nile lies in the basin of these lakes; but Livingstone was of a different opinion, and at his death was employed in exploring another basin some degrees westward of Tanganyika, the lakes in which (Bemba or Bangweolo, Moero, and many smaller lakes) are now known to drain into the river Lualaba or Congo. In time of flood, Tanganyika also discharges into the Lualaba.

Geology.—The geology of A. is known as yet only from cursory observations made at isolated points. The character of the Sahara has been already indicated. The section traversed by Dr. Livingstone presents a variety of schists, shales, sandstones, and tufa, through which protrude granite and trap-rocks. In one place towards the east side of the continent, the sandstone is found overlying coal. Between Tripoli and Murzuk there is a plateau, the dark sandstone of which disintegrated, fills up the inequalities of the surface, from which the black rock stands out in fantastic cones. The lofty barrier of limestone which forms the western boundary of Egypt, reappears in the rugged ranges of hills which break the monotonous waste of Sahara; they sometimes contain marine shells. Secondary limestone also constitutes the lower skirts of the Atlas Mountains, but what constitutes their basis has not yet been discovered.

Climate.—There are three great varieties of climate, correspond-

ing to the physical structure of the continent: first, that of the plateaus; second, that of the terraces which lead to them; and third, that of the coasts. In the vast desert of Sahara, extending over an area equal to that of the Mediterranean Sea, almost destitute of water and vegetation, and partly covered with tracts of sand and bare low rocks, the heat of the day is uniformly contrasted with the coldness of the night; while on the terrace-land of Limbu, for instance, situated behind the Sierra Leone region, we find a temperate and wholesome climate; and in that rising behind the Slave Coast, we have beautiful landscapes, abundant springs, new forms of vegetation, and a mild Italian air. The natives of Congo call their terrace-lands, which are well cultivated and thickly peopled, 'the Paradise of the World.' But the flat coasts, which are often over-flooded in the rainy season, have a very oppressive atmosphere, and from the morasses at the mouths of the rivers, a malaria arises which is pestilential to Europeans. This malaria has been supposed to arise from the decay of the vegetable matter brought down by the rivers from the dense mangrove-woods, which, mixing with the salt water on the coast, produces sulphuretted hydrogen gas. The region of pestilential air has been calculated to extend about 100 miles inland; but only 40 miles out at sea, and to rise to a height of 400 feet above the sea-level.

Productions.—The *vegetation* of A. is decidedly less varied than that of Europe or Asia. Along the Mediterranean sea-board, it greatly resembles that of Southern Europe. The tropical regions are not so rich in species of plants as those of South America, but still they exhibit many peculiar genera. As we leave the sultry coasts, and ascend the terraces towards the interior, we pass gradually from tropical productions to those of the temperate zones, which all flourish well in several parts of A. Though the forests cannot rival those of Brazil, they are rich in valuable woods, especially the harder kinds; some of them excellent for ship-building. Here we find the gigantic *Adansonia* (q. v.) *digitata* or baobab. Ebony, certain kinds of rosewood, and the timber called African teak, are among the productions of the tropical forests. The Butter-tree (*Bassia*, q. v.) is one of the most remarkable productions of the central regions. Extensive level tracts are covered with acacias. Certain palms are very characteristic of different parts of A., and are of the greatest importance to the inhabitants, particularly the Date-palm (q. v.) in the north, and in an inferior degree, the Doom-palm (q. v.), both of them growing in regions comparatively arid, and often surrounded by the very sands of the desert; whilst the Oil palm (q. v.) flourishes amidst the tropical luxuriance of the west, and supplies an article of commerce which now attracts the ships of Europe, in constantly increasing numbers, to shores once frequented only for the prosecution of the slave-trade. The Cocoa-nut Palm (q. v.) flourishes on many parts of the tropical coasts. A large quantity of oil is produced also by a plant of a very different description, the Ground-nut (*Arachis*, q.v.), a leguminous herbaceous plant, which has the remarkable peculiarity of thrusting its pods into the ground to ripen there, and which is now so extensively cultivated, that nine millions of bushels of ground-nuts are annually exported from the Gambia. The southern extremity of A. is remarkable for the vast number of its species of mesembryanthemums and heaths. Pelargoniums, iridaceæ and proteaceæ, are also among the most characteristic features of its vegetation. Euphorbiaceæ abound in most parts of the continent. Many of the productions of other countries have been introduced, both in the tropical and temperate parts of A. Maize is now extensively cultivated, as well as rice, wheat, and millet. A peculiar kind of grain, called fundi, or fundungi (*Paspalum exile*), is cultivated in the west, and grains called teff and tocusso (*Poa Abyssinica* and *Eleusine Tocusso*) in Abyssinia. Coffee grows luxuriantly, and of good quality. Indigo and tobacco are easily cultivated, and cotton has succeeded well where it has been introduced, as in Egypt, where, however, it requires artificial and laborious irrigation; while in the rich and well-watered soil of Sennaar, it flourishes even with a most careless style of cultivation, and might, without a doubt, be produced in enormous quantity. Other regions, as Natal, seem likely soon to produce it abundantly. The vine is cultivated with success at the Cape of Good Hope, and the sugar-cane in different parts of the continent.

In the *animal kingdom*, we find the lion, the leopard—often called the tiger, but the tiger is not yet known except as a native of Asia and the Asiatic isles—hyenas, jackals, and others of the canine family, a species of elephant, differing in some particulars from that of Asia, several species of rhinoceros, the hippopotamus, wart-hogs (*Phascochœrus*), and many kinds of monkeys, particularly within the tropics. The giraffe, the zebra, and the quagga, are peculiar and characteristic, as are also numerous species of antelope, which occupy, in African zoology, the place of deer in other parts of the world. The gnu is one of the most remarkable of the antelope genus. Some of the smaller species occasionally appear in prodigious numbers, devastating the fields of the colonists. The ostrich is found in almost all parts of A. Parrots, flamingoes, and guinea-fowls may also be mentioned among the birds. Crocodiles are found in the rivers, and many kinds of lizards and serpents occur, not a few of the latter being poisonous. There are also tortoises and turtles of different species. The domestic animals succeed well. Camels are said to have been introduced by the Arabs, and are plentiful in the north.

In the department of mineral wealth, the diamonds found in Griqualand West (q. v.) have in recent years surpassed every other product in value. Diamonds to the value of over £3,000,000 passed through the Kimberley post-office in 1880. Gold is found abundantly in the sands of the great rivers that flow out of the central region, on the coast of Guinea, and also in the south-east of A. The Sierra Leone coast has valuable iron ore, which is also found in the upper Senegal, the region of Timbuktu, the Congo chain of mountains, Egypt, and Darfur. Copper is plentiful at Majomba, and in some other places; salt may be obtained from almost every district in A. except Sudan, and sal-ammoniac, saltpetre, sulphur, and emery in various portions of the continent.

Population.—The population is vaguely estimated at about 205,000,000. Keane arranges the races of Africa in seven great groups, according to language: 1*st*, the Semitic family, along the north coast and in Abyssinia; 2*d*, the Hamitic family, mainly in the Sahara, Egypt, Galla Land, and Somali Land; 3*d*, the Fulah and Nuba groups, in Western, Central, and Eastern Sudan; 4*th*, the Negro group, in Western and Central Sudan, Upper Guinea, and the Upper Nile regions; 5*th*, the Bantu family, everywhere south of about 6° N. lat., except in the Hottentot domain; 6*th*, the Hottentot group, in the extreme south-western corner from the Tropic of Capricorn to the Cape; 7*th*, the Malayo-Polynesian family, in Madagascar. Latham's divisions were six: 1*st*, The *Negro Atlantidæ*.—These have, in an exaggerated form, the black unctuous skin, woolly hair, projecting jaws, flat nose, and thick lips, characteristic of the whole variety. They occupy Western A., from the Senegal to the Gaboon, Sudan in the center, and the low parts of the Upper Nile. The dusky or brown hue is more prevalent in A. than the jet-black of the negro. 2*d*, *Kafir Atlantidæ*.—In physical conformation they are modified negro; their language has some singular peculiarities. They occupy from north of the equator to south of the Tropic of Capricorn. 3*d*, *Hottentot Atlantidæ*.—Their color is brown rather than black; the hair grows in tufts. The stature is low. Their language has a characteristic *click*. 4*th*, *Nilotic Atlantidæ*, occupying the water-system of the Upper and Middle Nile. The leading tribes are the Gallas, Agows, Nubians, and Bishari, forming the population of Abbyssinia, Adel, and Nubia. It connects by imperceptible gradations the Coptic and Semitic groups with the rest of the African. 5*th*, *Amazigh Atlantidæ*, usually called Berbers. In conformation, they vary from the negro to the Arab type. The language is *sub*-Semitic. They inhabit the ranges of the Atlaf, the Sahara, the Canary Isles, and are found as far south even as the center of Sudan. 6*th*, *Egyptian Atlantidæ*, or old Egyptians, represented by the modern Copts. Both language and physical conformation connect them, on the one hand, with Berbers and Nubians; on the other, with the Assyrians, Jews, &c.

In *religion*, the natives are as various as in language; but it may be questioned whether some of the tribes, especially in South A., can be fairly described as having any religion. In not a few of these, the religious consciousness seems wholly extinguished, and the very terms which express it, to have dropped out of their language. Such, at least, was the result of Moffat's observations, though perhaps the degradation in which he found some tribes plunged was in itself a barrier to a just and adequate communication with them; for the lower that races or individuals sink, the less easy is it to understand them. Throughout the north, and to a considerable extent in the interior, the creed of Mohammed is received, but held very loosely by many. The Mohammedan tribes on the west coast divide themselves into two classes—the *Marabouts* and the *Sonnachees;* but it is not easy to understand the exact nature of this distinction, beyond the simple fact, that the Marabouts profess to adhere rather strictly to the laws of the Prophet, while the Sonnachees are more secular, make little profession of sanctity, but eat pork and drink spirituous liquors. The lowest form of superstition, styled *fetichism*, prevails among the uncultivated negro tribes, as well as among the Gallas, a nation widely spread south-east of Abyssinia; and the practice of offering human sacrifices is found in many tribes. The Abyssinians hold by tradition a crude form of Christianity.

Of the forms of *government* among the several nations and tribes, our knowledge is not sufficiently definite. Though there is a despotism, it appears to be limited to some extent by a respect for the 'head-men' in every tribe, who form a sort of aristocracy, and whom the king must consult on all important affairs. The liberty of speech employed in a native parliament, or rather 'palaver,' is often considerable. Though women are generally found in a degraded position, the wives of the king often take a part in council, and exercise their influence in the affairs of state. Civilization, in the proper sense of the term, is only to be met with in the settlements of the Europeans; for the condition of the *Moors*,

Arabs and *Egyptians* is scarcely entitled to rank higher than that of semi-civilization.

Of *science*, *art* and *literature*, we can say little; for all that had been achieved under the Pharaohs and Ptolemies disappeared with the conquest of the Moslems. A schoolmaster is found in almost every Mohammedan village; but the Koran is the only book studied. Medicine is little understood, though the tribes in the south and elsewhere have great faith in its powers, and practice it in a very absurd and superstitious style. Among many tribes, the religion might be styled medicine-worship. Inoculation, as a preservative against small-pox, is common among the Mohammedan tribes. Mechanical skill is generally respected; and the smith or worker in iron is reckoned among the 'head-men' in every tribe.

Of the interior *commerce* or barter of the natives among themselves, our knowledge is scanty. Caravans of camels pass over the wide deserts of the north by such routes as lead them to the greatest number of springs, brooks, and *oases*, or comparatively fertile places. The chieftains in the desert are the principal traders; and one feature in their character, though carried to a cruel extreme, is certainly favorable to commerce; debtors are treated with great severity. When payments are delayed, not only the debtor himself, but, if he is absent, any member of his family, may be seized as a slave. Timbuktu, on the southern edge of Sahara, is the chief commercial depôt and central station for the caravans which arrive from Tafilet, Tripoli, and other places in North A. From Timbuktu they proceed on their route along the course of the Niger to Kashna, another station of commercial importance, which is also visited by the caravans from Sudan and Bornu. From Kashna the caravan-route leads to Bornu and Lake Tchad; thence to the territories of the Tibbous and the Tawareks, and on to Murzuk in the oasis of Fezzan. Kulfa is another great meeting-place of the caravans coming from Dahomey in the south-west, Borgu in the north-east, and Niffe in the south-east. There seems to be no doubt that these caravans are in communication with others from the east, and thus connect, in a primitive style of commerce, the Indian ocean with the Atlantic and the Mediterranean Sea. The principal places of commerce in the east are Marnegar, Berbera, Ankobar, Gondar, Sennaar, and Kobbe. In Benguela and Angola, negro caravans from the interior arrive at the chief places on the coast, bringing slaves, ivory, and gold-dust, which are bartered for various commodities. and the plateau of the Upper Nile is visited by Arab traders from Zanzibar engaged in the same traffic.

Though A. is so rich in natural productions, and capable of maintaining a thriving commerce with other parts of the world, it is still a painful fact that along its coasts, and in the caravan-roads of the interior, the principal trade is in slaves. Baker's great expedition up the Nile, and recent enactments in Zanzibar forbidding slavery, will probably do much to diminish or destroy this odious traffic. The African is fit for something better. Many of the tribes are in a condition which cannot be fairly described as savagism. They have fixed dwellings, though these are merely mud-huts, defended by stockades; and are possessed of some law or customs which are favorable to commerce. Among several tribes the native merchant is highly respected, and his goods are safe even in times of feud or warfare. The land is cultivated; the natives wear dyed cotton dresses, thicker and more durable than those exported from England, and consequently far dearer. Gold and iron are manufactured with ingenuity. The principal tribes on the Gambia, the Fulahs, the Joliffes, and the Mandingoes, and the negroes of the sub-equatorial regions in which Livingstone spent the last twenty years of his life, have qualities which forbid us to despair of the progress of A. in culture. All that is wanted is a free commercial intercourse with the civilized world. Commerce must carry into A. the doctrine that it is better to employ men in trade, than to sell them as slaves. Ability to understand such a truth will not be wanting; and when it is known and practised, the negro will prove that he is human, and will break through all the natural obstacles placed in the way of his development and improvement.

That portion of A. which is known is divided as follows: Native states and regions—Ashanti, Dahomey, Fezzan, Barca, Bornu, Darfur, Kordofan, Dongola, Guinea, Abyssinia, Marocco, Senegambia, Sennaar, Sudan with Sahara, Zanzibar, and the countries of the interior, with others on the east coast. British possessions are—Cape Colony and Natal, at the south; the island of Mauritius, St. Helena, Ascension, Sierra Leone, Cape Coast, and the Gambia Colony. The French have settlements on the Senegal, with the islands of St. Louis and Goree, The Isle de Bourbon, St. Marie, and the great colony of Algeria. Egypt, Nubia, Tunis, and Tripoli belong nominally to Turkey. There are some North American forts and settlements in Guinea. The Portuguese have the Azore and Cape Verd Islands, with Madeira, Porto Santo, St. Thomas, Angola, Benguela, and Mozambique. The Canary Islands belong to Spain. The large island of Madagascar and the Comoro group are under native rulers; but in some of these islands on the east coast the French have recently established themselves, as at Mayotta.

AGA or AGHA, the Turkish title of a superior military commander; also of the higher officers of the seraglio.

A'GADES, formerly a very important city of Central Africa, but at present in a declining condition. It is the capital of Aïr or Asben (q. v.), and is built upon the eastern edge of a great table-land, at an elevation of not less than 2500 feet, in lat. 16° 33' N., long. 7° 30' E. It holds little intercourse with the northern cities, such as Murzuk, which, indeed, is never visited, except by pilgrims on their way to Mecca; but its merchants still frequent the markets of Katsena, Tasawa, Maradi, Kano, and Sokoto. At one time A. was a sort of entrepôt for the vast traffic carried on with Gogo—the ancient capital of the Songhay empire (q. v.)—but the conquest and destruction of this city, the center of the gold-trade, has fatally injured the prosperity of the former, 'cutting away the very roots through which it received life.' A. was founded some hundreds of years ago, in all likelihood by the Berbers, who were expelled by the great Songhay conqueror, Haj, Mohammed Askia, in 1515. Its highest degree of power had been reached previous to this, when it probably contained 60,000 inhabitants. At present, it has no more than 6000 or 7000. The language is the Emgedesiye, the same as that spoken at Timbuktu, with which place, however, it has no intercourse now. There is a large admixture of Berber blood in the people of A. The trade and manufactures are trifling in extent. Dr. Barth is of opinion that A. would form, for a European agent, a very good and comparatively healthy place from which to open relations with Central Africa. See Barth's *Travels in Central Africa*, vol. i.

AGALA'CTIA (Gr. *a*, not, and *galacté*, milk), a want of the due secretion of milk. It may depend either on organic imperfection of the mammary gland, or upon constitutional causes. In the latter case, the secretion may often be excited by warmth and moisture, by the stimulus of the act of sucking, and if this fail, by the application of the leaves of the castor-oil plant to the breast.

A'GAMA, a genus of Saurian Reptiles, the type of a family called *Agamidæ*. The Agamas are allied to the Iguanas, and have a lax skin, which they have the power of inflating with air. None of them are of a large size. They are found in warm climates, and are of various habits, some of them living in trees, and others confined to the ground. The Egyptian A. (*A. Egyptiaca* or *Trapelus Egyptiacus*) is remarkable for changing color, like

Frilled Agama.

the chameleon. Some of the most common lizards of Australia are of this family. The Frilled A. (*chlamydosaurus*) is a remarkable Australian lizard, having a sort of frill around the neck, which usually lies back in plaits, but is raised when the animal is alarmed.

AGAME'MNON, son of King Atreus, and brother of Menelaus. After his father's death, he reigned in Mycenæ, and married Clytemnestra, by whom he had three children—Iphigenia, Electra, and Orestes, afterwards celebrated in the Greek drama. When Paris, son of the Trojan king, Priam, seduced and carried away Helena, the wife of Menelaus, A., with his injured brother, made a tour throughout Greece, exhorting all the leaders of the people to unite their forces in an expedition against Troy. Having gained their alliance, A. was appointed general-in-chief of the united forces assembled at Aulis in Bœotia, where they were delayed some time. In the following campaign against Troy, which forms the subject of Homer's *Iliad*, A. is described as a very stately and dignified character. After the fall of Troy, he returned home, taking with him Cassandra, the daughter of Priam. Shortly afterwards, he was murdered by Clytemnestra, aided by Ægisthus, in whose care he had left his wife and children. A tragical fate had always lowered over the house of A.; and the destinies of his children—Iphigenia, Electra, and Orestes—were the favorite subjects of the Greek drama.

A'GAMI (*Psophia*), a genus of South American birds, allied to Cranes. Only two species are known. They are sometimes called *Trumpeters*, from a peculiar sound which they make. The best known species is the Gold-breasted Trumpeter (*P. crepitans*), which is of the size of a large pheasant, but with much longer

legs and neck, and a very short tail. It runs very quickly; so much so, that a tame one in England has been known to keep up

Agami.

with hounds. It is capable of the most perfect domestication.

A'GAPÆ were love-feasts, or feasts of charity, usually celebrated by the early Christians in connection with the Lord's Supper. The name is derived from the Greek word *agape*, which signifies love or charity. At these feasts, the rich Christians presented their poorer brethren in the faith with gifts, and all ate together, in token of their equality before God and their brotherly harmony. The meetings were opened and closed with prayer; and during the feast, spiritual songs were sung. At first, a bishop or presbyter presided, who read a portion of Scripture, proposed questions upon it, and received the various answers of the brethren. Afterwards, whatever information had been obtained regarding the other churches, was read—such as the official letters of overseers, or private communications from eminent members; and thus a spirit of practical sympathy was engendered. Before the conclusion of the proceedings, money was collected for widows, orphans, the poor, prisoners, and those who had suffered shipwreck. Then the members embraced, and the feast was ended with a 'philanthropic prayer.' As early as the 2d c., the custom of celebrating the A. and the Lord's Supper together had ceased, on account of the persecutions. Justin, when writing on the latter subject, does not speak of the former; but Ignatius, on the other hand, seems to regard them as identical. Generally, the feast of the A. preceded the celebration of the Lord's Supper. But during the period of the persecutions, when the Christians had often to hold divine service before dawn, the A. were, for the most part, delayed till the evening. Later, a formal separation was made between the two rites. In the 3d and 4th centuries, the A. had degenerated into a common banquet, where the deaths of relatives, and the anniversaries of the martyrs, were commemorated, and where the clergy and the poor were guests; but with the increase of wealth, and the decay of religious earnestness and purity in the Christian Church, these A. became occasions of great riotousness and debauchery. Councils declared against them, forbade the clergy to take any share in their celebration, and finally banished them from the church. At the same time, it must be admitted that the heathens ignorantly calumniated the practices of the Christians in these A., and that the defences made by Tertullian, Minucius, Felix, Origen, &c., are eminently successful. The Moravians have attempted to revive these A., and hold solemn festivals, with prayer and praise, where tea is drunk, and wheaten bread, called Love-bread, is used.

AGAPE'MONÉ (Gr. love-abode), a conventual establishment of a singular kind, consisting of persons of both sexes, founded at Charlynch, near Bridgewater, in the county of Somerset, by Mr. Henry James Prince, formerly a clergyman of the Church of England. The inmates belong to a new religious sect originating with Mr. Prince, and a Mr. Starkey, also a clergyman, and are sometimes called Lampeter Brethren, from the place where Prince was educated, and where, while a student, he formed a revival society. The adherents of the sect generally, of whom there are many in the south-western counties, are known as Princeites or Starkeyites.

From Mr. Hepworth Dixon's curious book on *Spiritual Wives* (2 vols. 1868), we learn that Prince was born at Bath in 1811, studied first for the medical profession, and actually passed Apothecaries' Hall in 1832; but that being of a singularly religious and even mystical spirit, he resolved, after a lapse of nearly three years, to become a clergyman. To this he was perhaps the more naturally disposed that he had been a martyr to ill-health from his youth. At Lampeter, where his reputation for piety and learning was great, he began to use language regarding himself, in the meetings of his fellow-students, in which one can see the germs of his subsequent extraordinary beliefs. On leaving college, he became curate of Charlynch, and succeeded in bringing round to his opinions among others, his own rector, the Rev. Samuel Starkey. But the sensation excited by his preaching alarmed his bishop, and Prince accepted a curacy on the opposite side of England, at Stoke in Suffolk, where, however, his strange theories regarding himself, and the Day of Grace, and the Holy Ghost, excited prodigious tumult, and led to his dismissal. About the same time his friend Starkey was silenced, and others of the Lampeter Brethren were also in difficulties with their ecclesiastical superiors. A conference was held, and it was resolved to formally quit the church. Prince began preaching on his own account at Brighton, and Starkey at Weymouth in Dorsetshire. People of all classes flocked to hear the new preachers; even clergymen's families were infected with the taint of this heresy, which spread through the secluded villages on the coast, obtaining especial hold among the farmers, several of whom, as in the times of the apostles, brought their wealth, and laid it at 'Brother Prince's' feet—community of goods being the tenet most strenuously insisted upon.

Meanwhile, funds accumulated rapidly. Three of the Brothers —Messrs Prince, Thomas, and Cobbe (brother of Miss Frances P. Cobbe, a well-known writer on social topics)—married three sisters, daughters of a wealthy widow lady named Nottidge. These young women, handsome, clever, and of independent fortune, began by listening, against the wish of their parent, to Mr. Prince's preaching, and finally left their home to marry his disciples. A fourth sister afterwards followed their example. So strong was the feeling under which they acted, that, on their aged mother coming in person to remonstrate on their conduct, they rejected her claims of authority, saying that the devil was speaking to them by her voice. Their money was used by Prince to purchase a fine property at Spaxton, near Charlynch, where the Brethren and Sisters have lived since 1859, and which is luxuriously fitted up, the church serving also as a parlor, a music-hall, and a billiard-room.

In 1846, however, one of the ladies above mentioned, having become dissatisfied with the doctrine and rule of life in the A., and also (according to Dixon) with Prince's views of property, was expelled from the society, and put away by her husband, Mr. Thomas, though then about to give birth to a child. After she had lived four years with her mother, who had made provision for the child, Mr. Thomas wrote, renouncing her for ever, and claiming the custody of the son. This was resisted; and in the course of the law proceedings (1850) that took place, much that was offensive in the conduct of the Agapemonians transpired. Although the inmates were married couples, it appeared that they entertained religious objection to the increase of population, as if believing that the perfection of all things will be the extinction of the human race.

Letters intended for Mr. Prince pass through the post-office directed to 'the Lord;' and his followers have been heard to say that he is their 'creator.' In 1851, Mr. Prince took up a party of them to London to see the Great Exhibition. He drove about town and in the parks in a carriage, constantly attended by outriders, bareheaded, because they were in the presence of 'the Lord.'

Mr. Prince has put forth many pamplets, some in the highest degree objectionable; others, in which the tenets of the Christian religion are mingled with his own peculiar doctrines. Christ came to redeem the soul. Prince affirms that *his* errand is to redeem the body, on which an astounding commentary is furnished by the 32d chapter of the first volume of Mr. Dixon's book. One test applied to his disciples was, that they were to see the internal punishment of those whom they best loved, and to rejoice in it as redounding to their Master's glory. On this, several declined to proceed further; others agreed to the test cordially. Pain and grief, sorrow and sickness, have forever lost their dominion over the Princeites; yet still, to the incredulous, it appears that consumption, rheumatism, and other infirmities of human nature, do affect them, and that they die, and are buried, like other men. In one of Mr. Prince's latest pamphlets, the following words occur, which may serve to elucidate his somewhat mysterious doctrine: 'God in Jesus Christ has again entered into covenant with man at the resurrection of mankind, and this is the first resurrection, and now Brother Prince is His witness.' 'This one man, Brother Prince, has Jesus Christ selected and appointed His witness to His counsel and purpose to conclude the day of grace, and to introduce the day of judgment. To close the dispensation of the Spirit—the Gospel—and to enter into covenant with flesh.'

In 1859 appeared *Brother Prince's Journal, an Account of the Destruction of the Works of the Devil in the Human Soul by the Lord Jesus Christ through the Gospel.* It had been commenced, according to Brother Prince, twenty-three years before, and more than nineteen years had elapsed since its completion. Its aim is simply this: to show the work of grace in the writer's soul, from its first struggling manifestations to that absolute harmony in which self is utterly absorbed and swallowed up in God. Brother Prince, at the close of his journal, deliberately states that he considers himself perfect, and incapable of further improvement. These are his words: 'Having neither wishes nor desires, my will can have no disposition whatever to move in any one direction rather than another, but like the finely poised beam of a well-adjusted

balance, it hangs delicately suspended on the divine will, in a holy equilibrium of inward passiveness.' From an advertisement or manifesto dated August 1873, we learn that the 'residents of the Agapemone' are still preaching 'every Sunday and Wednesday,' the everlasting damnation of all who do not believe in their incomprehensible jargon.

It would appear that a society, similar in its aims and character, though not conventual in its form, existed in England in the 16th and 17th centuries. It was called the 'Family of Love.' Its founder is generally supposed to have been Henry Nicholas, a native of Münster, in Westphalia, but who lived a considerable time in Holland. He held himself to be greater than Moses or Christ, for the former only taught men to *hope*, and the latter to *believe*, while he first announced the doctrine of *Love*. He made his appearance about 1540. Others, however, are of opinion that the real father of this 'Family' was one David George, a fanatical Anabaptist of Delft, in Holland, who died in 1556, and who imparted his 'damnable errors' to Nicholas, an old friend of his. In the reign of Edward VI., according to Fuller, Nicholas came over to England, and commenced the perversion of silly people in a secret way. By 1572, they had apparently increased in numbers considerably, for in that year one John Rogers published a work against them, entitled, *The Displaying of an Horrible Secte of Grosse and Wicked Heritiques, naming themselves the Family of Love, with the Lives of their Authors, and what Doctrine they teach in Corners*. In 1580, Queen Elizabeth issued a proclamation for the hunting out and punishing of the 'damnable sect.' The Family of Love, 'or Lust, rather,' as old Fuller has it, tried to insinuate themselves into the good graces of King James, by presenting a petition, casting aspersions on the Puritans. At length, the society expired from continual exposure to the effects of ridicule in prose and verse, as well as from its own intrinsic worthlessness. Their doctrines seem to have been a species of pseudo-spiritual sentimentalism, resulting in gross impurity. See MUCKERS.

A'GARIC and AGA'RICUS. See MUSHROOM.

AGASSIZ, LOUIS JOHN RODOLPH, one of the most distinguished of modern naturalists, was born at Orbe, in the Canton de Vaud, in 1807. After passing through the usual course of elementary learning at Biel and Lausanne, he prosecuted his studies at Zurich, Heidelberg, and Munich. In early youth, he had displayed a strong love of natural history; and at Heidelberg and Munich comparative anatomy was his favorite occupation. In Munich he became acquainted with Martius and Spix, the well-known travelers in Brazil; and when Spix died (in 1826), his collection of 116 species of fish collected in Brazil was left in the care of A., who published it under the title *Pisces, &c., quos collegit et pingendos curavit Spix, descripsit A.* (Munich 1829—1831, with 91 illustrations in lithography.) Led by this work to study ichthyology more closely, A. next undertook a systematic arrangement of the fresh-water fishes found in Central Europe. Of this work, the first fasciculus, containing the family of the Salmonidæ, appeared at Neufchâtel in 1839, and 34 illustrations, and descriptions in French, English and German. A second fasciculus, prepared by his friend Vogt, *Embryologie des Salmones*, was published in 1840; and a third, *Anatomie des Salmones*, appeared in 1845 as a part of the third volume of the *Memoirs of the Neufchâtel Society of Natural History*. Beyond this, the work was not continued. A. at the same time devoted his attention to the fossil remains of fishes, and during his stay in Paris (1831—1832), examined several private and public fossil collections. The results of his studies were given in his work *Recherches sur les Poissons Fossiles*, published at Neufchâtel, with 311 lithographed illustrations, 1833—1842. Meanwhile he had been invited to take the professorship of natural history at Neufchâtel; and here he found two active young friends, Desor and Vogt, who afforded considerable aid in the completion of his works. With their assistance his work on fossil fishes was brought to a conclusion in 1842. During several visits to England, A. made himself well acquainted with the collections of fossils in this country; and in 1844, published a monograph on fossil fishes found in the old red sandstone of the Devonian system. His study of these remains led him to examine other fossils; and the results appeared in his works *Description des Echinodermes Fossiles de la Suisse*, and *Monographies d'Echinodermes Vivants et Fossiles*. In the latter work, Professor Valentin of Berne supplied the section on the 'Anatomy of the Sea-urchin.' A. next turned his attention to the mollusca, and produced his *Critical Studies on Fossil Mollusca*, which was soon followed by his *Memoirs on the Muscles in Living and Fossil Mollusca*. His work on *Glaciers* excited great interest, as it opened new views in geology. The results of further study were given in a second work on *The System of Glaciers; or Researches on Glaciers* (Paris, 1847). In preparing this work he was assisted by his friends Guyot and Desor. In 1846, A. went to North America, where he was appointed to a professorship in Harvard College, near Boston; from which he was subsequently translated (1852) to the chair of comparative anatomy in Charleston; but this he resigned (1854), and returned to Harvard. In *Outlines of Comparative Physiology*, A. upholds the doctrine of the successive creation of higher organized beings on the earth. *An Essay on Classification*, by A., was published (Lond., 1859); and a *Journey in Brazil* (1868). During the latter of these years, he was appointed a non-resident professor and lecturer in Cornell University, Ithaca, N. Y., and along with Count Portalés, was intrusted with the dredging operations in the investigation of the Gulf Stream, undertaken by the American government in 1871. His last work was the establishment of a school of natural history on the island of Penikese, presented to him by Mr. John Anderson. He died in Dec. 1873.

A'GATA DE GO'TI, SANTA, a town of South Italy, in the province of Benevento, 14 miles east from Capua. It is situated on a hill of volcanic rock, surrounded by the Isclero, an affluent of the Volturno. It is an episcopal seat, and has a cathedral, seven other churches, and an abbey. Pop. 5000.

A'GATE, a mineral composed of layers of quartz, generally of different varieties or colors, intimately joined together. The layers are often concentric, and in the section sometimes appear nearly circular or elliptical, sometimes angular. Chalcedony, amethyst, common quartz, jasper, flint, &c., occur as layers in A. It takes a fine polish, and is much used for ornamental purposes. It is common in amygdaloids. Many agates are found in Scotland, and are sold under the name of *Scotch Pebbles*.

A'GATHA, ST, a noble Sicilian lady of great beauty, who rejected the love of the Prefect Octavianus, and suffered a cruel martyrdom in the persecution of Christians under Decius (250). She holds a high rank among the saints of the Roman Catholic church; her day falls February 5.

AGA'THOCLES, one of the boldest but most unworthy adventurers of antiquity, was born at Thermæ, in Sicily, in 361 B.C. He rose from humble circumstances through the patronage of Damas, a noble citizen of Syracuse, and received a command in the expedition against Agrigentum. Afterwards he married the widow of Damas, and became one of the most wealthy men in Syracuse. Under the rule of Sosistratus, he was obliged to flee into Lower Italy, where he collected a band of partisans. Returning to Syracuse, after the death of Sosistratus, he gained the supremacy, confirmed it by a massacre of several thousand of respectable citizens, and took possession of the greater part of Sicily. To establish his power, and keep his army employed, he now attempted to expel the Carthaginians from Sicily; but in this undertaking he was defeated. His next plan was to pass over to Africa with a part of his army, and there attack the Carthaginians. This war he carried on with success for four years, or until 307 B.C., when disturbances in Sicily compelled him to leave the army for a time. On his return to Africa he found his troops in a state of mutiny against his son Archagathus, whom he had left in command, but pacified them by promises of large booty. Soon afterwards, he suffered a serious defeat, and with deliberate treachery, left his own son exposed to the vengeance of the disappointed soldiers. The son was put to death, and the troops surrendered themselves to the enemy, while A. escaped safely into Sicily, where, by fraud and cruelty, he soon recovered his former power, and was afterwards engaged in predatory inroads upon Italy. It was his intention to leave the throne to his youngest son, A.; but his grandson, Archagathus, made an insurrection, slew the royal heirs, and persuaded Mænon, one of the favorites of the aged tyrant, to destroy him by means of a poisoned toothpick. This took place in 289 B.C., when A. was 72 years old, and had reigned 28 years.

AGA'VÉ, a genus of plants belonging to the natural order *Amaryllideæ* (q. v.), and having a tubular perianth with 6-partite limb, and a triangular, many-seeded inferior capsule. They are herbaceous plants, of remarkable and beautiful appearance. There are a number of species, all natives of the warmer parts of America. By unscientific persons they are often confounded with Aloes (q. v.); and *A. Americana* is generally known by the name of AMERICAN ALOE. The Agaves have either no proper stem, or a very short one, bearing at its summit a crowded head of large, fleshy leaves, which are spiny at the margin. From the midst of these shoots up the straight, upright scape, 24—36 feet high, and at the base often one foot in diameter, along which are small, appressed, lanceolate bracteæ, with a terminal panicle, often bearing as many as 4000 flowers. In South America, these plants often flower in the eighth year, but in our hot-houses not until they have reached a very advanced age; whence arises the gardeners' fable of their flowering only once in one hundred years. After flowering, the plant always dies down to the ground, but the root continuing to live, sends up new shoots. The best known species is *A. Americana*, which was first brought from South America to Europe in 1561, and being easily propagated by suckers, is employed for fences in Italian Switzerland, and has become naturalized in Naples, Sicily, and the north of Africa. By maceration of the leaves, which are 5 to 7 feet long, are obtained coarse fibres,

which are used in America, under the name of *maguey*, for the manufacture of thread, twine ropes, hammocks, &c. This fibre is also known as Pita Flax. It is now produced to some extent in the south of Europe. It is not very strong nor durable, and if exposed to moisture, it soon decays. The ancient Mexicans employed it for the preparation of a coarse kind of paper, and the Indians use it for oakum. The leaves, cut into slices, are used for feeding

American Aloe.

cattle.—Another species, *A. Mexicana*, is particularly described by Humboldt upon account of its utility. When the innermost leaves have been torn out, a juice continues to flow for a year or a year and a half, which, by inspissation, yields sugar; and which, when diluted with water, and subjected to four or five days' fermentation, becomes an agreeable but intoxicating drink, called *pulque*, to which the Mexican Indians not unfrequently sacrifice both fortune and life. It is made likewise from *A. Americana*, and from several other species.—The roots of *A. saponaria* are used in Mexico for washing, being a powerful detergent, and forming a lather with salt water as well as with fresh. The juice of the leaves, made into cakes, is used for the same purpose.

AGDE, an ancient French town in the department of Herault, founded by the Greeks, and situated about a league from the Mediterranean Sea, on the left bank of a navigable stream. To the north, under the walls of the town, flows the Languedoc Canal. The mouth of the stream forms a harbor, which is entered by 400 vessels yearly. The coast-trade of A., in particular, is very brisk, while it is also the entrepôt for the traffic of the south and west of France. It has, besides, considerable intercourse with Italy, Spain, and Africa. It carries on a large and prosperous trade in wine, oil, salt, corn, timber, wool, silk, and cloth; but the general apsect of the place is sombre and forbidding, on account of the black basalt of which the houses are built, whence it has popularly received the name of the Black Town. It possesses a Naval Academy, and is noted in history as the place at which Alaric, king of the Goths, convened a council. Pop. (1876) 7728.

AGE. The legal divisions of human life, being sometimes arbitrary, and sometimes founded on nature, differ considerably in different countries. In England, the whole period previous to twenty-one years of A. is usually spoken of as *infancy*, a term which has a totally different signification in those countries that have followed the civil law. But notwithstanding this general division, which is common to both sexes, the ages of male and female are different for different purposes. 'A male, at twelve years old, may take the oath of allegiance; at fourteen, is at years of discretion, and therefore may consent or disagree to marriage, may choose his guardian, may be an executor, although he cannot act until of age; and at twenty-one, is at his own disposal, and may alien and devise his lands, goods, and chattels. A female, also, at seven years of age, may be betrothed or given in marriage; at fourteen, is at years of legal discretion, and may choose a guardian; at seventeen, may be an executrix; and at twenty-one, may dispose of herself and her lands. So that full A. in male or female is twenty-one years, which A. is completed on the day preceding the anniversary of a person's birth, who, till that time, is an infant, and so styled in law.'—(Kerr's *Blackstone*, vol. i. p. 493.)

By the law of Scotland, again, life is divided into three periods —*pupilarity*, *minority*, and *majority*. The first extends from birth to the age of legal puberty, which is fourteen in males and twelve in females, at which ages they may respectively marry; the second embraces the period from the termination of pupilarity till the attainment of majority, which takes place at the age of twenty-one in both sexes; and the third includes the whole of after-life. The term Minority, however, is often applied to the whole period anterior to majority, and is thus equivalent to infancy or nonage in England. Infancy in Scotland can scarcely be said to possess a technical meaning; but when used at all, it is always in the sense of the Roman *infantia*, to indicate the period from birth till seven years of age, during which a child, unless in very unusual circumstances, is intrusted to the care of the mother. The office of *tutory* corresponds in duration to pupilarity, that of *curatory* to minority. See TUTOR, GUARDIAN. By the Roman law, an *approach* to majority was held to modify the character of minority, and so of the other periods; but this rule has not been followed by the law of Scotland; and a youth who wants but a day of twenty-one, is as much incapacitated as if he were fifteen. In France, the marriageable A. is eighteen in males, and fifteen in females (Code Civile, art. 144), an arrangement which seems more reasonable than that which we have borrowed from the Romans, and which, however suitable it may have been to the climate of Italy, could never have been free from inconveniences in this country. Twenty-one is generally the age at which men are eligible for public offices; and at this age they may elect, and be elected members of parliament. But a man must be twenty-four before he can be admitted to priests' orders, and thirty before he can be a bishop. In America, a member of the Senate must be thirty, and a member of the House of Representatives, twenty-five; this latter was also the period of majority by the civil law. The legal disabilities attaching to the different stages of minority, or, to speak more correctly, the privileges which the law confers on minors for their protection, will be treated of under the different subjects to which they relate. See INFANT, GUARDIAN, CONSENT, CONTRACT, CRIME, MARRIAGE, &c.

AGE'N, the chief town of the department of Lot-et-Garonne in France, is situated in a fertile region on the right bank of the Garonne. The town is old and gloomy in appearance; but carries on an active trade in woolen and linen fabrics, leather, colored paper, colors, cordage, and sail-cloth. It forms the connecting-link of the intercourse between Toulouse and Bordeaux, and exports plums, brandy, hemp, flax, and poultry. Close by it is the old-fashioned house in which Joseph Scaliger, the prince of scholiasts was born. In ancient times A. was the scene of many a fierce martyrdom of the Christians, when it was under the rule of Roman praetors. Afterwards it suffered the miseries of war, during the barbaric irruptions from Germany, to a most incredible extent, having been taken and plundered by Goths, Vandals, and Huns, in their turn. Next it came under the thraldom of the English, in their early French wars, and at a later period, was twice taken by the Huguenots, in the religious contests of the 16th c. Pop. (1876) 17,806.

A'GENT (Lat. *agens*). An A. is one who is authorized or delegated to transact business for another (who in this relation is called his Principal or constituent) in whose place he comes, and who is bound by his acts in the business to which the agency extends. The appointment of an A. may either be *general*, having reference to all the principal's affairs, or *special*, concerning some particular object. It may further be *limited* by instruction as to the conduct he is to pursue, or *unlimited*, in which case his conduct is left to his own discretion. Even in the last case, however, the A. is not freed from all responsibility for his conduct; he is bound to do his best for his employer, and he ought not to accept or retain the agency unless he is competent to its performance. The mutual relation of principals and agents, and their respective responsibilities to the public in mercantile transactions, will be treated under PRINCIPAL AND AGENT. See also FACTOR, BROKER, COMMISSIONER, COMMISSION-MERCHANT OR AGENT.

AGENT AND CLIENT. The employer of a law-agent is entitled to presume that he is possessed of competent professional knowledge, and the A. is consequently responsible to his C. for the consequences of gross professional ignorance, or flagrant negligence in the conduct of the business intrusted to him. It is not enough to entitle the C. to damages that the A.'s proceedings have not had the effect which was expected, or which he himself predicted from them. It has been observed in the House of Lords, that it is of the very essence of an action against a professional man by his employer, that there shall be *gross ignorance* (Purves *v.* Landell, 4 Bell, 46). See ATTORNEYS AND SOLICITORS, WRITER TO THE SIGNET.

AGENT, ARMY. A person authorized by the government to

manage the monetary affairs of regiments in the army, as a kind of military banker. In early times, persons were employed to effect the purchase and sale of commissions in the British army (the only army in which this strange system of purchase existed), without much reference to honesty or fitness; but to prevent pernicious trafficking, no one was after 1809 permitted to manage these transactions except the authorized Army Agents, under a heavy penalty. The Army Agents were also bound down by restrictions, in relation to any pecuniary advantage derivable by themselves from the sale and purchase. Their business, however, is now confined to the regular expenditure of government money. Every regiment has an agent, selected by the colonel, and empowered by him to be his representative in the monetary arrangements of the corps. The colonel is responsible to the Crown for the honesty of the Army Agent; but the agent is in many ways regarded as a servant of the public. When money is wanted for the regular expenses of the regiment, the agent applies to the War-office; whereupon the Secretary of State for War issues an order to the Paymaster of the Forces to advance the requisite sum; the Paymaster does so, and takes a receipt from the agent. There is an annual settlement of accounts between the Paymaster and the agent, each one paying or receiving, according to the side on which excess or deficiency may appear. The agent then distributes the pay and other charges of the regiment. The tendency of recent alterations has been greatly to reduce the public functions of the Agents, who now only receive £15,000 from the state, while in 1858 they had £40,000. The percentage allowed to Army Agents for their trouble in paying the full-pay of officers, was allowed for by the state, and was included among the annual army estimates; but the officer generally bore this charge in relation to half-pay and allowances. The Army Agents conducted all correspondence, and sent all the requisite notices concerning pay and payment; the colonel of the regiment took no part in the matter. The details of the system varied considerably at different times, and in different portions of the British dominions. Sometimes the agent received twopence in the pound on the amount of pay; sometimes three-halfpence in the pound, with an addition varying from sixpence to one shilling per day for each company of infantry or troop of cavalry; sometimes (in Ireland, and in the colonies) a fixed annual salary. When the colonels of regiments provided the men's clothing, under a system now abandoned, the Army Agents were very intimately mixed up with the transactions; but at present, the duties of those agents are limited to the following: applying monthly to the War-office for the money required for each regiment; receiving that money; applying part of it to the payment of officers; disbursing the regimental paymasters' bill for the cost of the expediture; paying soldiers' remittances for the benefit of their families; settling the effects and credits of soldiers. Many experienced government officers have recommended the abandonment of the system, and the paying of all moneys by the War-office direct, as a measure of simplification and economy.

AGENT, NAVY, a banker and attorney for naval officers, who bears some such relation to Admiralty expenditure as the Army A. (q. v.) to War-office expenditure. By the Act 27 and 28 Vict. c. 24 (1865), each of Her Majesty's ships of war, while in commission, has an agent appointed by the commander, and registered. His duties are to act for the ship in cases of salvage, merchant shipping law, distribution of prize-money, capture of slave-ships, &c. He receives two and a half per cent. as payment in full of his services. The *Navy List* for 1875 contained the names of 11 navy and prize agents.

AGES, a term employed to designate the epochs of civilization in the history of the human race. The old poets and philosophers described these in harmony with what they conceived to have been the moral and political condition of their ancestors. The idea of a succession of A. presented itself at a very early period to the Greek mind. The life of the race was likened to that of the individual—hence the infancy of the former might easily be imagined to be, like that of the latter, the most beautiful and serene of all. Hesiod mentions five A.—the golden, simple and patriarchal; the silver, voluptuous and godless; the brazen, warlike, wild, and violent; the heroic, an aspiration towards the better; the iron, in which justice, piety, and faithfulness had vanished from the earth, the time in which Hesiod fancied that he himself lived. Ovid closely imitates the old Greek except in one particular—he omits the heroic age. This idea, at first perhaps a mere poetic comparison, gradually worked its way into prose, and finally became a portion of scientific philosophy. These A. were regarded as the divisions of the great world-year, which would be completed when the stars and planets had performed a revolution round the heavens, after which destiny would repeat itself in the same series of events. Thus mythology was brought into connection with astronomy. The golden age was said to be governed by Saturn; the silver, by Jupiter; the brazen, by Neptune; and the iron, by Pluto. Many curious calculations were entered into by ancient writers to ascertain the length of the heavenly year, and its various divisions. The greatest discrepancy prevailed, as might naturally be expected; some maintaining that it was 3000, and others, as many as 18,000 solar years. The Sibylline books compared it to the seasons of the solar year, calling the golden age the spring, &c.; and on the completion of the cycle, the old order was renewed. The idea of a succession of A. is so natural, that it has inwrought itself into the religious convictions of almost all nations. It is sanctioned by Scripture, for it is symbolically adopted in the Apocalypse to a certain extent; it also manifests itself in the sacred books of the Indians. Modern philosophy, at least in Germany and France, has also attempted to divide human history into definite A. or periods. Fichte numbers five, of which he conceives that we are in the third; Hegel and August Comte reckon three, placing us in the last. Fortunately, the course of history is not arrested by such speculations, but proceeds in quiet indifference to all metaphysical dogmatism.

AGESILA'US, king of Sparta (399—360 B.C.), was elevated to the throne chiefly by the exertions of Lysander. Being called upon by the Ionians to assist them against Artaxerxes, he commenced a splendid campaign in Asia; but was compelled by the Corinthian war, in which several of the Grecian states were allied against Sparta, to leave his conquest over the Persians incomplete, and return to Greece. At Chæronea (394 B.C.), he gained a victory over the allied forces, and in 378 the war was concluded by a treaty of peace in favor of Sparta. Afterwards, in the Theban war, though hard pressed by Pelopidas and Epaminondas, he bravely and ably defended his country. He died in his 84th year. A. is described as of small stature but commanding aspect, blameless in his private character, and, in public life, just, as far as his partiality for his own country allowed. His biographers are Xenophon, Plutarch, and Cornelius Nepos.

AGHMA'T, or AGHMET, a fortified town of Morocco, the capital of a province, on the left bank of the Entis, a tributary of the Tensift, on the north-western slope of Mount Atlas, 24 miles south from Morocco. Pop. 6000, of whom about 1000 are Jews. A. is said to have been at one time the residence of the Moorish emperor.

A'GINCOURT. See AZINCOURT.

A'GIO, an Italian word, signifying 'accommodation,' was first used in Italy to denote the premium taken by money-changers in giving gold for silver, on account of the greater convenience of gold for transport. The same word is now used to denote the difference between the real and the nominal value of money; also the variations from fixed pars or rates of exchange. It corresponds very nearly to the English word 'premium.'

A'GIS, the name of several kings of Sparta. Mention is made of a king A. as early as about 1000 years B.C., who subdued the old inhabitants of sparta, and made the Helots vassals or slaves. Of the others, A. I. reigned during the greater part of the Peloponnesian war, from 420 to 397 B.C.—A. II. ascended the throne in 338 B.C. His hatred of the Macedonian supremacy led him to form alliances with several Persian satraps against Alexander the Great. A., after extending his conquests to almost all the cities of Peloponnesus, fell in battle 330 B.C.—A. III. came to the throne in 244 B.C., when the state of Sparta had fallen into a ruinous condition through long-continued war. Though only twenty years old when he began to reign, he boldly resolved to restore the old institutions and severe manners of Sparta; but intrigues and self-interest in the higher classes frustrated his designs. The riches of the state were now in the hands of a few persons, while a great majority of the people were in extreme indigence. A., therefore, in accordance with the old laws of the state, proposed a redistribution of landed estates by lottery. The new ephorus, Agesilaus, who was rich in landed property, but burdened with many debts, astutely proposed that first all debts should be cancelled, and next the lands should be divided. The first part of this plan was soon effected; but great hindrances were opposed to the carrying out of the remainder. Meanwhile, the disappointed people were easily persuaded that A. had endeavored to introduce measures inimical to the welfare of the state. Pursued by his enemies, he fled for refuge to a temple, but was betrayed by false friends into the hands of the magistrates, who immediately ordered him to be put to death by strangulation (240 B.C.). His mother and his grandmother, who had favored his measures, were barbarously executed in the same manner. Alfieri, the Italian poet, wrote a powerful tragedy on the fate of A. III.

AGNA'NO, a small lake near Naples, is about sixty feet in depth, and has no visible outlet. The surrounding country is volcanic and mountainous. Formerly the lake was named *Anguiano*, from the number of snakes in the neighborhood. On the right of Lake A. lies the *Grotto del Cane*—so called from the stratum of carbonic acid gas, some 18 inches deep, which always covers the floor, and which suffocates a dog (*cane*) or other small animal taken

into it—and on the left are found the natural vapor-baths of *San Germano*, used for the cure of gout, rheumatism, &c., but inferior in virtue to the baths (*Stufe di Nerone*) at Baiæ. The volcanoes surrounding the lake have been extinct since 1198 A.D. Further on the left from A. lies the lake of *Astroni*, which occupies the crater of an extinct volcano, and is surrounded by beautiful woodlands.

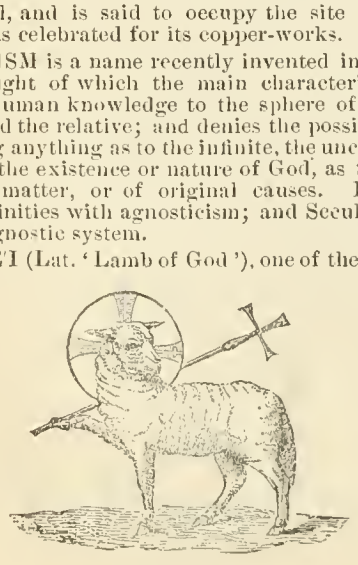
A'GNATE (Lat. *agnatus*). Agnates, in the law both of England and Scotland, are persons related through the father, as cognates are persons related through the mother. In the Roman law, both of these terms had a somewhat different signification. Agnates, by that system, were persons related through males only, whilst cognates were all those in whose connection, though on the father's side, one or more female links intervened. Thus, a brother's son was his uncle's A., because the propinquity was wholly by males; a sister's son was his cognate, because a female was interposed in that relationship. With us the intervention of females is immaterial, provided the connection be on the male, or paternal, side of the house. The cause of our having thus changed the meaning of terms manifestly borrowed from the Roman law, seems to be that in Rome the distinction between agnates and cognates was founded on an institution which has not been adopted in the Roman sense by any modern nation—that, namely, of the *patria potestas* (q. v.). Roman agnati are defined by Hugo to be all those who either were actually under the same *paterfamilias*, or would have been so had he been alive; and thus it was that, as no one could belong to two different families at the same time, the agnation to the original family was destroyed, and a new agnation created, not only by marriage but by adoption (q. v.). The foundation of cognation, again, was a legal marriage. All who could trace up their origin to the same marriage were *cognati;* and thus the term *cognatus*, generally speaking, comprehended *agnatus*. But though an agnatus was thus almost always a cognatus, a cognatus was an agnatus only when his relationship by blood was traceable through males. Justinian abolished entirely the distinction between agnates and cognates. See SUCCESSION, GUARDIAN.

AGNESI, MARIA GÆTANA, a woman remarkable for her varied attainments, was born at Milan, 1718. In the ninth year she could converse in Latin, and gave a lecture in this language, in which she argued that a knowledge of the ancient languages was a proper accomplishment in women. In her eleventh year she could also speak Greek fluently, and subsequently acquired with great facility several of the Oriental languages, and also French, Spanish and German. This precocious development of intellect was encouraged by her father, who invited parties of learned men to his house, with whom Maria disputed on philosophical points. Of her discourses in these parties, her father published some specimens, entitled *Propositiones Philosophicæ* (Milan, 1738). After her twentieth year, she devoted her mind to the study of mathematics, wrote an unpublished treatise on *Conic Sections*, and published her *Instituzioni Analitiche* (2 vols., Milan, 1748). When her father was disabled by infirmity, she took his place as Professor of Mathematics in the University of Bologna, by the appointment of Pope Benedict XIV. She at last became a nun, and gave the whole of her time to attendance on the poor and the afflicted. Maria A. was a remarkable exception to the general rule of precocious intellect and short life, as she lived to the age of 81.

AGNO'NÉ, a town of South Italy, in the province of Campobasso, and 22 miles north-west from the town of Campobasso. It stands on a hill, and is said to occupy the site of the ancient *Aquilonia*. It is celebrated for its copper-works. Pop. 7500.

AGNOSTICISM is a name recently invented in Britain for a system of thought of which the main characteristic is, that it strictly limits human knowledge to the sphere of experience, to phenomena, and the relative; and denies the possibility of knowing or affirming anything as to the infinite, the unconditioned, the absolute, as to the existence or nature of God, as to immortality, the origin of matter, or of original causes. Positivism (see COMTE) has affinities with agnosticism; and Secularism (q. v.) is distinctly an agnostic system.

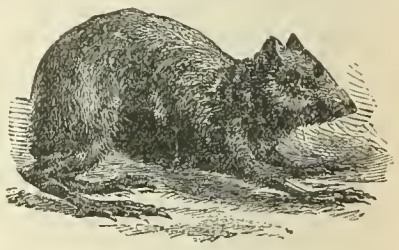
A'GNUS DEI (Lat. 'Lamb of God'), one of the titles of Christ (John i. 29); also the name given to a certain prayer used in the Roman Catholic service of Mass. The litanies generally conclude with the same prayer: 'O Lamb of God, that takest away the sins of the world, have mercy upon us.'—The figure of a lamb bearing a cross, stamped upon an oval of wax, silver, or gold, is also styled an *A. D.* Such medals have been consecrated by the popes since the 14th c., and are generally distributed among the faithful on the first Sunday after Easter. In the ancient church, candidates for baptism received similar medals of wax, and wore them as amulets. See AMULET. In the Greek Church, the cloth which covers the cup in the communion-service bears the image of a lamb, and is styled the *A. D.*



Agnus Dei.

AGO'STA, or AUGUSTA, a fortified city of Sicily, in the province of Syracuse, 12 miles north of that city. It stands on a peninsula projecting into the Mediterranean. It is said to occupy the site of the *Megara Hyblæa* of the ancients, but contains ancient remains. The present city was founded by the Emperor Frederick II. in 1229. It was the last place in Sicily to hold out against Charles of Anjou, but was betrayed into the hands of William L'Estendard, one of his barons, in 1268, when it was sacked, and its inhabitants mercilessly butchered. It remained desolate for years, but having been repeopled, and begun again to prosper, it was burned and razed to the ground in 1360 in another Sicilian war; and again was taken and burned by the Turks in 1551. Finally, in 1663, it was destroyed by an earthquake, when one-third of the inhabitants perished. It has three long parallel streets. The houses are generally of one story. The port is spacious, but of rather difficult access. Salt is the chief article of export. Oil, wine, cheese, fruit, honey, and sardines are also exported. Pop. 9800.

AGOU'TI (*Dasyprocta Agouti*), a small quadruped nearly allied to the Cavy or Guinea-pig, very abundant in some parts of the West Indies and of South America. It is often very injurious to the fields of sugar-cane. It is gregarious. Its flesh resembles that of



Agouti.

the hare or rabbit. Other species are found in the same regions, and even in the colder parts of South America. The *Pampas Hare* is *Dasyprocta Patachonica*.

A'GRA, a British district in the lieutenant-governorship of the North-western Provinces, bounded N. and E. by the districts of Muttra, Minpooree, and Etawah, S. and W. by the territories of Dhortpore, Gwalior, and Bhurtpore. Its area is 1908 square miles. The surface of the country is for the most part very level, the principal elevation of the Futtehpore Sikri hills, a sandstone range on the west frontier, being about 700 feet. The principal rivers are the Jumna—flowing along the north-east frontier, and its tributary the Chumbul (along the southern boundary), both of which are too deep in the channel to be of much avail for irrigation. The district generally is, in consequence, deficient in water; and the failure of the rains in some seasons (as in 1837, 1838) has been followed by severe famine. The temperature has a wide range, being during the hot winds of April, May, and June, so high that the city of A. is scarcely habitable by Europeans, while in January, severe frosts occur at night, though the thermometer at mid-day is high. The most important commercial product is cotton, which generally occupies about a tenth of the arable-land. There are two crops yearly—the spring crop, consisting of various grains (wheat, barley, oats, &c.), leguminous plants, flax, tobacco, &c., the autumnal crop of maize, *mung*, *moth*, melons, &c. The cultivation of rice is very limited, owing to the want of water. The population in 1872 was 1,096,367, of whom about 100,000 were Mohammedans, Europeans, &c., the rest Hindus. Of the Hindu population, about two-thirds are agricultural; of the rest about one-fourth.—The 'division' of A., which constitutes one of seven in the North-western Provinces, embraces the districts of A., Muttra, Farruckabad, Minpooree, Etawah, and Etah, and contains an area of 10,164 square miles, with a population in 1872 of 5,040,919. In 1833 it was resolved (3 and 4 Will. IV. cap. 85) to divide the Bengal Presidency into two, one of which was to be called the A. Presidency. This act was never carried into effect, and a subsequent act suspended its operation, substituting the present arrangement. See NORTH-WESTERN PROVINCES. Till 1862, the city of A. was the seat of the lieutenant-governor, from which circum-

stance that functionary was sometimes called the lieutenant-governor of A.

AGRA, a city in the British North-western Provinces in India, is situated in the district of the same name on the right bank of the Jumna, 139 miles S.E. from Delhi, and 783 N.W. from Calcutta. The ancient walls of the city embrace an area of about 11 square miles, of which about one-half is at present occupied. The houses are for the most part built of the red sandstone of the neighboring hills. The principal street, running north-west from the fort, is very spacious, but the rest are generally narrow and irregular, though clean. Some of the public buildings, monuments of the house of Timour, are on a scale of striking magnificence. Among these are the fortress built by Akbar, within the walls of which are the palace and audience-hall of Shah Jehan, and the Moti Masjid or Pearl Mosque, so called for its surpassing architectural beauty. Still more celebrated is the Taj Mahal, situated without the city, about a mile to the east of the fort. This extraordinary and beautiful mausoleum was built by the Emperor Shah Jehan for himself and his favorite wife, Arjimand Banoo (surnamed Numtaz Mahal). 20,000 men, says Tavernier, who saw the work in progress, were employed incessantly on it for twenty-two years. The principal parts of the building are constructed or overlaid outside and in with white marble; and the mosaic work of the sepulchral apartment and dome is described by various travelers in terms of glowing admiration. It is composed of twelve kinds of stones, of which lapis-lazuli is the most frequent, as well as the most valuable. Of British edifices in and near the city, the principal are the Government House, the College (for the education of natives), the Metcalfe Testimonial, the English Church, and the barracks. The climate at A., during the hot and rainy seasons (April to September), is very injurious to Europeans; but on the whole, the average health of the city is equal to that of any other station in the North-western Provinces. A. is fortified and has a garrison; there is a military station in the neighborhood of the city. As administrative center of its district, and of the large 'division' to which it gives name, A. is a place of great importance. The population, according to the census of 1872, is 149,008. The principal articles of trade are cotton and salt, which are conveyed in large quantities down the Jumna to the lower provinces. This city is held in great veneration by the Hindus, as the scene of the incarnation of Vishnu under the name of Parasu Rama. It first rose to importance in the beginning of the 16th c., and from 1526 to 1658, it was the capital of the Mogul sovereigns. In that year, Aurungzebe removed to Delhi; henceforth, A. declined. It was taken in 1784 by Scindia, and surrendered in 1803 to Lord Lake, after a bombardment of a few hours. Among the spoils on that occasion was a canon of 23 inches calibre, 11½ inches metal at the muzzle; length, 14 feet 2 inches; weight, 96,000 pounds. The balls of cast iron, weighed 1500 pounds. This stupendous piece of ordnance is said to have been wantonly reduced to fragments by blasting by some artillery-officers in 1833. (Thornton's *Gazetteer of India*). During the late mutiny, A. was one of the places in which the Europeans were shut up. At the outbreak, the garrison consisted of the 44th and 67th regiments of B. N. Infantry, the 3d European Fusiliers, and a few artillery. The native regiments were disarmed in June 1857; and the defence of this important city devolved upon the Europeans. The ladies resorted at night to places of refuge appointed by the governor, while the gentlemen patrolled the streets; but matters growing worse both in the city and country, it was resolved, after a battle with the mutineers, to abandon the city and retire to the Fort or Residency. It was time; for some thousands of prisoners getting loose, began to fire all the European buildings in the city. Hardly a house escaped destruction; numbers of traders were ruined, and had to endure the misery of beholding their ruin from the Fort. As the Fort was both large and strongly defended, fugitives flocked in from all parts of the country, and the numbers soon swelled to 5846. Heroic sallies were occasionally made. Major Montgomery's march to Allygurh, and his defeat of the rebels, though twenty times as numerous, was a feat worthy of Havelock. When Delhi fell, its rabble of defenders hurried off in the direction of A., which place was seriously threatened by them, but was relieved by the rapid and brilliant march of Colonel Greathed, who discomfited the enemy, and despoiled them of nearly all their baggage.

AGRAM, capital of the Austrian 'kingdom' of Croatia and Slavonia; is at the foot of a richly wooded range of mountains, about two miles from the Save. It is divided into three parts—the upper town, built upon two eminences; the lower town; and the episcopal town. The cathedral, built in the 15th century, is one of the finest Gothic buildings in Austria. The inhabitants are principally Croats, who carry on a trade in wood and corn, and manufacture tobacco and leather. Repeated and violent shocks of earthquake in November 1880, felt throughout great part of Croatia, Dalmatia, Servia, and other parts of Austria and Hungary, destroyed most of the public buildings of A., overthrew 200 houses, and caused great loss and distress. Further shocks were felt at various dates in December, and in January 1881. The lower town is the newest and finest in appearance. A. is the place of meeting of the provincial diet. It possesses a university (since 1874) and a public library. Pop. (1870) 23,856.

AGRA'RIAN LAW. With the name of A. L. used to be associated the idea of the abolition of property in land, or at least of a new distribution of it. This notion of the A. laws of the Romans was not only the popular one, but was also received by most scholars. The French convention, in 1793, passed a law punishing with death any one who should propose an A. L., understanding by the term an equal division of the soil among all citizens. Now, it would have been strange if the Romans, with whom private property was so sacred, could ever have been brought to sanction any measure of the kind. It was the German scholars, Heyne, Savigny, and especially Niebuhr, who first explained the true nature and character of the Roman A. laws. There are still some disputed points on this matter, but one thing seems made out—that those laws had no reference to private lands held in absolute property, but to public or state lands.

As the dominion of Rome extended, a portion more or less of each conquered territory was confiscated to the state, and became public domain. All laws respecting the disposition of these lands were called A. laws; which are therefore of various kinds. What made these laws be so long mistaken for an interference with private rights, and excited such opposition to them at the time, was the use which was made of the public domains while unappropriated. 'It was the practice at Rome,' says Dr. Arnold, 'and doubtless in other states of Italy, to allow individuals to occupy such lands, and to enjoy all the benefits of them, on condition of paying to the state the tithe of the produce, as an acknowledgment that the state was the proprietor of the land, and the individual merely the occupier. Now, although the land was undoubtedly the property of the state, and although the occupiers of it were in relation to the state mere tenants-at-will, yet it is in human nature that a long undisturbed possession should give a feeling of ownership; the more so as, while the state's claim lay dormant, the possessor was, in fact, proprietor, and the land would thus be repeatedly passing by regular sale from one occupier to another.'

The state, however, was often obliged to interfere with these occupiers of the public lands, and resume its rights. The very idea of a citizen, in ancient times, involved that of a landholder, and when new citizens were to be admitted, they had each to receive their portion out of the unallotted public domain; which was attended of course, with the ejection of the tenants-at-will. It appears, also, that the right to enjoy the public lands in this temporary way was confined to the old burghers or patricians. This, taken in conjunction with the tendency, strong at all times, of larger possessions to swallow up smaller, kept up an ever-increasing number of landless commons, whose destitution and degradation came from time to time to such a pitch, that alleviation was necessary, to prevent the very dissolution of the state. It is easy, however, to see what motive the patricians, as a body, had to oppose all such measures, since it was their interest, though not their right, to keep the lands unallotted.

The enactment of A. laws occasioned some of the most memorable struggles in the internal history of Rome. Most of the kings of Rome are said to have carried an A. L., that is, to have divided a portion of the public land among those whom they admitted to the rights of citizenship. 'The good king,' Servius Tullius, may be looked upon as the first victim of the hostility of the nobles to A. laws. About twenty-four years after the expulsion of the Tarquins, the distress of the commons called aloud for remedy, and the consul, Spurius Cassius, proposed an A. L. for a division of a certain proportion of the public land, and for enforcing the regular payment of the rent or tithe from the occupiers of the remainder. The aristocracy, however, contrived to defeat the proposal, and when the year of his consulship was out, Cassius was accused of trying to make himself king, was condemned, scourged, and beheaded, and his house razed to the ground.

The first important A. L. of a permanent nature, actually passed, was that proposed by the tribune, Licinius Stolo, and carried, after a struggle of five years, in the year of Rome 383. The provisions of Licinius' bill, or *rogation*, were as follows: 'Every Roman citizen shall be entitled to occupy any portion of the unallotted state land not exceeding 500 *jugera* (see ACRE), and to feed on the public pasture-land any number of cattle not exceeding 100 head of large, or 500 head of small, paying in both cases the usual rates to the public treasury. Whatever portions of the public land beyond 500 jugera are at present occupied by individuals, shall be taken from them, and distributed among the poorer citizens as absolute property, at the rate of seven jugera apiece. Occupiers of public land shall also be bound to employ a certain number of freemen as laborers.'

This law produced for a time very salutary effects. But before the year 621, when Tiberius Gracchus was elected tribune, the

Licinian law had been suffered to fall into abeyance; and although vast tracts had been acquired by the Italian, the Punic, and the Greek wars, no regular distribution of land among the destitute citizens had taken place for upwards of a century. Numerous military colonies had indeed been founded in the conquered districts, and in this way many of the poorer Romans or their allies had been provided for; but still there remained large territories, the property of the state, which, instead of being divided among the poorer members of the state, were entered upon, and brought into cultivation, by the rich capitalists, many of whom thus came to hold thousands of jugera, instead of the five hundred allowed by the Licinian law. To a Roman statesman, therefore, looking on the one hand to the wretched pauper population of the meaner streets of Rome, and on the other, to the enormous tracts of the public land throughout Italy which the wealthy citizens held in addition to their own private property, the question which would naturally present itself was—Why should not the state, as landlord, resume from these wealthy capitalists, who are her tenants, as much of the public land as may be necessary to provide little farms for these pauper citizens, and so convert them into respectable and independent agriculturists? This question must have presented itself to many; but there were immense difficulties in the way. Not only had long possession of the state lands, and the expenditure of large sums in bringing them into cultivation, given the wealthy tenants a sort of proprietary claim upon them, but in the course of generations, during which estates had been bought, sold, and inherited, the state lands had become so confused with private property, that in many cases it was impossible to distinguish between the two. Notwithstanding these difficulties, Tiberius Gracchus had the boldness to propose an A. L., to the effect, that every father of a family might occupy 500 jugera of the state land for himself, and 250 jugera additional for each of his sons; but that, in every case where this amount was exceeded, the state should resume the surplus, paying the tenant a price for the buildings, &c., which he had been at the expense of erecting on the lands thus lost to him. The recovered lands were then to be distributed among the poor citizens; a clause being inserted in the bill to prevent these citizens from selling the lands thus allotted to them, as many of them would have been apt to do.

According to the laws and constitution of Rome, there was nothing essentially unjust in this proposal, which was, in private, at least, approved of by some of the most distinguished men of the time. The energy of Gracchus carried the measure, in spite of the opposition of the aristocratic party, whose vengeance, however, could only be satisfied with the assassination of Gracchus and his brother. See GRACCHUS. The attempts to carry out the 'Sempronian law,' as it was called, were attended with great difficulties, and although not formally repealed, it continued to be evaded and rendered inoperative. Various A. laws were subsequently passed, some by the victorious aristocratic party, in a spirit directly opposed to the Licinian and Sempronian laws.

Besides A. laws having for their object the division among the commons of public lands usurped by the nobles, there were others of a more partial and local nature, for the establishment of colonies in particular conquered districts: these naturally met with less opposition. Still more different were those violent appropriations of territory made by the victorious military leaders in the latter times of the republic, in order to reward their soldiers, and establish exclusively military colonies. In these the private rights of the previous occupants were often disregarded.

AGRI'COLA, GNAEUS or CNEIUS JULIUS, a Roman of the imperial times, distinguished not less by his great abilities as a statesman and a soldier than by the beauty of his private character, was born at Forum Julii (now Fréjus in Provence), 37 A.D. Having served with distinction in Britain, Asia, and Aquitania, and gone through the round of civil offices, he was, in 77 A.D., elected consul, and in the following year proceeded as governor to Britain—the scene of his military and civil administration during the next seven years. He was the first Roman general who effectually subdued the island, and the only one who displayed as much genius and success in training the inhabitants to the amenities of civilization as in breaking their rude force in war. In his seventh and last campaign (84 A.D.), his decisive victory over the Caledonians under Galgacus, at a place called *Mons Graupius*, established the Roman dominion in Britain to some distance north of the Forth. After this campaign, his fleet circumnavigated the coast, for the first time, discovering Britain to be an island. Among the works executed by A. during his administration, were a chain of forts between the Solway and the Tyne, and another between the Clyde and Forth. Numerous traces of his operations are still to be found in Anglesey and North Wales, and in Galloway, Fife, Perthshire, and Angus. The news of A.'s successes inflamed the jealousy of Domitian, and he was speedily recalled. Thenceforth he lived in retirement; and when the vacant proconsulships of Asia and Africa lay within his choice, he prudently declined promotion. The jealousy of the emperor, however, is supposed to have hastened his death, which took place at the early age of 55. His life by his son-in-law Tacitus, has always been regarded as one of the choicest specimens of biography in literature.

AGRICOLA, JOHN (whose true name was Schnittel or Schneider, but who was also called Magister Islebius and John Eisleben, after the name of his native town), born 1492, was one of the most zealous founders of Protestantism. Having studied at Wittenberg and Leipsic, he was sent (1525) by Luther, who highly appreciated his talents and learning, to Frankfort-on-the-Main, to institute there, at the desire of the magistrates, the Protestant worship. On his return, he resided as a teacher and preacher in his native town of Eisleben, till 1536. In 1537, he became a professor at Wittenberg, where the Antinomian controversy, already begun between him and Luther and Melancthon, broke out openly. See ANTINOMIANISM. The troubles in which he was thus involved obliged him to withdraw (1538) to Berlin, where he was reduced to extreme want, and was thus induced to make a recantation, never altogether sincere. He then found a protector in the Elector John of Brandenberg, who appointed him preacher to the court and general superintendent. He made great exertions for the spread of the Protestant doctrine in the Brandenberg states; but ere his death, which took place at Berlin, 22d September, 1566, he had become as much hated for his share in the drawing up of the Augsburg *Interim* (q. v.), as he had formerly been for his Antinomian opinions. Besides his numerous theological writings, his country possesses a truly national work of his, entitled *Die Gemeinen Deutschen Sprüchwörter mit ihrer auslegung* (Common German Proverbs, with their explanation; Hagenau, 1592; and a very complete but somewhat altered edition at Wittenberg, 1592). The patriotic feelings, pure morals, and pithy language of this book, have procured for it one of the first places among the German works of that age.

AGRICOLA, RUDOLPHUS, one of the most learned and remarkable men of the 15th c., and a chief instrument in transplanting the taste for literature, just revived in Italy, into his native country of Germany, was born, 1443, in the village of Baflo, near Gröningen. His name was properly Rolef Huysmann (i. e., houseman or husbandman), which was Latinized by him into A., after the usage of the time. He was also called Frisius, and Rudolf of Gröningen, from his native place; and sometimes Rudolf of Ziloha, from the monastery of Silo, where he spent some time. Having been first a disciple of Thomas à Kempis at Zwolle, he went to Louvain, then to Paris, and thence to Italy, where, during the years 1476 and 1477, he attended the lectures of the most celebrated men of his age. Here he entered into a close friendship with Dalberg, who afterwards became Bishop of Worms. He was the first German who distinguished himself in Italy in public speaking and lecturing, and this he did not only by his erudition, but by the elegance of his language and the correctness of his pronunciation. He likewise acquired reputation as an accomplished musician; and his pieces were popular throughout Italy. On his return to Germany, he endeavored, in connection with several of his former co-disciples and friends, among whom were Alexander Hegius and Rudolphus Lange, to promote a taste for literature and eloquence in Germany. Several cities of Holland vainly strove with each other to obtain his presence, by offering him public functions; but not even the brilliant overtures made to him by the court of the emperor Maximilian I., to which he had repaired in connection with affairs of the town of Gröningen, could induce him to renounce his independence. At length yielding (1483) to the solicitations of Dalberg, who was now chancellor to the Elector Palatine, and Bishop of Worms, he established himself in the Palatinate, where he sojourned alternately at Heidelberg and Worms, dividing his time between private studies and public lectures, and enjoying high popularity. He distinguished himself also as a painter; and at the age of 40 set with ardor to learn Hebrew, in order to study theology. He went again (1484) with Dalberg into Italy, and died shortly after his return to Germany (on the 28th October 1485). His fame rests chiefly on the personal influence he exerted. His compositions, which are written in Latin, are neither so numerous nor so important as those of many of his learned contemporaries. The first nearly complete edition of them was that published by Alard (2 vols., Cologne, 1539). Consult Tresling, *Vita et Merita R. A.* (Gröningen, 1830).

AGRICUL'TURAL CHEMISTRY, that branch of chemical science which treats of the composition of soils and manures, and of the vegetable and animal substances which it is the object of agriculture to produce. Instead of considering the subject by itself, it will receive attention under the heads of Drainage, Irrigation, Manures, Soils, &c.

AGRICULTURAL EDUCATION, as at present understood, is a comprehensive term, including instruction in chemistry, geology, botany, zoology, mechanics—embracing, in short, the *science* as well as the *practice* of agriculture. However important the branching off of education into this special track, it is only of late years

that adequate attention has been paid to it. The first agricultural school was founded by Fellenberg at Hofwyl, in Switzerland, in 1806. His pupils were taken from the poorest class of peasantry, of whom he truly observed, that having 'no other property than their physical and mental qualities, they should be taught how to use this capital to the best advantage,' by a combination of 'discipline, study, and manual labor.' No fewer than 3000 pupils were trained in this school, which flourished for thirty years under the able direction of Wehrli. Since then, various institutions of the same character have sprung up on the continent. In France, several have been supported by the state—the principal being the one at Grignon, to which an old royal palace with its domain of 1185 acres has been given up. One of the first duties undertaken by the new government of Marshal MacMahon, in 1873, was the nomination of a commission to re-organize the system of agricultural education. In Prussia, there is scarcely a province that does not boast its agricultural school and model farm; and, indeed, throughout Germany, as well as in Russia, we find educational institutions supported by the state, in all of which, with some slight difference of detail, agriculture is practically as well as theoretically taught. More recently, experimental stations have been established in various parts of the empire. Indeed the agricultural schools and field experimental stations in Germany are a credit to that country and a source of much attraction to visitors from other countries.

In America, increasing facilities are being provided for acquiring a thorough knowledge of agriculture scientifically as well as practically. Several of the British colonies have recently established Boards of Agriculture and Agricultural Schools. The government of Ontario started an agricultural college and model or experimental farm at Guelph, in May 1874. It has so far been very successful. An efficient staff of lecturers has been secured, and instructions are systematically given to first-year's students in agriculture, chemistry, zoology, anatomy, physiology, and book-keeping; while second-year's students are taught entomology, meteorology, and cattle pathology. High-bred stock of various kinds imported from the mother-country are kept on the college farm.

In England, there are as yet no state institutions of this kind. In 1845, an Agricultural College (Royal by command since 1880) was established, by private enterprise, at Cirencester, for the education of both residents and non-resident pupils, the course of instruction extending over two years. A large farm is attached to the school. Of late, strong feeling has risen in favor of more encouragement being extended to agricultural education, especially by the state. British agriculturists at length came to see that as farming had got to be a science in itself, their educational system was lamentably defective. In the practical training, the young British farmer has long been and possibly still is ahead of his fellows in other countries; but it has recently become notorious that so far as an acquaintance with the various sciences that bear on agriculture is concerned, British agriculturists are considerably behind some of their neighbors—Germany, for example. Besides publishing twice a year a very instructive and useful *Journal*, the Royal English Agricultural Society has since 1868 given handsome prizes as well as the certificate of the Society to young men, at the close of an annual examination, who are supposed to have finished their agricultural and scientific education. Those who obtain first-class certificates are enrolled as life members of the society. After conference with the head masters of the middle-class schools of England, this society commenced in 1874 to offer ten annual scholarships of £20 each to scholars from the middle-class schools who pass the best examinations in land surveying, the mechanics of agriculture, the chemistry of agriculture, the principles of agriculture, the nutrition of animals and plants, &c. The successful candidates must study for the year at an agricultural college, or with an approved practical agriculturist. This scheme works very successfully. Through the liberality of the Duke of Bedford, the Royal English Agricultural Society was enabled to establish an experimental farm on His Grace's property at Woburn, Bedfordshire, in 1876. On this farm, experiments in the fattening of stock with various kinds of food, and in the growing of crops with different kinds of manures, are carried on.

In addition to offering diplomas, life memberships, and certificates to agricultural students who successfully pass an examination similar to the above, the Highland and Agricultural Society resolved in 1874 to give ten scholarships of £20 each, tenable for one year, to students attending the agricultural department of Edinburgh University (the only British University that possesses a chair of Agriculture), and five scholarships of £10 each to younger students, who may the second year compete for the £20 scholarships. The society otherwise contributes handsomely to the agricultural department of Edinburgh University. This society was also instrumental in 1875–6 in getting the government to add agriculture to the list of subjects, towards instruction in the sciences of which aid is given by the Science and Art Department. Classes were early set on foot at Aberdeen with the view of enabling teachers of country schools to qualify for giving instruction in the elementary sciences relating to agriculture. Field experiments were begun in Aberdeenshire in 1876 through the enterprise of the leading agriculturists and the liberality of several landowners and others who subscribed handsomely to the necessary funds. The Highland and Agricultural Society resolved also in that year to start two experimental agricultural stations in the Lothians. Many farmers, both in England and Scotland, especially the latter, keep agricultural students.

The authorities in Ireland were many years ago alive to the benefits of a scientific education for farmers. The Commissioners of National Education have not been idle. In 1838, they established that popular, useful, and well-conducted institution, Glasnevin Training College, which has 180 acres of land attached. Some of the students coming from minor schools and passing an entrance examination are admitted free, and get two years' training; others pay for the bare cost of their board and lodgings; while a third class consists of young men who board at their own expense in the neighborhood, and pay a moderate fee for attendance at the classes. Lectures are regularly delivered on animal and vegetable physiology, chemistry, geology, botany, and practical agriculture, while instructions in the field are carefully attended to. Much good has been done in Ireland by the attachment of small farms or gardens to about 200 national schools throughout the country, where elementary instructions in agriculture and the sciences bearing thereon are given, with excellent results. Many of the pupils pass from these schools to Glasnevin College, while the teachers of the National Schools often qualify for their agricultural duties by attendance at this college and model farm. Lately, however, some of the farm schools have been discontinued by the government. See AGRICULTURAL EDUCATION in AM. SUPP.

AGRICULTURAL SOCIETIES, associations for the purpose of promoting the science and practice of agriculture. Such societies were established in the north of Italy in the beginning of the last century. As early as 1723, a 'Society of Improvers in the Knowledge of Agriculture in Scotland' was instituted. This had a short existence; but the necessity of such an association was felt, and another arose in 1755. This also did not succeed well; however, in 1783 a number of gentlemen met in Edinburgh and founded one destined for permanency, the well-known 'Highland Society.' The first annual meeting of this body was held in 1784, and it was incorporated by royal charter in 1787. Originally designed for the improvement of the Highlands, it extended its operations over the whole of Scotland, and confined its efforts more to the advancement of agriculture. Its title is now, under a royal charter granted in 1834, the 'Highland and Agricultural Society of Scotland.' Its earliest efforts were aided by a grant of £3000 out of the moneys paid for the estates of the noblemen and gentlemen who were attainted in consequence of their accession to the rebellion of 1745. The funds required to defray the expenses of the charter, however, were raised by subscription, and the members then were only about 150. In 1799 the Society began to publish its Transactions or prize essays. At present its members number about 5000. The ordinary subscription is £1, 3*s*. 6*d*. annually, which may be redeemed by one payment of £12. 12*s*. Tenant-farmers are admitted on a subscription of 10*s*. annually, or £5, 5*s*. for life. The more important objects aimed at by the society are—

1. Agricultural meetings and general shows of stock, implements, and dairy produce held in the principal towns of Scotland.

2. Encouraging a system of district shows, for the improvement of breeds of stock most suitable to the different parts of the country.

3. The encouragement and promotion of a proper system of agricultural and forestry education by means of powers conferred by a supplementary royal charter in 1856, authorizing 'the Council of the Highland and A. Society on Education' to prescribe a curriculum of study, and to grant diplomas and certificates to students of agriculture who shall pass the requisite examination.

4. The advancement of the veterinary art, by conferring the Society's certificate on students who have passed through a regulated curriculum in the Edinburgh Veterinary College, and who are found by a rigid examination qualified to practice.

5. The appointment of two chemists for the purpose of analyzing soils, manures, &c. to members, and for promoting the application of science to agriculture.

6. The establishment of an agricultural museum, illustrative of the vegetable products of the country; but this collection has been handed over to the Edinburgh Museum of Science and Art.

7. The annual publication of reports and prize-essays on all branches of agricultural and arboriculture, as well as the proceedings of the laboratory.

The general shows of stock, &c., are held once every year, at Edinburgh, Glasgow, Aberdeen, or some other principal town, and are attended by vast numbers of persons. The business of the society is conducted by a secretary at an office in Edinburgh.

The writings of Arthur Young directed attention to the agricultural condition of England, shortly after the middle of the last

century. In 1793 the 'Board of Agriculture' was incorporated. This was a private association, but being supported by parliamentary grants, it so far partook of the nature of a public institution. Its 'surveys' of the different counties collected and diffused an immense amount of information of the most valuable kind. It latterly encouraged experiments and improvements of all kinds in agriculture, but was dissolved in 1816. Various societies have sprung up since then in different parts of England; of these, the 'Smithfield Cattle Club,' 'The Bath and West of England Society,' and the 'Yorkshire A. Society,' may be mentioned as the most influential. The growth and vigor of the national society, 'The Royal A. Society of England,' has been beyond all precedent. It was established in May 1838, and then consisted of 466 members, but in 1880 the members were as many in number as 6000. The objects which it pursues are almost identical with those of the Highland and A. Society of Scotland. Ordinary members pay £1 annually, or £10 for life. The *Journal*, containing interesting and original reports on A. subjects is sent free to all the members. Ireland also boasts of its 'Royal A. Society of Ireland.' It was formed in 1841, and has greatly assisted in advancing the agriculture of the country, especially by introducing improved breeds of cattle.—Most of the countries of continental Europe have followed the example of Great Britain in the formation of A. Associations of various kinds.

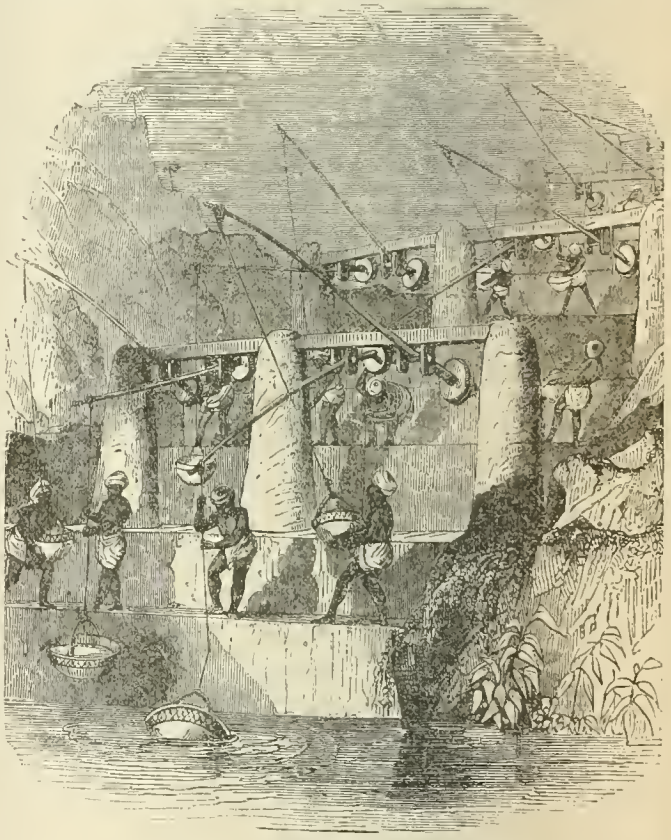
In the free states of America, where the land is mostly owned by those who farm it, A. S. have sprung up in great numbers. Every state has its central Society, which in its turn fosters a number of local associations. Indeed, in all the chief grain-producing districts, each county boasts of its own society. These being all partly supported by state money, useful information is collected, published, and sold at a cheap rate in Reports. Canada follows in the wake of her enterprising neighbors, and supports by grants of money a provincial show in each province, while the county societies are numerous, and supply materials for the Reports of the Boards of Agriculture at Toronto and Montreal. In Canada and the United States, the A. S. are of a highly popular character. Prizes are given, not only for animals, implements, and dairy produce, but also for fruits. Being more of a general nature, combining agriculture, horticulture, and domestic economy, such exhibitions are frequented by all classes. They are usually denominated 'fairs' though partaking little of the character and appearance of what is understood by a 'fair' in Britain. The diffusion of education among the farmers of the free states has made them eager readers of A. writings, and the numerous societies soon diffuse a knowledge of improved stock, implements, and seeds, over their wide territories.

A'GRICULTURE (Lat. *ager*, a field, and *colo*, I till) is the art of rearing those plants and animals that are best suited to supply the wants of man. Man has found the earth, in almost every clime, covered with vegetation, yet this often yields little that he can use. The spontaneous growth of nature affording but a limited quantity of food, he at first attempts to supply the deficiency by capturing the wild animals, which often feed upon what is unsuited for his sustenance. Sometimes, however, the most fertile lands under luxuriant forests, or other natural vegetation, only support a small number of animals. In the most favorable circumstances, a given area of territory cannot maintain many of the human family, so long as they depend upon the natural vegetation or on the chase. It is only after those plants which yield man an abundant supply of food are selected and made the object of cultivation, that population augments, and civilization takes its rise.

Man has selected a great variety of plants for cultivation to afford him food and clothing. In northern latitudes, wheat, barley, oats, rye, and the potato form the chief plants from which he derives subsistence. These crops are most productive when grown in summer in the temperate climates of the earth, being unsuited to the heats of the torrid zone. Their geographical limits, however, are greatly extended by growing them as winter crops on the borders of, and even within, the tropics. In these regions, however, rice, maize, millet, and other grains become far more productive of food than the already mentioned cereals are in high latitudes, as they flourish during the heats of summer. Where heat and moisture are almost perennial in the tropics, the banana, the bread-fruit tree, and other herbaceous plants and trees, are most productive of human food.—A short historical outline of the A. of different parts of the world will exhibit the chief elements that regulate the practices of the husbandman.

The early civilization of *Egypt* claims for it the first notice in a passing outline of the chief system of A. The teeming population that existed in ancient times in the narrow valley of the Nile, the large standing army which was maintained, the extraordinary works of engineering and architecture still visible in our day, and the exportation of corn to other nations, indicate an advanced state of the art of A. Rain is a rare phenomenon in Upper Egypt, and fertility is only maintained by the waters of the Nile, which are subject to annual floods. The risings and ebbings are as regular now as they were in the days of Herodotus; and the agricultural systems are also in a great measure the same. The inundation which, unless prevented by embankments, covers the whole land, occurs at the hottest season.

As the waters retire in October, the land is sown with what are there styled *winter crops*, consisting of wheat, barley, lentils, beans, flax, lupines, chick-pease, &c. All these crops require no further watering, as the moisture which the soil has imbibed during the inundation is sufficient to bring them to maturity about the end of April, or even a month sooner in Upper Egypt. Only one crop in the year is grown upon most of the inundated lands. But on those lands which are protected from the inundation, *three crops a year* may be raised by means of artificial watering. Few of the plants used as winter crops can be grown in summer in Egypt. The plants adapted for summer consist of rice (largely grown in the Delta), durra, millet, maize, sesame, melons, onions; they are sown from April to August, and of several of them two crops in the season ripen under the cloudless sky of Egypt. A vast amount of manual labor and animal power is expended in watering the ground for the summer crops. The peasants use the *shadoof* for



Modern Shadoof.

the purpose, which is a simple contrivance, used in drawing water over a large portion of the East. The Persian wheel, driven by oxen, is largely employed; so much so, that about 50,000 of these machines are at present in use in the valley of the Nile. Besides these crops, cotton, indigo, and sugar-cane are now cultivated to a small extent. When the waters rest long on the land, it answers all the ends of a fallow, by extirpating the land-weeds and disintegrating the soil. The ground, in such cases, requires no further culture than treading in the seed by animals, or slightly scratching the surface with bushes. On the other hand, the summer crops require a great deal of tending, both in cultivating and watering the soil. The diminution of the population in Egypt has in some measure deprived the country of the means of its former advanced state of A.; nor is its present political condition at all likely to lead to much improvement.

Few historical records of the state of Babylonian A. have come down to us. We can only judge of its productiveness by the dense population that was supported in the plains bordering the Euphrates, where the summer climate is almost as arid as that of Egypt. That river also was subject to overflow, when the snows melted on the mountains of Armenia in summer. Further than this, however, we have no knowledge of the system pursued or crops cultivated.

The Scriptures are full of allusions to the operations of the husbandman in *Palestine* as well as in Egypt. The operations in the two countries necessarily formed striking contrasts—the crops in the former being chiefly dependent on the rains for growth; in the latter, on the inundations of the Nile. In the Holy Land, there are extensive plains of fertile soil which yielded the finest wheat. The hillsides were covered with vines and olives, often planted on terraces formed with much labor, to afford a larger mass of soil, in which the plants might flourish in the almost rainless summers. The valleys were well watered, and afforded pasture for numerous flocks. Of the smaller cultivated plants, millet was the chief summer crop, but it was only cultivated to a limited extent, being confined to those spots that could be artificially watered. Wheat and barley were the chief cereals, as the winter rains were sufficient to bring them to maturity. The large number of inhabitants that Palestine supported under the Jews is the wonder of all modern travelers, who are struck with the ruins of ancient cities and the desolation of the country. The means of cultivation, however, disappeared with the inhabitants; and the destruction of the wood has added to the aridity of the climate. Concurring testimony indicates that the systems of cultivation were somewhat similar in all the countries bordering on the Mediterranean, which are characterized by arid summers, and autumn and winter rains. Irrigation, therefore, was had recourse to wherever it was practicable.

The A. of *Italy* in the present day exhibits great contrasts in its condition; for while a garden-like cultivation is seen in Lombardy, the utmost rudeness and backwardness prevail in the southern parts of the peninsula. Into the social causes that have led to these results our limits forbid us to enter. The literature of the A. of the ancient Romans, throws much light on the systems that then existed in the countries bordering on the Mediterranean. As is well known, the wide-spread dominion of Rome rose out of a diminutive colony planted on the banks of the Tiber. In the time of the early kings, its original territory did not extend above five miles towards the Alban Hills, and still less in other directions. Romulus is said to have divided a portion of his small territory among his subjects, at the rate of little more than an acre to each. This allotment, granted in perpetuity, was not liable to be taxed, and could be sold by its owner. The whole territory was not assigned to the citizens, but the larger part was kept as domain lands, which yielded a revenue to the state, by being let to the wealthy classes. These domain lands were either cultivated or allowed to remain in pasture. The common conditions were, that the occupants of the corn-land paid one-tenth of the produce as rent; of vines and fruit-trees, one-fifth; and a moderate rate a head for sheep or cattle pastured. The occupants were merely tenants-at-will, and the state could resume and sell their lands at any time. A similar policy seems to have been pursued by the numerous states of ancient Italy. As these were all conquered in succession by the Romans, their lands became the property of the Roman state. Sometimes the inhabitants were wholly extirpated, or sold into slavery, and their lands were partly assigned to the poorer citizens engaged in the war; the remainder, which was always the much larger part, became domain lands. In other instances, only a portion of the lands was taken from the conquered nations; the former owners were allowed to retain them as tenants, paying the ordinary rent. Thus, from the earliest times, two classes of cultivators were in existence—the small proprietors, and the wealthy tenants, holding the lands of the state. Betwixt the two, there was almost a perpetual strife—the one demanded the distribution of the state domains, while the others constantly resisted it. Even after the Romans became masters of the whole of Italy, the citizens had little more than four acres of land assigned to each; and the domain lands increased enormously. Attempts were constantly made to restrict the extent of domain held by the patricians, but generally without effect. See AGRARIAN LAWS. The great extent of domain lands gave rise to the employment of slave-labor in their cultivation by the wealthy citizens. This led to the discouragement of small proprietors, so that the free population engaged in A. diminished throughout Italy. The evil was further aggravated by the policy that the Romans pursued towards the inhabitants of the conquered provinces: there, none of the land was held as freehold, but it was solely vested in the Roman people, being all let out for the benefit of the state. On the conquest of Sicily, the wealthy Romans flocked over, and farmed the rents, as well as cultivated the lands by means of slave-labor. Indeed, the chief supplies of grain sent to Rome from Sicily, Sardinia, and Carthage, were raised by means of slaves. A. was long the only source of wealth open to the patricians; and it was deemed the most honorable of occupations. Its operations were then directed by men of wealth and learning; and no wonder that its literature was so copious, and held in so high estimation. Cato, the first and most celebrated agricultural writer (who died aged 88, 150 B.C.), was in the middle period of life at the end of the second Punic war. The large farming system had then been fully established; and he gives us, not only the most minute particulars regarding the management of the slaves on his Sabine farm, but all the details of husbandry, from the ploughing of the fallows to the reaping and threshing of the crop.

The chief grain cultivated by the Romans was wheat, but barley was also cultivated to a considerable extent. Land devoted to grain was fallowed for a whole year every alternate year; in other words, the rotation consisted of 1*st*, wheat, 2*d*, fallow. One-third of the fallow was manured and sown with some green crop as cattle-food. Fallow received from four to five furrows before the wheat was sown in autumn. The last ploughing left the land in narrow ridges; and as the seed was sown broadcast, it came up in rows, which admitted of the crop being several times hand-hoed. The crops of wheat ripened about the middle of June, but the summers were too dry to allow of millet and other summer crops being raised with certainty. Rye, hemp, flax, beans, turnips, lupines, vetches, and lucerne are also mentioned as occasionally cultivated. Meadows were highly esteemed, and irrigation to some extent adopted. Cattle were fed in the plains in winter, and driven towards the Apennines as the snows melted in spring, and when the pastures below became parched by the heat. The greater proportion of the surface of Southern Italy consists of thin calcareous soils, ill-adapted for the growth of grain or grass; and the vine, the olive, and the mulberry become the chief objects of culture. The principle districts for growing wheat are, in the neighborhood of Naples, and in the ancient Apulia, where Hannibal generally wintered when he overran Italy. Some of these rich plains are still held directly from the government, and cultivation is of the rudest character. One-third of the land is in pasture, and the other two-thirds in fallow and grain. Three or four crops are taken in succession, and the soil is then allowed to recruit its exhausted strength by remaining under pasture.

In the great plain of Northern Italy watered by the Po, agriculture is now in a very advanced condition. A great part of it is of great natural fertility; it drew forth the praises of Polybius, who visited it about fifty years after it came into the hands of the Romans. The oak-groves which he found scattered over the plain, fed the immense droves of swine that were then raised in Italy. Now, however, rich and poor soils are subjected to the fertilizing influences of irrigation, and the region has become the best cultivated in Europe. No less than 1,600,000 acres of land are under irrigation, and the results are of the most striking character. The land is forced to produce a constant succession of grass and grain. The irrigated meadows, like the pastures of Ireland and Scotland, are made the corner-stone of the systems of rotation. In general, three years in meadow are succeeded by three years in rice; two years in Indian corn and flax; one year in wheat sown out with grass-seeds. Large numbers of cattle are kept on the farms of Lombardy, where the land is often a complete net-work of canals, with their smaller distributing channels. There is a large exportation both of grain and dairy produce. The vast ranges of snowy mountains that bound the plain to the north, afford a never-failing supply of water during the heats of summer. The vine and mulberry beautify the country, and also give employment to the dense population.

The lower latitude of *Spain* gives it a still more arid summer climate than Italy. Rains commonly fall only during the autumn and winter, and the supply is scanty and irregular. This renders Spain a poor and unproductive country, excepting where the soil can be irrigated. For this reason, the resources of its agriculture are chiefly confined to its well-watered valleys, which are capable of being made to outstrip Egypt itself in productiveness. The Moors early introduced the art of irrigation in the south of Spain, and carried it to a high pitch in the kingdom of Granada. Before the conquest of that country by Ferdinand and Isabella, the valley of Granada was one well-cultivated garden. Though the undiminished powers of the land are still attested by a few spots in the *vegas* of Murcia and Granada, its present condition cannot be compared to its condition under the Moors. The high temperature admits of a succession of crops being raised in one year, as in Egypt. After wheat has been gathered in June, a crop of maize or millet, or of vegetables is got. Maize is scarcely grown in Spain except where the land is irrigated, so that every valley is more or less under the productive influences of water. The melting of the snows in summer on the high ranges of mountains, affords a supply when it is most needed in the plains below. Vines, olives, and oranges find a genial climate for their growth in the southern parts, and are important objects of culture.

France must be regarded as one of the richest agricultural countries in Europe. In the south, the climate is sufficiently hot for olives, maize, the mulberry, and the vine. The summer rains, too, are more abundant than in Spain, and permit maize to be extensively grown alternately with wheat, which forms a most productive course of crops. Irrigation has received considerable attention in the southern valleys, and the reclamation of the barren wastes of the Crau in Provence, testifies to its fertilizing effects. Much of the soil is poor in the southern provinces, and not suited

to the growth of grain; but such soil admits of the growth of the mulberry, the olive, or the vine. All these crops demand a large amount of labor in their culture, and sustain a dense population. Normandy is celebrated for its pastures. The north-west of France generally is the most fertile tract of land in Europe. In the less advanced districts, fallow, wheat, and oats is the rotation still followed. Clovers and lucerne are largely sown in the chalky districts. In the best cultivated districts in the north, wheat and beet-root or poppy are sown alternately. Beet forms a most important plant in the agriculture of France in the present day, as a large part of the sugar consumed in the country is derived from it. Much of France is divided into small properties, which is more especially the case in the less fertile provinces. This division of property is, so far, a necessity, as no other industrial occupation is open to the people. As soon as manufactures raise the standard of living in the town, it will influence the condition of the rural population, and lead to the enlargement of properties.

In *Austria*, *Hungary*, and the countries on both sides of the Danube, the climate resembles that of the southern half of France. Maize and wheat are the chief products, but the agriculture labors under so many impediments to progress, that it is yet in a backward state. In Southern *Russia*, there are vast tracts of rich land bordering on the rivers flowing into the Black Sea and Sea of Azov, from which Western Europe derives large supplies of wheat and flax-seed, as well as some maize. The northern parts of Russia are less fertile, and as yet the means of transport is defective and limited. Oats, flax, skins, and tallow are the chief products sent to market. Rye forms the common bread-corn of the lower classes. *Prussia*, unless along the shores of the Baltic, has no great proportion of fertile land within her territory: the chief article exported is wheat from the Baltic provinces, which is of fine quality. The potato enters largely into the food of the common people in Prussia, and is also used in the manufacture of ardent spirits. Its agriculture, however, has no peculiarities deserving of special notice in this cursory sketch.

Flanders has long been celebrated for its farming, and its cultivators are generally supposed to have carried improved systems into the eastern counties of England. It is characterized by painstaking management, and, at the same time, liberal application of manure. The general size of the farms would be considered rather small in England, but considerable capitals are invested in stock and implements, and several kinds of crops are raised unknown to British A. A large part of the stock is stabled throughout the year, the grass being cut and carried from the fields. The rearing and the feeding of cattle, as well as the dairy, are often combined on the same farm. Flax is a crop which receives a great deal of careful management. Hemp and beet-root require liberal treatment with respect to manure, and only enter into the rotation where high farming is followed. The crops are so arranged in the rotation, that two cereal crops do not succeed each other. In no country are the fields kept so free from weeds as they are in Flanders, and in none do the agriculturists suffer so little from fluctuations in the prices of grain, owing to the great variety of crops that are raised.

England had made considerable advances in A. so far back as the 16th c. This fact may be gathered from the writings of Fitzherbert, Tusser, and others. At an earlier period, her chief article of export had been wool, which supplied the seats of manufacturing industry in Holland, but now she also exports a large quantity of wheat. The increasing prosperity of the country caused a demand for butcher-meat, which began to rise in price much sooner than it did in Scotland. By the middle of the 17th c., turnips and red clover were introduced as field-crops, and by the end of it, the two were extensively cultivated in many parts, in alternation with corn. In 1750, the four-course shift was not uncommon in many parts of Norfolk. Under this system of *1st*, wheat; *2d*, turnips; *3d*, barley; *4th*, grass, one half of the land was constantly under corn-crops, and the other under cattle-crops. Large numbers of sheep and cattle were fattened on the turnips and clover. In the preparation of the land for turnips, it was well cultivated and weeded, and the consumption of the roots on the land increased the yield of the barley. The four-course shift has formed the basis upon which further improvements have been made in the southern and eastern parts of England. The strong soils of Suffolk and Essex yield good pasture, and about a century ago, they were mostly devoted to dairy-farming. The high price of corn, however, encouraged the conversion of these lands into arable-farms. The course followed was *1st*, wheat; *2d*, fallow; *3d*, barley; *4th*, clover. Instead of the fallow, mangel-wurzel is now largely substituted, which enables the farmers to feed large numbers of bullocks in the yards, without so large an expenditure in the purchase of oil-cake as was at one time thought necessary. In the western counties, where the climate is more suitable for grass, and less so for wheat, dairy and stock-rearing become greater objects of attention. The demand for dairy produce in the neighborhood of the large manufacturing towns of the west, renders the land of much greater value under grass than under corn, more especially where the soil is tenacious. In the more friable soils of the north-western counties of England, the systems of A. resemble somewhat that of Scotland. Instead of the land lying one year under grass, it lies two, followed by oats, then turnips or potatoes, and the wheat-crop is taken after this green crop, and not after the grass. This is the characteristic which distinguishes the arable farming in the western from that in the eastern counties of England. A large portion of the surface of England is under permanent pasture, and the beauty of the meadows is unrivalled in any part of the world. The surface of England is very unequally farmed, for while A. has attained a great degree of perfection in such counties as Suffolk, Norfolk, and Lincoln, it is in a comparatively primitive state in others. Owing to a succession of bad seasons, and American competition combined, agricultural interests have suffered severely in recent years, so that in 1880–81 rents had fallen from 20 to 50 per cent.

In *Ireland*, the want of manufactures has continued to act as a great hindrance to agricultural improvement. The competition that arose among a generally indigent population in taking small farms, led to extravagant rents (illustrated on the application of the Land Act of 1881), the payment of which involved the starvation of the tenants. The faithful pictures, which Arthur Young drew, towards the close of the last century, showed the workings of such a system. The general introduction of the potato, upon which the people chiefly subsisted, enabled rents to be paid by selling the scanty produce of grain, or the pigs that were reared. The failure of the potato-crop in 1846 produced the most heart-rending scenes of misery that have been witnessed in our times. When Young made his tour, it was the common practice, among the small farmers, to take from four to six crops of oats or barley in succession, after which the land was allowed to renovate its powers by the growth of the natural grasses. On the moderate-sized farms, the cultivation was better; but turnips had little place in a course of cropping for nearly a century after they were largely cultivated in Norfolk. The Protestant population in the north of Ireland introduced, at an early period, the culture of flax, which still forms a peculiar feature in the A. of that part of the country. The large amount of manual labor which it requires in its preparation for market, has so far served to preserve the cultivators from descending so low in the scale of social existence as those in the south. As a general rule, it is found that the worst land is most densely peopled; the secondary descriptions are in moderate-sized farms; while the best land has hitherto been devoted to pasture, for which the climate is admirably suited. The winters are so mild in the south, that cattle are often not stabled. In Young's time, the Irish graziers were the only class of agriculturists that were possessed of capital. The exodus which took place after the potato-failure, has relieved the country of a portion of the redundant population, but it is still too dense in many places.

Scotland made comparatively little or no advance in A. for ages previous to the beginning of the 18th c. Donaldson, who published his *Husbandry Anatomized* ten years before the Union, affords a pretty accurate picture of the art as then practised. The farms were small, and divided into outfield and infield land. On the former, which was furthest from the homestead, the rotation consisted of two years in grass, succeeded by two years in oats. On the infield land, barley, oats, and pease were sown in succession, and the whole manure was commonly applied to the barley-crop. The yield of corn was from three to four times the quantity of seed. Pastures were of the poorest description, as no artificial grasses were sown. Little encouragement was held out to rear cattle, for a heifer did not bring more than twenty shillings in the market—scarcely the price of two quarters of barley at that time. At the Union, however, Scotland gained free trade with her wealthier rival, from which flowed the happiest consequences. Every branch of industry shared in the new field opened up, and none more so than A. A large trade soon arose in sending the lean cattle and sheep that were reared on the mountainous wastes, as well as in the low country, to be fattened on the pastures and green crops in the south. A great rise in the prices of stock soon followed, which not only encouraged improved breeds, but enabled cultivators to devote a certain portion of the arable-lands to the growth of artificial grasses and turnips. Neither of these were grown previous to the Union; but in little more than fifty years afterwards, one farmer in Roxburghshire is said to have had 100 acres of turnips in one year. Toward the end of the century, turnips and artificial grasses formed the bases of improved A. in every county. A great rise in the value of land took place. The war-prices in the beginning of the present century gave a further stimulus to the reclamation of land. The improvements, however, were not effected without a great revolution in the state of the rural population. Formerly, the farms were small, and often labored by the members of a single family. A consolidation of farms took place, which necessitated a great change in the social condition of employers and employed, producing often painful contrasts. Of late years, the commercial

prosperity of the country has greatly helped to elevate the rural population, and necessitated improvements in cottage accommodation.

Scottish A. is distinguished for great economy in labor, forming a contrast in this respect to that in the chief corn districts of England. Few farms are to be seen in the richer districts without having a fixed steam-engine for driving the barn and other machinery. Labor-saving machines have also been freely introduced. With soil, climate, and situation, the mode of cropping varies greatly over the country. In the Lothians, the six-course shift is common; namely, 1*st*, wheat; 2*d*, beans or potatoes; 3*d*, wheat; 4*th*, turnips; 5*th*, barley or wheat; 6*th*, grass-seeds. In certain situations, the potato-crop has lately been still more extensively planted, occupying the place of the bean or the turnip. On secondary farms, the five-course rotation becomes more common: 1*st*, wheat, or barley; 2*d*, grass; 3*d*, grass; 4*th*, oats; 5*th*, turnips or potatoes. The larger proportion of the surface of Scotland, however, is devoted to pasture for sheep and cattle. The mountainous tracts are generally unfit for cultivation. Little else has been done in the way of improving them than digging a few surface-drains, and improving the breeds of the stock they feed. Sheep-farms vary in extent from 1000 to 60,000 acres. A few of the best stock-farms may summer and winter a sheep to the acre, but most require three acres. The black-faced are reared upon the most elevated and exposed ground, while the Cheviots thrive on those parts that are less so. No other food is usually given in winter than what is left on the fields in autumn. Cross-breeds between the Cheviot and the Leicester are reared in the lower ranges, where a supply of turnips may be had to give to the ewes while suckling their offspring. When the sheep are to be fattened, they are taken to the arable districts. The opening of steam-navigation, and lately, the system of railways, have been of infinite benefit to Scottish A. in getting a market for fat animals.

In *North America*, the same crops are raised as in corresponding latitudes in Europe. The winters in Canada and the United States are much more severe than those of Western Europe, while the summers are quite as hot, and far more moist, and hence arise considerable variations in the practices of agriculture. In Canada and the northern states, wheat is the staple article of export. Wheat and red clover are often grown as alternate crops. The growth of wheat has enormously extended of late in the western states; and by exports of wheat, dairy produce, and cattle or dead meat, the United States farmers compete with English farmers in English markets. Betwixt latitudes 42° and 39°, wheat is sometimes grown alternately with maize, after the land has been under pasture for some years. Betwixt latitudes 39° and 35°, the climate is better suited for maize than wheat, which becomes less productive. Cotton again, is the staple product from latitude 35° to the shores of the Gulf of Mexico. Rice is the most profitable crop in the southern states; but its culture is chiefly confined to the tidal swamps, which can be flooded by fresh water. The sugar-cane is limited to the rich alluvial lands on the banks of the Mississippi as far north as latitude 31°. Tobacco is a principal crop in Virginia and some other states. The West India Islands, surrounded by the warm waters of the gulf, are free from the cold north winds of the American continent. This circumstance favors the growth of the cane, which is so susceptible of injury from frosts. The rich lands of these islands produce large crops of sugar. Coffee is also grown to a considerable extent on several of the Antilles. On the Pacific coast, the climate is characterized by mild winters and dry summers, so that the agriculture must conform to that of the countries bordering on the Mediterranean. See Perlam's *American Cyclopædia of A.* (1882).

The soil of *South America* appears to be much more fertile than that of North America. In the southern parts, the winters are comparatively mild, when contrasted with those on the same latitudes in the British possessions. The valley of the Rio de la Plata is admirably suited for rearing sheep and cattle, which are found in immense herds in the interior. Brazil is densely wooded, showing the abundance of the rains, and the capabilities of the country for the growth of the sugar-cane. In the north, where the dry seasons are of longer duration, there are immense grassy plains called savannahs, covered with herds of wild cattle. Though no cattle were found on the continent when discovered by Europeans, it has been asserted that more cattle are now running wild in South America than the whole domesticated cattle of Europe.

China possesses a climate having a great similarity to that of the United States, east of the Rocky Mountains. The winters are cold, and the summers moist and hot. Rice forms the great staple crop in the warmer regions of the south, wherever the land can be irrigated. This plant is also cultivated to a limited extent on dry lands, along with millet and maize. The density of the population in China, is an indication of the advanced state of its A. The careful manner in which all the refuse of the towns and villages is husbanded and applied to the land, while weeds are not suffered to grow among the crops, is the true secret of the productive A. of the Chinese.

The condition of A. in China shows what we might expect from enlightened policy in the promotion of that of *India*. The monsoons which prevail over Hindustan during summer cause a great luxuriance of vegetation while they last; but the extreme droughts that precede and follow them parch and wither up the shallower-rooted plants. Over a large part of India, irrigation is required to produce many of the crops with certainty. In the tropical latitudes, rice is the most abundant grain-yielding plant, and forms the chief food of the people. The numerous rivers of Northern India supply the means of irrigation, and the production of food then becomes a matter of comparative certainty. Where the winters are cool, wheat and barley are grown at that season, and rice, maize, millet, &c., in summer, just as we find in the irrigated valleys of the south of Spain. At the present time, the principal drawbacks to the better cultivation of land are the deficiency in the means of transporting the produce, and the tenure by which the land is held. The immense quantities of cotton and flax which are grown and literally lost for want of a market, is a subject that is beginning to attract attention, since our manufacturers are suffering from the scarcity of raw material.

It would be out of place to give an outline of the A. of the other intertropical countries of the world, which have contributed so little to the common civilization of mankind. Where rains are abundant, the ease with which a subsistence can be got from large herbaceous plants, and trees yielding fruit at all seasons of the year, has been justly regarded as inimical to the progress of society. The productiveness of the banana and the bread-fruit tree, considering the small amount of cultivation they require, is calculated to strike natives of colder climates with astonishment. Captain Cook eloquently remarks: 'Whoever has planted the bread-fruit trees, has fulfilled his duty to his own and succeeding generations as completely and amply as an inhabitant of our rude clime who, throughout his whole life, has ploughed during the rigor of winter, reaped in the heat of summer, and not only provided his present household with bread, but painfully saved some money for his children.'

In the southern hemisphere, the extent of sea greatly predominates over the land. The vapors which are raised over so vast an expanse of water flow towards the equator, and are chiefly deposited there in copious rains. They are not diverted by the peninsulas of South America, South Africa, or Australia, as they are by the continents of America and Asia. Comparatively sterile regions are the result. Australia and the Cape of Good Hope are sparingly supplied with rains, so that their soil is not very productive of grain. Cultivation languishes, and the agriculturist devotes his attention to the rearing of cattle and sheep. New Zealand, however, possesses a climate having considerable resemblance to that of England, and is favorable for the production of grass and grain.

Under the heads of Cultivated Plants, Dairy, Domestic Animals, Drainage, Irrigation, Implements, Manures, Soil, Rotation of Crops, Lease, &c., will be more particularly treated the systems and rationale of farm-management pursued in the British Islands. See AGRICULTURE in AM. SUPP.

AGRIGE'NTUM (Gr. *Akragas*), the modern Girgenti, a town on the south coast of Sicily, in lat. 37° 17′ N., and long. 13° 28′ E., founded by a colony from Gela (582 B.C.), and, in the earlier ages, one of the most important places in the island. In its palmy days, it is said to have contained 200,000 inhabitants. After being at first free, and then subject to tyrants, it was demolished by the Carthaginians (405 B.C.); but very soon rose again. In the course of the Punic wars, it was compelled to submit to the Romans. From 825 to 1086 A.D., it was in the possession of the Saracens, from whom it was conquered by Count Roger Guiscard. The modern city contains (1872) 19,603 inhabitants, is the capital of the province of the same name, and exhibits numerous and splendid ruins which afford inexhaustible materials for pictorial representation. Among the best preserved of these remains of antiquity is the Temple of Concord, of which only the roof and part of the front are wanting. The most extensive of the temples was that of Jupiter, 340 feet long, 120 feet high, and 160 feet wide, which, at the time of its destruction, appears not to have been finished. Only the basement and some fragments remain. Considerable ruins of the temples of Juno Lucina, of Hercules, and Æsculapius, are still found. The trade of the modern city is inconsiderable. Some corn, fruit, oil, &c., is exported, but the harbor is little frequented.

A'GRIMONY (*Agrimonia*), a genus of plants of the natural order *Rosaceæ* (q.v.), sub-order *Potentilleæ*. The calyx is five-cleft, without bracts; the hardened tube at length invests two carpels, and is covered with hooked bristles.—The COMMON AGRIMONY (*A. Eupatoria*) is a native of Britain and other parts of Europe, growing in borders of fields, on waysides, &c. It has an upright habit, attains a height of two feet or more, and has interruptedly pinnate leaves, with the leaflets serrate and downy beneath. The flowers are small and yellow, in close racemes. The

whole plant has a pleasant, slightly aromatic smell, and is bitter and styptic. A decoction of it is used as a gargle; the dried leaves form a kind of herb tea; and the root has some celebrity as a vermi-

Common Agrimony (*Agrimonia Eupatoria*).

fuge.—Very similar to this is *A. suaveolens*, a native of Virginia, Carolina, &c. It has a very agreeable fragrance.

AGRI'PPA, Cornelius Henry, a remarkable character of the 16th c., distinguished as writer, philosopher, and physician, who united great ability and extensive acquirements with quackery, was born of a noble family at Cologne, 1486. He led an adventurous and unsettled life, quite in the spirit of his times. As early as 1509, he was appointed teacher of theology at Dôle, in Franche Comté, and attracted great attention by his lectures; but having by his bitter satires on the monks drawn upon himself the hatred of that body, he was accused of heresy, and obliged to leave Dôle. He next taught theology for some time in Cologne, occupying himself at the same time with alchemy, and then went to Italy, where he took military service under Maximilian I., and was knighted. He was afterwards made Doctor of Laws and of Medicine, and gave lectures at Pavia, until, burdened with debt, he fled to Casale. After a time, he was appointed Syndic of Metz; but in 1520, he was again in Cologne, having excited the hostility of the inquisition and of the monks by his defense of a witch. His old enemies, the monks, persecuted him still in Cologne so that he went to Freiburg in Switzerland, where he began to practise as a physician. In 1524, he went again to Metz, and there he gained such a reputation that the mother of Francis I. chose him as her physician. As he declined to prophesy the issue of the campaign that Francis I. undertook in 1525 in Italy, he lost his post, and went to Holland. Here he wrote his celebrated book, *De Incertitudine et Vanitate Scientiarum* (Colog. 1527), a biting satire on the sciences as they then existed. An accusation against him having been brought before Charles V., on account of this book, he again became a fugitive, and repaired to Lyon. He there found the hatred he had early excited in France not yet extinguished, and was imprisoned; but being liberated, through the exertions of his friends, he retired to Grenoble, where he died (1535). A. was a clear-headed man, and had the merit of successfully combating many of the prejudices of his age. His book, *De Occulta Philosophia*, containing a systematic account of the Cabbala (q. v.), directly contradicts the above work. A complete collection of his writings appeared at Lyon, 2 vols. without date (about 1550). See Life of A., and analysis of his works, by H. Morley (1856).

AGRIPPA, Herod, I., son of Aristobulus and Berenice, and grandson of Herod the Great, was educated at Rome. He lived there in a very extravagant style, giving splendid entertainments, especially to the princes of his imperial family, and scattering his money lavishly in gifts to the freedmen of the emperor, until his debts rendered it unsafe for him to remain longer in the city. He then took refuge in Idumea. From this period almost to the death of Tiberius, he suffered a variety of misfortunes, but having formed a friendship with Caligula, the latter on his accession to the throne, gave him the tetrarchies of Abilene, Batanæa, Trachonitis, and Auranitis. After the banishment of Herod Antipas, he received his tetrarchy also—namely, Galilee and Perea. Claudius, whom A. helped to secure the possession of the empire, added to his dominions Judæa and Samaria, and he was thus the ruler of a more extensive territory than even Herod the Great had been. His government was mild towards the Jews, with whom he was remarkably popular; but he severely persecuted the Christians. He caused James, the brother of John, and the head of the Church at Jerusalem, to be beheaded, and Peter to be thrown into prison. He died of a peculiarly loathsome disease at Cæsarea, in Palestine, while celebrating games in honor of the emperor, in the 55th year of his age, and the 44th of the Christian era. The account given of this in the Acts of the Apostles, substantially agrees with that of Josephus.

AGRIPPA, Herod, II., son of Agrippa I., was at Rome when his father died, and only 17 years of age. Claudius, therefore, resolved to detain him for some time, and in the meanwhile retransformed the kingdom into a Roman province, but presented him with the little territory of Chalcis when his uncle Herod, who was its ruler, died. In 53 A.D., he left Rome, and received from the emperor nearly the whole of his paternal possessions, which were subsequently enlarged by Nero. Like his father, A. was fond of fine buildings, a taste which he probably acquired by his long sojourn at Rome. He spent great sums in adorning Jerusalem, Berytus, and other cities; but he was not prudent in the distribution of his favors, or just in his treatment of the high-priests, so that he failed to secure the good-will of the Jews. He did all in his power, however, to dissuade them from rebelling against the Romans; but when he found his advices and warnings neglected, he abandoned his countrymen, and joined the imperial troops. When Jerusalem was taken, he went with his sister to live at Rome, where he was made prætor, and where he died in the 70th year of his age—the last of the Herods. It was before him Paul made his memorable defense.

AGRIPPA, Marcus Vipsanius (63—12 B.C.), a Roman, who, though not of high birth, rose to an exalted position through his own talents. He first espoused Marcella, the niece, and then Julia, the daughter of Octavius. He was eminent both in war and in peace; and as a general, counsellor, and friend of the emperor, did good service to him and to the Roman state. As a general, he laid the foundation for the sole dominion of Octavius, and commanded his fleet in the battle of Actium (31 B.C.). He was generous, upright, and a friend to the arts; Rome owed to him the restoration and construction of several aqueducts, and of the Pantheon, besides other public works of ornament and utility.

AGRIPPI'NA.—I. The daughter of M. Vipsanius Agrippa, by his wife Julia, was one of the most heroic and virtuous women of antiquity. She was married to Cæsar Germanicus (see Germanicus), whom she accompanied in all his campaigns. She openly accused Tiberius before the senate of having hired the murderers of her husband; and the tyrant, who hated her for her virtue, and the esteem in which she was held by the people, banished her to the island of Pandataria, near Naples, where she voluntarily died of hunger (33 A.D.). The antiquarian museum at Dresden possesses four excellent busts of her.—II. A very different character was Agrippina, the daughter of the last mentioned, one of the most detestable women that have lived. In her second widowhood, she induced the Emperor Claudius, her own uncle, to marry her, and espoused his daughter, though already betrothed to another, to her son Nero. In order to bring the latter to the throne, she ruined many rich and noble Romans, excluded Britannicus, the son of Claudius by Messalina, and finally poisoned the emperor, her husband. She then endeavored to govern the empire through her son Nero, who was chosen emperor; but her ascendency proving intolerable, Nero caused her to be put to death (60 A.D.). She enlarged and adorned her native city, Cologne, which received from her the name of Colonia Agrippina.

AGTELEK, Cavern of (in Hungarian, *Baradla*, i. e., a suffocating place,) one of the largest and most remarkable stalactitic caverns of Europe, is situated near the village of Agtelek, in the county of Gomor, not far from the road from Pesth to Kaschau. It opens at the foot of a mountain with an entrance scarcely 3½ feet high by 5 feet wide. It consists of a labyrinth of caverns communicating with one another, many of which it is difficult, and even dangerous, to explore, when the streams that flow through them are high. Numerous stalactitic structures occur in all the caverns, which, from their singular shapes, have given rise to the various names of 'the Great Church,' 'the Mosaic Altar,' 'the Image of the Virgin,' &c. The largest and most imposing of those caverns, situated about 200 paces from the entrance, is called the *Flower-Garden*. It is 96 feet high, 90 feet wide, and runs nearly 900 feet in a straight line.

AGUADO, Alexander Maria, Marquis de Las Marismas del Guadalquiver, one of the wealthiest bankers of modern times, was born at Seville, 1784, and died 14th April 1842. He was descended from a Jewish family, and in his youth bore arms as a soldier. During the Spanish war of independence, he fought with distinction on the side of Joseph, rose in the French army to the rank of colonel, and acted as aide-de-camp to Marshal Soult, but retired in 1815, and began a commission business at Paris. In this he soon realized such wealth as enabled him to found a bank. Good-fortune, energy, and boldness, with a singular talent for concerting schemes, advanced him in a short time to be one of the first bankers in Paris. He also obtained a political reputation by negotiating the Spanish loans of 1823, 1828, 1830, and 1831. In these operations, the Spanish government frequently invested him with unlimited powers, which he dexterously employed to save his country from national bankruptcy. Ferdinand VII. conferred on

him the title of Marquis de Las Marismas del Gaudalquiver. His services were also recompensed by privileges in mining and in executing public undertakings. All the Spanish bonds issuing from his house received the name of *Aguados*. It was through A. that the Greek loan of 1834 was effected. He was naturalized in France in 1828, and at his death left a fortune of above 60 million francs, of which he had invested part in landed property; the castle of Château-Margaux, celebrated for its wine, belonged to him. His distinguished collection of pictures gave occasion to Gavard for the publication of the *Galerie A.* (Paris, 1837—1842).

A'GUAS CALIE'NTES, a well-built town in Mexico, in the province of Zacateeas. It is situated in N. lat. 21° 53′, and W. long. 101° 45′, in a plain 6000 feet above the sea-level, and on a stream of the same name, which is tributary to the Rio Grande de Santiago. It contains a population of 30,000; and besides the cultivation of fields and gardens, the manufacture of woollen cloth is very considerable, and is carried on on the factory system. The town is favorably situated for trade, as the great road from Mexico to Sonora and Durango is here crossed by that from San Louis Potosi to Guadalaxara. The environs abound in hot springs, from which the town takes its name.

A'GUE (*Febris intermittens*) is the common name for an intermitting fever, accompanied by paroxysms or fits. Each fit is composed of three stages; the cold, the hot, and the sweating stage. Before a fit, the patient has a sensation of debility and distress about the epigastrium; feels weak and disinclined for exertion; the surface of his body becomes cold, and the bloodless skin shrivels up into the condition termed goose-skin (*cutis anserina*). A cold sensation creeps up the back, and spreads over the body; the patient shivers, his teeth chatter, his knees knock together; his face, lips, ears, and nails turn blue; he has pains in his head, back, and loins. This condition is succeeded by flushes of heat, the coldness gives place to warmth, and the surface regains its natural appearance. The warmth continues to increase, the face becomes red and turgid, the head aches, the breathing is deep and oppressed, the pulse full and strong. The third stage now comes on; the skin becomes soft and moist, the pulse resumes its natural force and frequency, and a copious sweat breaks from the whole body.

These paroxysms recur at regular intervals. The interval between them is called 'an intermission.' When they occur every day, the patient has *quotidian* A.; every second day, *tertian;* and when they are absent for two days, *quartan*. All ages are liable to this disease; and a case is on record of a pregnant woman having a tertian A. which attacked her of course every other day; but on the alternate days, when she was well, she felt that the child also had A., although the paroxysms did not coincide with her own.

The exciting causes of this disease are invisible effluvia from the surface of the earth (marsh miasmata). A certain degree of temperature seems necessary—higher than 60° Fahrenheit—for the production of the poison. It does not exist within the Arctic Circle, nor does it appear in the cold seasons of temperate climates, and seldom beyond the 56° of N. lat. (Watson). It also requires moisture. In England, A. is almost exclusively confined to the eastern coast; and the extension of drainage has rendered agues far more rare than before. James I. and Oliver Cromwell died of A. contracted in London. The Pontine Marshes to the S. of Rome have long been notorious as a source of aguish fevers. Peat bog, or moss, is not productive of malaria, as is seen in parts of Ireland and Scotland. Neither is A. ever seen among the inhabitants of the Dismal Swamp—a moist tract of 150,000 acres on the frontiers of Virginia and North Carolina in North America.—The treatment of aguish fever consists generally in calomel given in purgative doses, followed by preparations of cinchona-bark, and in applying, during the paroxysm, external warmth to the body.

AGUE'SSEAU, Henri François d', a distinguished lawyer and Chancellor of France, and pronounced by Voltaire to have been the most learned magistrate that France ever possessed, was born at Limoge, 1668 A.D. He received his earliest education from his father; and afterwards devoted himself to the study of law, became *avocat-général* at Paris in 1690, and at the age of thirty-two, *procureur-général* of the parliament. In this office, he effected many improvements in the laws and in the administration of justice. He displayed great benevolence during a famine which occurred in the winter of 1709, applying all the means in his power for the alleviation of the calamity. As a steady defender of the rights of the people, and of the Gallican Church, he successfully opposed the decrees of Louis XIV. and the Chancellor Voisin in favor of the papal bull Unigenitus (q. v.). During the government of the Duke of Orleans, he became chancellor; but in the following year fell into disgrace by opposing Law's system of finance, and retired to his country-seat at Fresnes. When, however, the ruin induced by Law's system produced a general outcry of dissatisfaction, A. was reinstated, in order to appease the people. But his well-meant effort could not retrieve the desperate state of affairs. A. was afterwards exiled a second time, in consequence of his opposing Cardinal Dubois; and though he (in 1727) obtained from Cardinal Fleury permission to return, yet he did not again resume the office of chancellor till 1737. He resigned in 1750, and died, Feb. 9, 1751. His works, consisting of pleadings and speeches at the openings of parliament, occupy thirteen volumes (Paris, 1759—1789; Paris, 1819).

AGUILA'R DE LA FRONTE'RA, a town of Andalusia, Spain, in the Province of Cordova, occupying the summit and slopes of several low hills on the left bank of the Cabra, 26 miles south-south-east from Cordova. Many of the houses are of three stories, and the town is remarkable for the whiteness of its houses and the cleanness of its streets. It has three fine squares, and a dismantled Moorish castle. The chief trade is in corn and wine. Many of the inhabitants are employed in agriculture, and in the breeding of oxen, horses and mules. Pop. 12,000.

AGU'LHAS, CAPE, (meaning Needles), the most southern point of Africa, lies about 100 miles E. S. E. of the Cape of Good Hope, in lat. 34° 51′ S., long. 19° 55′ E. In 1849, a light-house was erected on it, at an elevation of 52 feet above high-water. The A. Bank extends along the whole southern coast of Africa. It is 560 miles in length, and opposite the Cape of Good Hope, as many as 200 in breadth.

AGU'R, a town of India, in the territory of Gwalior, the possessions of Scindia's family, on the route from Oojein to Kota, 41 miles north-east from Kota. It stands in an open plain, 1598 feet above the sea, is surrounded by a rampart of stone, and has on one side of it a large and fine tank. Pop. about 30,000.

A'HAB, the son and successor of Omri, was king of Israel from 918 to 897 B.C. He married Jezebel, the daughter of Ethbaal, king of Sidon; through whose injurious influence the Phœnician worship of Baal was introduced, the king himself seduced to idolatry, and the priests and prophets of Jehovah cruelly persecuted. Yet the prophets retained their influence over the people; and Elijah dared openly to attack the priests of Baal, and reprove the wickedness of the king with the most severe threatenings of punishment. A. prosecuted three wars, with various success, against Benhadad, king of Syria; but in the last campaign he was killed by an arrow. His whole family was afterwards extirpated under King Jehu.

AHASUE'RUS is the name, or rather, perhaps, the title, by which several kings of Media and Persia are mentioned in Scripture. The best known of these is Esther's husband (see ESTHER), who is probably the same as the Persian king Xerxes; the Hebrew form of his name (Achaschverosch) pointing to the old Persian form of the name Xerxes (Khschyârschan).

A-HULL, a maritime term, used to denote the position of a ship when all her sails are furled, and her helm lashed on the lee-side; in such a position she lies nearly with her side to the wind, but with the head turned a little towards the direction of the wind.

It may be convenient to mention in this place that the phraseology adopted by British naval officers and seamen, whether belonging to the royal navy or to the mercantile marine, comprises a large number of words formed on a principal similar to that of *ahead*, with the vowel *a* (a corruption of the Anglo-Saxon preposition *on*, meaning *on, in, at*) prefixed to a noun. Such are the following: *Aback, abaft, aboard, abreast, a-cockbill, adrift, afloat, afore, aground, ahead, a-hull, a-lee, aloft, aloof, amain, amidships, an-end, apeak, ashore, astern, atrip, avast, a-weather, a-weigh*. Such of these terms as seem to require it, will be found briefly explained under their proper headings.

AHMEDNU'GGUR, or EDUR, a Rajpoot state of Guzerat, in the Mahi Kanta agency, politically connected with the presidency of Bombay. It is under the rule of the Rajah of Edur, subject to British sovereignty. The population is estimated (1872) at 217,000.—The principal town is Ahmednuggur, on the banks of the Hant Mati, a branch of the Sabarmati, in an extensive plain, 92 miles north-north-west from Baroda. It is surrounded by a fine old stone wall. Pop. 9000.

AHMEDPU'R, a town of India, in the native state of Bhawulpur, and 25 miles south-west from Bhawulpur. The houses are mostly built of mud; but there is a large and lofty mosque, with four tall minârets. There are manufactures of matchlocks, gunpowder, cotton, and silk. The pop. has been estimated at 30,000, but other estimates make it much less.

AHMEDABA'D, or more properly AHMADABAD, the chief town in the district of the same name, in the Presidency of Bombay, is situated on the left bank of the Sabermutty, which flows nearly due south into the Gulf of Cambay. It was built in the year 1412, by Ahmed or Ahmad Shah, and underwent all the vicissitudes of government incident to the cities of Hindustan, till the year 1818, when it finally came under the power of the British. It was formerly one of the largest and most magnificent capitals in the East,—in the opinion of a native writer, 'the hand-

somest city in Hindustan; perhaps in the world.' Its architectural relics are gorgeous, even in the midst of decay. The Jumna or Juma'ah Masjid, or Great Mosque, rises from the center of the city, and is adorned by two superbly decorated minarets 'each of which contains a circular flight of steps, leading to a gallery near the summit. Its domes are supported by lofty columns, regularly disposed; the concave of these cupolas is richly ornamented with mosaic and fret-work. The pavement is of the finest marble.' The mosque of Sujaat Khan is extremely elegant. There is likewise an ivory mosque, which has obtained that name from the circumstance, that although built of white marble, it is 'curiously lined with ivory, and inlaid with a profusion of gems, to imitate natural flowers, bordered by a silver foliage on mother-of-pearl.' There are also the Fire Temple and the Tower of Silence of the Parsis. A. once abounded in gardens, aqueducts, reservoirs, &c.; but these, especially the gardens, are now sadly defaced and injured. Its prosperity has been almost wholly destroyed by the rapacity of the Mahrattas, although at one time it was famous for its manufacture of rich fabrics of silk and cotton, articles of gold, silver, steel, and enamel. 'It employed many artists in portrait-painting and miniatures,' and had extensive trade in indigo, cotton, and opium. The old city-walls, built in 1485, which had in the course of ages, and through the assaults of enemies, become, very dilapidated, were repaired in 1834 at an expense of 250,000 rupees. Water was also conveyed from the river through the city by means of pipes. It is distant from Bombay 290 miles north; in lat. 23° N., long. 72° 36′. Pop. (1872) 116,873.

AHMEDNU'GGUR, or AHMADNUGGUR, an important town in the Presidency of Bombay. It was founded in 1494 by Ahmad Nizam Shah. During the reign of his son, Boorhan Nizam Shah, it reached a high degree of prosperity; but after his death, it witnessed an incessant series of wars, confusions, and murders. In 1797, it fell into the hands of the Mahrattas; and in 1803 was surrendered, after a trivial resistance of two days, to General Wellesley. It was, however, shortly after restored to the Peishwa; but in 1817, the fort was again occupied by the British. The town has increased rapidly since it came under British protection and rule. It possesses a most singular defense, in addition to its wall, this consists of an 'immense prickly-pear hedge about 20 feet high, which is so full of sap that no fire will kindle it, and so vigorous that it is almost impossible to force one's way through it.' A. contains an English church and a *dhurmsalah* (or place of entertainment for travelers) capable of holding 250 persons. It also possesses a good supply of water by means of aqueducts. It is distant from Bombay 122 miles east, in lat. 19° 6′, long. 74° 46′. There are several places of the same name in Hindustan. Pop. (1872) 32,841.

A'HRIMAN (in the Zend, *añhro mainyus*, i. e., the malignant, destroying spirit) is, according to the dualistic doctrine of Zoroaster, the personification of malignity, the original source of all moral and physical evil, the chief of the devils and malignant spirits, the king of darkness and of death, and consequently the eternal enemy and opponent of Ormuzd and of his kingdom of light. See ZOROASTER.

AIDAN, SAINT, one of those distinguished monks of the early Scoto-Irish Church, who were received into the calendar of saints by a sort of acclamation, and without the ceremony of canonization. His period is the middle of the 7th century. He was the first efficient missionary who propagated Christianity in the north of England. Oswald, the celebrated king of Northumbria, requested the community of Iona to send to his court one of their brethren who would teach the Christian religion to his people. As the history has come down to us, the first person sent was a certain Cormac, who was too dogmatic and intolerant to be a successful missionary. On his returning after a failure, A., who possessed the patience, geniality, and popular manners fitted for the task was successful. He left a great reputation, and, as the earliest promulgator of Christianity in the northern districts, is generally counted the first in the lists of the bishops of Durham.

AI'DE-DE-CAMP, an officer who may be regarded as a kind of superior confidential attendant upon a general in active service. The A. is the organ of the general. He carries all orders on the field of battle; these he is to deliver in the plainest terms, so as to be distinctly understood; and when so understood, the orders are to be as implicitly obeyed as if the general himself were present and speaking. As an example of the importance of this matter, may be adduced the brilliant but disastrous light-cavalry charge at Balaklava in the autumn of 1854. Lord Raglan sent a message, partly verbal and partly written, to the Earl of Lucan, concerning a certain particular piece of strategy at a certain time and place; the message was misconceived, and the Earl of Cardigan was directed to make a military movement, perfectly hopeless in its character, resulting in a very serious cavalry loss; although the incident presented a fine display of heroism united with discipline. An A. also acts as secretary to the general; and assists him in his correspondence, when he has not specifically a military secretary. He aids likewise in dispensing the courtesies of the general's house or tent. Generals are much accustomed to appoint their sons or other relations to this confidential post. The Aides-de-camp vary from one to four in number, according as the commander is a brigadier-general, major-general, lieutenant-general, general, or field-marshal: each receives 9*s*. 6*d*. a day besides regimental pay. Before an officer can be appointed as A., he must have been two years with his regiment, and must pass an examination. Aides-de-camp are not removed from the list of their regiments; and, most commonly, are captains. Besides these Aides-de-camp to generals, the Queen has the power to appoint any number of Aides-de-camp to herself, in her capacity of nominal head of the army. There are no particular duties attached to the office; but it is much sought after, both as an honor, and as conferring on the holder the rank of colonel in the army. There are 6 who receive daily pay as Aides-de-camp, and who take it in turn to attend the Queen on state occasions. In the year 1880, there were no fewer than thirty-six military Aides-de-camp to the Queen, of whom a certain proportion were peers of the realm; but of the thirty-six, only about one-half belonged to the army, the rest being militia officers, whose appointments are purely honorary. In addition to all the above, their are naval Aides-de-camp to the Queen, about twelve in number.

AIDE-TOI ET LE CIEL T'AIDERA (Help yourself, and Heaven will help you). This moral aphorism was the cry of certain French political writers to the middle classes, about the year 1824, and became the watch-word and title of a society, having for its object to agitate the electoral body in opposition to the government. This, however, was to be done by means strictly legitimate, and chiefly by correspondence and political publications. Most of its founders and active members belonged to the party of *Doctrinaires* (q. v.), as Guizot, who was president for some time, Duchatel, Duvergier de Hauranne, Dubois, Remusat, Thiers, Cavaignac, &c. *Le Globe* newspaper was the organ of the association, and afterwards *Le National*. It had a great share in bringing about the revolution of July 1830, and was at first countenanced by the new government; but after a short time it was dissolved (1832).

AIDI'N, or GUZEL-HISSAR, a town of Asiatic Turkey, on the river Meander, in the pachalic of Anatolia, built out of the ruins of the ancient Tralles, which was situated on a plateau above the present town. It lies sixty miles south-east of Smyrna, contains 6000 houses, and a population estimated at from 35,000 to 60,000 inhabitants, is four miles in circuit, and carries on a trade next in importance to that of Smyrna. It is adorned, like all eastern cities, with numerous mosques and other religious edifices, and has a picturesque appearance.

AIDO'NÉ, a town of Sicily, in the province of Caltanisetta, 20 miles east-by-south from Caltanisetta. It crowns the summit of a lofty height, commanding a view of the great plain of Catania. It was one of the settlements of the Lombards, who accompanied Roger the Norman in his conquest of Sicily. The road which leads to the town is very rugged, bordered by luxuriant prickly pears. Pop. 5920.

AIDS. These were originally mere benevolences granted by a tenant to his lord, in times of distress; but gradually they came to be regarded as matters of right, and not of discretion. There were three principal objects for which A. were demanded: 1*st*, To ransom the person of the lord when taken prisoner; 2*d*, To make his eldest son a knight; and 3*d*, To provide a suitable portion to his eldest daughter on her marriage. These A. were abolished by 12 Car. II. c. 24.

AID OF THE KING is where the king's tenants pray *A. of the K.* on account of rent demanded of them by others. In such cases, the proceedings are stopped till the king's or queen's counsel are heard to say what they think fit for avoiding the king's prejudice.

AI'GRETTE, a French word, used to denote the down or plume (botanically, *pappus*) which is found attached to many vegetable seeds, as the thistle and dandelion. It is also used in reference to the feathery tuft on the heads of several birds, as the heron; and in English zoology the name aigret or egret (q. v.) is applied to the lesser white heron, an elegant bird, with a white body and a feathery crest. Hence the term A. came to be used to designate the long, delicate, white feathers which, being stuck upright in a lady's head-dress, are calculated to give a majestic appearance to the person. More recently, the usage has been still further extended, and any head-dress bearing an analogy to a plume, even a bouquet of flowers, fastened with precious stones, is denominated an A.

AIGUES-MORTES (*Aquæ Mortuæ*), a small town in France—pop. (1876) 3167—in the department of Gard, which claims to have been founded by the Roman Marius. It is situated in an extensive marsh, impregnated with sea-salt, and is about three miles from the Mediterranean, with which it is connected by a canal. It was from A. M. that St. Louis sailed in 1248, and again in 1270,

for the Crusades—a proof that the sea then reached this spot. In 1538, Francis I. had an interview at A. M. with Charles V.

AIGUI'LLE (Fr. a needle), an instrument often used by military engineers, to pierce a rock for the reception of gunpowder, when any blasting or blowing-up is to be effected.

AIGUILLE'TTE, a part of the decorations of military dress. It was formerly worn on the right shoulder by general officers of various grades; but is now chiefly confined to officers of the Life-Guards and Horse-Guards. It is merely an ornament, composed of gold or silver cords and loops.

AI'GULET, a rope called a lashing-rope, employed on ships-of-war for securing the breeching of a gun.

AILANTO (*Ailanthus glandulosa*), a lofty and beautiful tree, of the natural order *Xanthoxylaceæ* (see XANTHOXYLON), a native of China, but now frequently planted to shade the public walks in the south of Europe, and not uncommon in England. The styles are combined at the base, the fruit consists of 3–5 *samaræ* (or winged *achenia*, q.v.). The leaves are large and pinnate, with an odd leaflet, resembling those of the ash. The tree grows better than almost any other on chalky soils, and is hardy enough to endure the climate even of the north of Scotland. It is easily propagated by suckers and cuttings of the roots. The wood is fine-grained, satiny, and suited for cabinet-making.

AILE'TTES (Fr. little wings) were appendages to the armor worn by the knights in the 13th c. They were sometimes made of leather, covered with a kind of cloth called *carda*, and fastened with silk laces. The form was sometimes circular, sometimes pentagonal, cruciform, or lozenge shaped, but more usually square. Sometimes they were not larger than the palm of the hand; in other instances, as large as a shield. In most instances, the A. were worn behind or at the side of the shoulders. Whether the purpose of these appendages was as a defense to the shoulders in war; as an ensign or mark, to indicate to the followers of the knight his place in the field; or as armorial bearings, is not now clearly known; but the first supposition is the most probable. A. are figured on many effigies, monumental brasses, and stained windows, in our cathedrals and old churches.

AI'LSA CRAIG, a remarkable islet about 10 miles from the southern coast of Ayrshire, opposite Girvan, lat. 55° 15 12″ N.; long. 5° 7′ W. Rising abruptly out of the sea to a height of 1114 feet, it forms a most striking object, even at a considerable distance. It is about two miles in circumference, and is accessible only at one point, where the accumulation of débris has formed a rough beach. The rock may be described generally as a mass of trap, assuming in some places a distinct columnar form, with dimensions far exceeding those of the basaltic pillars of Staffa. On the north-west, perpendicular cliffs rise to a height of from 200 to 300 feet; on the other sides, the Craig descends to the sea with a steep slope, covered with grass and wild-flowers, with numerous scattered fragments of rock. The only inhabitants are goats, rabbits, and wild-fowl. Solan geese, in particular, breed in the cliffs in countless numbers. About 200 feet from the summit are some springs, and on the ledge of a crag on the eastern front, are the remains of an ancient stronghold. In 1831, the late Earl of Cassillis, the proprietor of A. C., was raised to the dignity of Marquis of Ailsa.

AIN, a river in France, rises in the mountains of the Jura, flows through the departments of Jura and Ain, and after a course of about 100 miles, falls into the Rhone, 18 miles above Lyon.

AIN, a frontier department of France, is bounded on the N. by the departments of Jura and Saône-et-Loire, on the E. it is separated from Switzerland and Savoy by the Rhone, which also divides it from Isère on the S., while on the W. the Saône separates it from the departments of the Rhone and Saône-et-Loire. The eastern part is mountainous; but the southern portion of that part which lies to the west of the Ain, forms an argillaceous plateau, abounding with marshes, which occasion epidemic fevers. This dep. contains five arrondissements—Bourg, Belley, Gex, Nantua, Trévoux—or 35 cantons. Area, 2230 sq. m. Pop. (1881) 361,279. Chief town, Bourg.

AINMÜLLER, MAX. EMAN., to whom we owe the restoration of the art of painting on glass, was born at Munich, 1807. He began the study of architecture, but afterwards entered the royal porcelain manufactory as decorator; and it was here that he first succeeded in overcoming the technical difficulties in the execution of glass painting. A separate institution was now established for the art; and A., as inspector, succeeded in raising it to a high degree of perfection. He is said to have first conceived the happy thought of laying colored glass on colored, instead of the process hitherto followed, of laying colored glass on white; thus giving the command of above 100 variously colored glasses, in all gradations of tint. He was also the first, in conjunction with Wehrstorfer, to execute pictures on glass, and thus revive the art of miniature glass-painting. Nor was it only technical improvements and inventions that he contributed to the new art; his artistic culture qualified him powerfully to aid the regeneration of taste that has accompanied it. The first work of the new institution was the restoration of the windows of the cathedral of Ratisbon (1826—1833), to which A. contributed the ornamentation, and painted several of the figures. He made a like contribution to the splendid windows of the church of Maria-Hilf (1833—1838), in Munich. In the contribution of King Ludwig of Bavaria to the cathedral of Cologne, and the numerous other windows executed at Munich for all parts of the world—England among the rest—A. displayed the highest artistic faculty. One of his most important and successful undertakings was providing the fine windows of the Glasgow Cathedral as recently restored, including more than 100 biblical and historical pictures. A. also acquired a reputation as an architectural painter in oil. He died December 1870.

AINOS, a race inhabiting Yesso (q. v.) and Sakhalin. See also JAPAN.

AI'NSWORTH, ROBERT, the author of a once extensively used Latin Dictionary, was born at Woodvale, near Manchester, in 1660. He was educated at Bolton, and taught a school there for some time, but afterwards went to London, where he was engaged for many years in educational pursuits. In 1714, he commenced his Dictionary (Latin-English and English-Latin), which, however, was not published until 1736. A. died near London on the 4th of April 1743. He wrote also some Latin poems, and a few treatises on various subjects; but nothing keeps his memory alive except the Dictionary, which itself is now fast passing away into oblivion. The labor expended on such a production was indeed highly honorable to the author, but the work has no claim to the character of an accurate or philosophical lexicon, and, in spite of the numerous emendations it has received, it remains essentially what it was at first. It has been superseded by Riddell's, and more recently by Smith's, Andrews's, and Other Lexicons.

AINSWORTH, WILLIAM FRANCIS, an English physician, geologist, and traveler, a relation of the foregoing, was born at Exeter, 1807. He studied medicine at Edinburgh, and, after receiving (1827) his medical diploma, he traveled in France, and prosecuted geological investigations in the Auvergne and Pyrenean mountains. Returning to Edinburgh in 1828, he conducted the publication of the *Journal of Natural and Geographical Science*, and delivered lectures on geology. In 1835, he was attached as physician and geologist to the Euphrates expedition under Colonel Chesney, at the recommendation of Colonel Sabine, and returned home in 1837 through Kurdistan, the Taurus, and Asia Minor. In the following year, he went again to Asia Minor, being sent with Rassam and Russell by the Geographical Society, and the Society for the Diffusion of Christian Knowledge. The objects were chiefly to explore the course of the Halys, and to visit the Christians in Kurdistan. On his return (1841) he published *Researches in Assyria*, &c. He has published also *The Claims of the Christian Aborigines in the East* and *Travels in the Track of the* 10,000. He has edited *Lares and Penates, or Cilicia and its Governors; On an Indo-European Telegraph by the Valley of the Tigris*, a project which the Turkish government has since carried out; *All Round the World; The Illustrated Universal Gazetteer*, &c. He is a member of many foreign learned societies, and was one of the founders of the West London Hospital.

AINSWORTH, WILLIAM HARRISON, a well-known writer of fiction, was born Feb. 1805, at Manchester, where his father was a solicitor. His creative fancy began early to show itself in ballads and tales, which appeared in the local newspapers, and in contributions to the *London Magazine* and other periodicals. Being destined to succeed his father, he entered a writer's office; but after a while he forsook law for literature, and at first began a publishing business in London, which, however, he soon gave up in disappointment. He had previously published his first novel, *Sir John Chiverton* (1825). After spending some time on the continent, he returned to England, and wrote *Rookwood* (1834), which was favorably received. It was followed by *Chrichton* (1837) and *Jack Sheppard* (1839). A. edited for a time *Bentley's Miscellany*, and in 1842 began his own *Ainsworth's Magazine*. He published the *Lancashire Witches* in 1848; six years later, appeared the *Star Chamber;* in 1860, *Ovingdean Grange;* the *Lord Mayor of London* was published 1862, *Cardinal Pole* the following year, and *John Law, the Projector*, in 1864. More recent are the *Spanish Match*, the *Constable de Bourbon*, *Old Court*, *Middleton Pomphret*, *Merrie England*, *The Leaguer of Lathom* (1876), *Stanley Brereton* (1881). The 'Lancashire Novelist' was honored with a banquet in his native city in 1881. He died January 2, 1882.

AÏR, or ASBEN, a kingdom in the north of the Soudan. Agades (q. v.) is the capital, and residence of the sultan, but his power is in a large measure merely nominal. The country is principally inhabited by three large tribes—the Kel-owi, the Kel-geres, and Itisan, each of which has numerous subdivisions. There are, besides the Kel-n-Negarru, the Imghad, &c. The word *kel* means 'people,' but specially denotes *settled* people, in opposition to *nomads*. Thus, Kel-owi is people settled in the valley

of Owi. Many of the tribes and families live not in fixed dwellings, but movable tents made of mats. The valleys of A. are naturally rich, but they are poorly cultivated. Food and clothing are both imported. The population, which is very considerable, could not be sustained, were it not for the salt-trade of Bilma, a town lying to the east of A., in the Tebu country. Although the valleys of A. are in the region of the tropics, the climate is comparatively temperate. See Barth's *Travels in Central Africa*, vol. i.

AIN-TA'B, a town of Syria, near the source of the Kowek, an affluent of the Euphrates, 59 miles north-north-east from Aleppo. It is tolerably well built: the houses are mostly of stone. It is well supplied with water, pure streams of which flow constantly through the streets. It has a castle built upon a mound, resting on rock, and of very striking appearance. The chief trade is in hides and leather; but cotton, sheep's and goat's wool, wax, wheat, and rice, are also of commercial importance, being chief articles of produce in the surrounding district. A. is supposed by some to be the ancient *Antiochia ad Taurum*. Pop. 20,000, composed of Turks, Greeks, and Armenians.

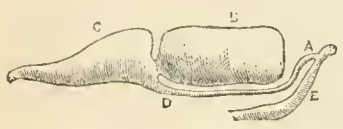
AIR is the name given to that compound of gases constituting the substance of our atmosphere. Formerly, all aëriform fluids were called 'airs,' but in this sense the word *gas* is now used. The chief properties of air, and the phenomena they give rise to, will be found treated under Atmosphere, Aërodynamics, Aërostatics, Air-pump, Barometer, Balloon, &c.

AIR, in Music. See AIRIA.

AIR-BEDS and AIR-CUSHIONS. Air-beds were known as early as the beginning of the 18th c., but being made of leather, were expensive. It was only after the invention of air-tight or Macintosh cloth that it became possible to use air in this way at a moderate cost. An air-bed consists of a sack in the form of a mattress, divided into a number of compartments, each air-tight; a projection at one end forms a bolster. Each compartment has a valve, through which the air is blown in by a bellows. The advantages of such beds, in point of cleanness, coolness, lightness, and elasticity are obvious. They are specially valuable in many cases of sickness. The *traveling-cushion* is another contrivance of the same kind. Recently, vulcanized India-rubber, instead of cloth, has been used in the fabrication of such articles. The chief drawback to these contrivances is the liability to being spoiled by a rent or other injury.

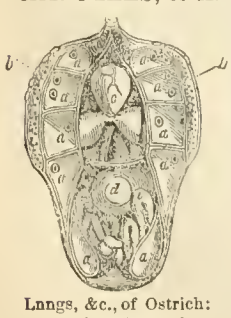
AIR-BLADDER, or SWIMMING-BLADDER, in Fishes. An organ apparently intended to aid them in ascending in deep water, and for the accommodation of their specific gravity to various depths. It is made to serve this purpose by the increase or diminution of its volume, according to the degree of pressure exerted upon it by the ribs. Its place is in the abdomen, under the spine; and it is very various in size and form in different kinds of fishes.

It generally has an opening into the œsophagus, or into the stomach, but apparently only for the ejection, and not for the admission of air. In some fishes, it has no opening. The air with which the A. is filled appears to be the result of secretion; and in fresh-water fishes, consists in general almost entirely of nitrogen, but contains a larger proportion of oxygen in sea-fishes; the oxygen in deep-sea fishes having been found to amount to 87 per cent. The A. is in some fishes very small; in others, it is entirely wanting, particularly in fishes that are destined to live chiefly at the bottom of the water, as flat fishes, eels, &c.; but there are remarkable instances of its absence also in species of very different habits, such as the common mackerel, whilst it exists in other species of the same genus or family. The A. of fishes affords the finest kind of isinglass.



Air-bladder of Carp: Consisting of two parts—B and C, joined by a narrow neck; A D, a canal communicating with œsophagus, E.

AIR-CELLS, or AIR-SACS, in Birds, are remarkable cavities connected with the respiratory system. They are distributed along the inside of the whole cavity of the chest and abdomen; and in birds of strong wing and rapid flight, often send prolongations into the bones. They are connected with the extremely active respiratory system, and communicate with the lungs, giving an immense extension to the surface with which the air inhaled comes in contact.



Lungs, &c., of Ostrich: *a a a a a*, air-cells; *b b*, lungs; *c*, heart; *d*, stomach; *e*, intestines.

The cells in the lungs of the mammalia, into which the air is conveyed by minute ramifications of the windpipe, in order to be brought into contact with the blood distributed on their walls, are very small; in man only about one hundredth part of an inch in diameter.—Air-cells, or air-sacs, may be said to form the whole respiratory apparatus in some of the lower kinds of animals (see ANNELIDA), while in others, higher in the scale of organization, particularly in insects, *air-tubes* arising from these ramify throughout the whole body. The air-tubes of insects are formed of a spiral fibre within a membranous coat, like the spiral vessels of plants, so that they possess great elasticity.

Air tubes of Insect.

AIR-CELLS in plants are cavities containing air in the stems or leaves. The orifices of the inter-cellular passages are closed up, so as to prevent the juices of the plant from entering them. They are very variable in size, figure, and arrangement, but are formed according to a uniform rule in each particular species in which they are found. They are large and numerous in many aquatic plants, evidently serving the purpose of buoying them up in the water. Besides A. of regular form, there are irregular cavities, also called by the same name, which seem to be formed by the tearing of the cellular tissue in the rapid growth of the plant, as in grasses and umbelliferous plants.

AIRE, or AIRE-SUR-L'ADOUR (anc. *Vicus Julius*), a town of the dep. of Landes, France, on the left bank of the Adour, 76 miles south from Bordeaux. It is a bishop's seat; and its cathedral, which has been often destroyed and rebuilt, is one of the most ancient in France. A. has been a place of consequence from the days of the Roman conquest of Gaul, and was the capital of the Visigoths under Alaric, but is now much decayed, and diminishing in population. It has hat manufactories and tanneries. Pop. 2576 in 1872.

AIRE, or AIRE-SUR-LE-LYS, a town of the dep. of Pas-de-Calais, France, on the Lys, 30 miles south-east from Calais. It is a fortress of third-class; the town well built, but its situation low and marshy. The barracks are capable of containing 6000 men. There are manufactures of woollen stuffs, linen thread, hats, starch, Dutch tiles, and soap; also some trade in grain. Osier-work is carried on to some extent. Pop. (1876) 5058.

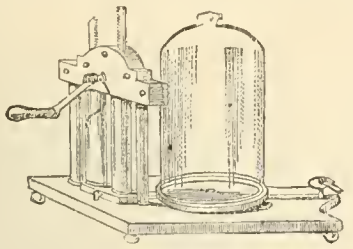
AIR-ENGINE. See CALORIC ENGINE.

AIR-GUN, an instrument for firing bullets or other projectiles, by the force of compressed air instead of gunpowder. Various forms of construction have been adopted. The most usual plan is to insert a condensing syringe in the stock of the gun. The piston of this syringe is worked by an apparatus which passes through to the exterior of the gun; and this working causes a small body of air to be condensed into a chamber. The chamber has a valve opening into the barrel, just behind the place where the bullet is lodged. The gun is loaded from the muzzle, as ordinary muskets or fowling-pieces; and there is at that time just behind it a small body of highly compressed air, ready to rush out at any opening. This opportunity is afforded by a movement of the trigger, which opens the valve; the air rushes forth with such impetuosity as to propel the bullet. By a certain management of the trigger, two or three bullets, successively and separately introduced, can be fired off—if firing it can be called—by one mass of condensed air. Another form of A. contains several bullets in a receptacle or channel under the barrel; by the movement of a cock or lever, one of these bullets can readily be shifted into the barrel; and thus several successive discharges can be made after one loading—on a principle somewhat analogous to that of the revolving pistol. Some varieties of A. have the condensing syringe detached, by which means a more powerful condensation of air may be produced; this done, the air-chamber is replaced in its proper position behind the bullet in the barrel. Those air-guns which present the external appearance of stout walking-sticks, and are thence called air canes, have a chamber within the handle for containing condensed air, which can be unscrewed, and subjected to the action of the condensing syringe. One inventor has devised a form of A. with two barrels—one of small bore for the reception of the bullets, and another of larger bore for the reservoir of condensed air; the condensing syringe being within the stock of the gun. An attempt has more recently been made to combine the action of elastic springs with that of compressed air, in an A.; springs of gutta-percha, or of vulcanized india-rubber, are employed in substitution of, or in co-operation with, a condensing syringe. No form of A. hitherto made has had power enough to propel a bullet to any considerable distance; and therefore the instrument is scarcely available in war; there are, however, circumstances in which such an arm may be useful—seeing that there is no expense for gunpowder, no noise, no smoke, no unpleasant odor. The A. was known in France more than two centuries ago; but the ancients were acquainted with some kind of apparatus, by which air was made to act upon the shorter arm of a lever, while the larger arm impelled a bullet.

AIR-PLANTS. See EPIPHYTES.

AIR-PUMP, an instrument for removing the air from a vessel. The essential part is a hollow brass or glass cylinder, in which an

air-tight piston is made to move up and down by a rod. From the bottom of the cylinder, a connecting tube leads to the space which is to be exhausted, which is usually formed by placing a bell-glass, called the receiver, with edges ground smooth and smeared with lard, on a flat, smooth plate or table. When the piston is at the bottom of the barrel, and is then drawn up, it lifts out the air from the barrel, and a portion of the air under the receiver, by its



Air-pump.

own expansive force, passes through the connecting tube, and occupies the space below the piston, which would otherwise be a vacuum. The air in the receiver and barrel is thus *rarefied*. The piston is now forced down, and the effect of this is to close a valve placed at the mouth of the connecting tube, and opening inwards into the barrel. The air in the barrel is thus cut off from returning into the receiver, and, as it becomes condensed, forces up a valve in the piston, which opens outwards, and thus escapes into the atmosphere. When the piston reaches the bottom, and begins to ascend again, this valve closes; and the same process is repeated as at the first ascent. Each stroke thus diminishes the quantity of air in the receiver; but from the nature of the process, it is evident that the exhaustion can never be complete. Even theoretically, there must always be a portion left, though that portion may be rendered less than any assignable quantity; and practically the process is limited by the elastic force of the remaining air being no longer sufficient to open the valves. The degree of rarefaction is indicated by a *gauge* on the principle of the barometer. By means of the partial vacuum formed by the A., a great many interesting experiments can be performed, illustrating the effects of atmospheric pressure, and other mechanical properties of gases.—The A. was invented by Otto Guericke (q. v.) 1654; and though many improvements and varieties of structure have been since devised, the principle of all is the same. Two barrels are generally used, so as to double the effect of one stroke. In some air-pumps, stop-cocks turned by the hand take the place of valves; and in others, the entrance of the connecting tube into the cylinder is so contrived that the valve through the piston is not required.

AIRD, Thomas, a poet of considerable genius, born at Bowden, in Roxburghshire, in 1802. He received the rudiments of education at schools in his native county, from which he passed to the university of Edinburgh. While in the metropolis, he made the friendship of many distinguished men, especially Professor John Wilson, who was accustomed to speak of him in the highest terms. In 1835, he became editor of *The Dumfries Herald*, a new journal, started on Conservative principles, an office which he filled till 1864. His genius was of a purely literary character, and not calculated to be effective in the discussion of political questions. His works are not so well known as they deserve to be, from their intrinsic merit. In spite of very warm eulogy from some of the greatest names in popular criticism, and in spite of many elaborate and discriminating reviews in various important magazines, they have failed to secure a large measure of public approbation. *The Devil's Dream* is perhaps an exception to the rest, for it is both well known and admired. Competent judges have asserted that there is something almost Dantesque in the stern, intense, and sublime literalness of the conception. Whether the scenes are colossal as in *The Devil's Dream*, or minute, as in *The Summer's Day*, there is the same clear, vigorous, and picturesque word-painting. Herein lies A.'s chief originality, for his thought and sentiment, though always pure and fine, are not strikingly novel. In 1827, he published *Religious Characteristics*, a piece of exalted prose-poetry; in 1845, *The Old Bachelor*, a volume of tales and sketches; in 1848, a collected edition of his poems—a second edition of which appeared in 1856; and in 1852, he edited the select poems of David Macbeth Moir (the 'Delta' of *Blackwood*), prefixing a memoir for the benefit of Dr. Moir's family. Without having fully realized the expectations to which his early works gave rise, A. died 25th April, 1876. See Life and Poems edited by J. Wallace (1878).

AI'RDRIE, a flourishing town in Lanarkshire, 11 miles east of Glasgow. The high-road between Edinburgh and Glasgow intersecting it, forms its principal street. It has risen rapidly, and is now one of the most flourishing inland towns in Scotland. Little more than a century ago, it consisted of a solitary farm-house or two; but the abundance of iron and coal in the vicinity has given its progress an impetus like that of an American city (see Gartsherrie). The Monkland Canal and the Caledonian Railway receive the produce of the coal-pits and iron mines. The town has some neat buildings, is well paved, and lighted with gas. The weaving of cotton goods for the Glasgow manufacturers is carried on to a considerable extent, as is also the distillation of spirits, silk-weaving, and paper-making. It unites with Falkirk in sending a member to parliament. Pop. (1881) 13,363; with suburbs, 16,335.

AI'RY, Sir George Biddell, K.C.B., F.R.S., Astronomer Royal from 1835 till his retirement in 1881, was born at Alnwick, 27th June 1801. In 1819 he went to Trinity College, Cambridge. In 1822, he was elected Scholar; in 1823, he took the degree of B.A., with the honor of Senior Wrangler; and in 1826, that of M.A. In the same year, he was elevated to the chair of Science founded by Lucas, which he rescued from the reproach of being a sinecure, by a course of public lectures on experimental philosophy. In 1828, he was made Plumian professor, and had the management of the newly erected Cambridge Observatory intrusted to him. On account of his severe and unintermitting labors in connection with this office, his income was augmented from the funds of the university. He published his observations (*Astronomical Observations:* Cambridge, 1829—1838, 9 vols), arranged in a clear and simple manner; and they have served as a model ever since for those of Greenwich and other observatories. In 1835, the office of Astronomer Royal becoming vacant, A. was appointed to it by Lord Auckland, then First Lord of the Admiralty. He has introduced new or more perfect scientific instruments, more rapid methods of calculation, and researches in magnetism, meteorology, photography, &c. He contributed the well-known article on 'Gravitation,' to the *Penny Cyclopædia* (1837). Equally excellent and popular is his treatise on Trigonometry, written for the *Encyclopædia Metropolitana* (1855). He has deservedly obtained the reputation of being one of the most able and indefatigable of living *savans*. He served on the Royal Commission appointed in 1868, to inquire into the standard weights and measures. In 1869, he communicated to the Royal Astronomical Society, a remarkable discovery on 'Atmospheric Chromatic Dispersion, as affecting Telescopic Observation and the mode of correcting it.' He became a Companion (Civil) of the Bath in 1871, and a Knight Commander in 1872. A. is an F.R.S.; an Honorary Member of the Institution of Civil Engineers, Corresponding Member of the French Institute, a D.C.L. of Oxford, and LL.D. of Cambridge and Edinburgh.

Aisle (Melrose Abbey).

AISLE (from Lat. *ala*, a wing) means any lateral division of any part of a church, whether nave, choir, or transept. The number of aisles varies in the churches of different countries. In England, there is only one on each side of the nave or choir; in most foreign countries, there are generally two, and at Cologne there are even three. The continental edifices, it would seem, have antiquity in their favor for this arrangement (see Basilica). The word is often incorrectly applied to the open space in the nave of churches between the seats of the congregation.

AISNE, a tributary of the Oise, in France, rises in the department of Meuse, and flows north-west through the departments of Marne and Ardennes, and then west through that of Aisne and part of Oise, where it falls into the river Oise, above Compiègne. Its course extends to 150 miles, of which 70 are navigable.

AISNE, a department in the north of France, formed of a part of ancient Picardy and the Isle of France. It belongs to the basin of the Seine, and is intersected by the river A., and by other navigable streams and canals. The soil is fertile; the chief culture is wheat, and other grain. Its rich meadows supply Paris with hay. The area is 2830 square miles, with a population of (1881) 552,988. It is the seat of considerable cotton and other manufactures, the center of which is St. Quentin (q. v.), and at St. Gobin is the famous manufactory of mirrors. The department is divided into 5 arrondissements and 37 cantons. The chief town is Laon (q. v.).

AIX, a town in France, formerly the capital of Provence, now the chief town of an arrondissement in the department of the Bouches-du-Rhone. It is believed to have been built by the Roman consul, C. Sextius (120 B.C.), on account of the mineral springs in the neighborhood, and thence called Aquæ Sextiæ. A. is the seat of a court of appeal; and possesses an academy for theology and law, and a public library which reckons nearly 100,000 vols., and

1100 MSS. The baptistery of the cathedral is believed to have been originally a temple of Apollo. The numerous public fountains give a cheerful air to the place. One of them has a sculpture of the Good King Réné, executed by David. There is also an old clock-tower, the machinery of which, when the clock strikes, sets various quaint-looking figures in motion. The industry of this again flourishing town consists chiefly in the cultivation of the olive, in cotton-spinning, leather-dressing, and trade in oil, wine, almonds, &c. The warm springs are slightly sulphurous, with a temperature from 90° to 100° F., clear and transparent as the purest well-water, almost free from smell, yet with a slightly bitter taste. They have the reputation of improving the beauty of the skin, and are on this account especially frequented by the fair sex. The field on which Marius defeated the Teutones lies in the plain between A. and Arles. In the middle ages, under the Counts of Provence (see RÉNÉ), A. was long the literary capital of Southern Europe. The population of Aix in 1876 was 23,407.

AIX (*Aquæ Gratianæ, Allobrogum*), a small town of Savoy, pop. 2—3000, in a delightful valley near Lake Bourget, seven miles north from Chambery. It was a much frequented bathing-place in the times of the Roman empire, and among its numerous remains of ancient times, are the arch of Pomponius, the ruins of a temple and of a vaporarium. The king of Sardinia has a palace here. The hot springs, two in number, are of sulphurous quality, and of a temperature above 100° F. They are used both for drinking and as baths, and attract annually above 2000 visitors.

AIX-LA-CHAPELLE (Ger. Aachen) is the capital of a district in Rhenish Prussia. It is situated in a fertile hollow, surrounded by heights, and watered by the Wurm; N. lat. 50° 47′, E. long. 6° 5′; pop. (1880) 85,551, of whom a very small proportion are Protestants. A. is the center of numerous thriving manufactories, especially for spinning and weaving woollen fabrics, and for needle and pinmaking. There are also immense manufactures of machinery, bells, glass-buttons, chemicals, cigars, &c. As a principal station on the Belgian-Rhenish railways, A. is an important staple place of Prussian trade. The city is rich in historical associations. It emerges from historical obscurity about the time of Pepin, and Charlemagne founded its world-wide celebrity. Whether it was the birthplace of Charlemagne, is doubtful, but it became his grave 814 A.D. In 796 A.D. Charlemagne caused the already existing palace, called the Imperial Palace, to be entirely rebuilt, as well as the chapel, in which Pepin had celebrated Christmas in 765 A.D. The two buildings were connected by a colonnade, which fell into ruins a short time before the emperor's death, probably from the effects of an earthquake. The present town-house has been built on the ruins of the palace; the chapel, after being destroyed by the Normans, was rebuilt on the ancient plan by Otho III., in 983, and forms the nucleus of the present cathedral. This ancient cathedral is in the form of an octagon, which, with various additions round it, forms, on the outside, a sixteen-sided figure. In the middle of the octagon, a stone, with the inscription 'CAROLO MAGNO,' marks the grave of Charlemagne. Otto III. opened the vault in the year 997 A.D. The body of the emperor was found in a wonderful state of preservation, seated upon a marble chair, dressed in his robes, his sceptre in his hand, the Gospel on his knee, a piece of the holy cross on his head, and a pilgrim's scrip attached to his girdle. Otto caused the tomb to be built up again, after repairing the injuries of the arch. In 1165 A.D., when the emperor Frederick I. caused the vault to be re-opened, the bones of the great emperor were enshrined in a casket of gold and silver, and a large and beautifully wrought chandelier was hung up over the tomb as a memorial. In 1215 A.D., Frederick II. caused the remains of the emperor to be inclosed in a costly chest, in which they are yet kept in the sacristy. The marble chair was, in later times, overlaid with gold plates, and used till 1558 A.D. at the imperial coronations, as a throne for the newly crowned emperor. The imperial insignia were removed to Vienna in 1795.—In the 14th c., a choir in the Gothic style was added to the east side of the octagon, which had been built in the Byzantine style; while on the west side, a square belfry was joined to it, as well as two small round towers, with winding stairs leading to the treasury. Here are kept the so-called 'great relics,' which, once in seven years, are still shown to the people, in the month of July, from the gallery of the tower. This spectacle attracts many thousands of strangers to A. Much has of late years been done to restore this venerable pile. The columns brought by Charlemagne from the palace of the Exarch at Ravenna, to decorate the interior of the octagon, had been carried off by the French; and although part of them had been restored at the peace of Paris, they were not replaced in the building till recently.

The town-house—which encloses the remains of the Imperial Palace—adorns the market-place, having a Bell or Market Tower on the left, and on the right the Granus Tower, a memorial of old Roman times. The coronation-hall, 162 feet long, by 60 feet wide, in the interior of the town-house, was, in the last century, divided in the middle by a wooden partition. This noble hall, in which thirty-five German emperors and fourteen empresses have been crowned, has been restored to its original form, and the walls have been lately decorated with large fresco-paintings of scenes from the life of Charlemagne, by Rethel. Before the town-house stands a beautiful fountain, with a bronze statue of Charlemagne. In the church of the Franciscans, are to be seen a fine picture of the Taking Down of Christ from the Cross, by Vandyck and two other pictures representing the Crucifixion, by A. Diepenbeeck. At a short distance from A., and surrounded by the river, stands Frankenburg, once the favorite abode of Charlemagne and of Fastrada, and still rich in legends. It has been rebuilt from its romantic ruins. As a town, A. has recently been much improved. It now possesses many fine buildings, among which are several large and splendid hotels. From being a quiet old city of historical interest, it has become a busy center of manufacturing industry. In 1870, a new Polytechnic School was erected. A. was formerly noted for its gambling-tables; but these are now disallowed.

The name of Aix or Aachen is evidently derived from the springs, for which the place has been always famous. (See AA.) The name Aquis Granum, which it received about the 3d c., may possibly be derived from Granus, one of the names of Apollo, who was worshiped by the Romans near springs. The French name, A., refers to the Chapel of the Palace. Charlemagne granted extraordinary privileges to this city. The citizens were exempted, in all parts of the empire, from personal and military service, from imprisonment, and from all taxes. The city also possessed the right of sanctuary: 'the air of A. made all free, even outlaws.' In the middle ages, this free imperial city (then included in the circle of Westphalia) contained more than 100,000 inhabitants; and held an important place among the confederate cities of the Rhine. The emperors were crowned in A. from Louis the Pious to Ferdinand I. (813—1531 A.D.). 17 imperial diets and 11 provincial councils were held within its walls. The removal of the coronations to Frankfort, the religious contests of the 16th and 17th centuries, a great fire which in 1656 A.D consumed about 4000 houses in the city, combined with other causes to bring into decay this once flourishing community. In January 1793, and again in 1794, A. was occupied by the French. By the treaties concluded at Campo Formio and Lunéville, it was formally ceded to France, and became the capital of the department of Roer; at length, in 1815, the city fell to Prussia. See Quix, *Geschichte der Stadt A.* (History of A.), 2 vols., A., 1841.

The MINERAL SPRINGS of A., of which six are hot, and two cold, were known in the time of Charlemagne, and were much frequented as early as 1170. The hot springs are strongly sulphurous, and contain also hydrochlorates. The temperature varies from 111°—136° F. They chiefly act on the liver, and on the mucous surfaces and skin, and are therefore efficacious in cases of gout, rheumatism, cutaneous diseases, &c. The most remarkable is the 'Emperor's Spring,' which rises in the middle of the Hôtel Kaiserbad. The baths themselves are from 4 to 5 feet deep, and are built quite in the old Roman style. The cold springs are chalybeate, and not so copious. The new 'Eisenquelle' (iron spring), first discovered in 1829, is provided with an elegant bath-house. The well-proved medicinal virtues of the mineral springs of A. bring yearly to the city many thousands of strangers.

TREATIES OF PEACE, and CONGRESS OF A.—The first Peace of A. ended the war carried on between France and Spain for the possession of the Spanish Netherlands. On the death of Philip IV., Louis XIV. laid claim to a large portion of those territories in the name of his wife, Maria Theresa, the daughter of Philip, urging the law of succession prevailing in Brabant and Namur respecting private property. The victorious progress of Louis was checked by the triple alliance between England, Holland, and Sweden; and a treaty of peace was concluded at A. in 1668, by which France retained possession of the fortresses of Charleroi, Lille, &c., which she had already taken.

The second Peace of A. concluded the war respecting the succession of Maria Theresa to the empire. See SUCCESSION, WARS OF. After the war had been carried on with various success for eight years, peace was concluded in 1748. In general, the possessions of the several states remained as before the war. Austria ceded Parma and Placentia to the Spanish infanta, Philip; and the possession of Silesia was guaranteed to Prussia. The privilege of the Assiento Treaty (q. v.) was anew confirmed to England for four years, and the pretender was expelled from France. Owing chiefly to the exertions of her minister, Kaunitz, Austria came off with but small sacrifice, while England, notwithstanding her splendid victories, derived little solid advantage, and was left with a debt raised to 80 millions.

The Congress of A. was held in 1818, for regulating the affairs of Europe after the war. It began on the 30th September, and ended on the 21st November. Its principal object was the with-

drawal from France of the army of occupation, 150,000 strong, as well as the receiving of France again into the alliance of the great powers. The emperors of Russia and Austria, and the king of Prussia, were personally present. The plenipotentiaries were —Metternich, Castlereagh, and Wellington, Hardenberg and Bernstorff, Nesselrode and Capo d'Istrias, with Richelieu on the part of France. France having engaged to complete the payment of the stipulated sums of money, was admitted to take part in the deliberations, and the five great powers assembled, signed a protocol announcing a policy, known as that of the 'Holy Alliance' (q.v.).

AJA'CCIO, the chief town of the island of Corsica, which forms a department of France. Pop. in 1876, 16,419. The chief employments are the anchovy and pearl fisheries, and the trade in wine and olive-oil, which the neighborhood produces in abundance, and of good quality. The harbor is protected by a strong fort. A. is remarkable as the birthplace of Napoleon; the house is still to be seen.

AJA'N, a portion of the E. coast of Africa, extending from Cape Guardafui nearly to the equator

A'JAX was the name of two of the Greek heroes of the Trojan war. One of them was called A. the Less, or the Locrian, being the son of Oïleus, king of the Locrians. At the head of forty Locrian ships, he sailed against Troy, and was one of the bravest of the Greek heroes; in swiftness of foot, he excelled all except Achilles. When Cassandra fled to the temple of Minerva, after the taking of Troy, it is said that A. tore her from it by force and dragged her away captive. Others make him even violate the prophetess in the temple. Though he exculpated himself by an oath when accused of this crime by Ulysses, yet he did not escape the vengeance of the goddess, who caused him to be engulfed in the waves.

The other A., called by the Greeks the Greater, was the son of Telamon, king of Salamis, and, by his mother's side, a grandson of Æacus. He sailed against Troy with twelve ships, and is represented by Homer as next to Achilles, the bravest and handsomest of the Greeks. After the death of Achilles, A. and Ulysses contended for the arms of the hero, and the prize was adjudged to Ulysses, which threw A. in such a state of rage and despair that he killed himself with his sword. This melancholy fate of the hero is the subject of one of the extant tragedies of Sophocles.

AJMEER', one of the districts of Hindustan, directly under the government of India, lying between lat. 25° 43'—26° 42'; long. 74° 22'—75° 33'. Its length from south-east to north-west is about 80 miles; breadth, 50; area, 2661 square miles. The surface of the country towards the south-east is generally level. In the north, north-west, and west, it is broken by mountains and hills belonging to the Aravulli range. The mountain of Taragurh, above the city of Ajmeer, contains carbonate of lead, manganese, copper, and abundance of iron ore. The general elevation of the plain of A. is about 2000 feet, and the frosts in winter are sometimes severe. Strong breezes are prevalent, and the climate on the whole is healthy. The scarcity of water, however, often occasions great distress. The only permanent stream is the Koree, the water of which is so impregnated with mineral salts as to be unfit for alimentary use except during the rains. To compensate for this deficiency, water-tanks are numerous. The staple crop is bajra (*Holcus spicatus*). Sheep are reared in great numbers, and wool is cheap, affording the material of their clothing to the lowest orders. Among the more prevalent diseases are small-pox and ophthalmia. The population in 1872 was 316,032, of whom about 40,000 were Mussulmans, &c., the rest Hindus. The principal race are the Rajpoots, the conquerors of the native Bheels, Mhairs, and Neenas. The present limits of this district by no means correspond to its former importance. In the 12th c., at the time of the Mussulman invasion, the sultan of A. and Delhi was the most powerful monarch in India. Under Akbar also, who acquired this territory in 1559, A. was a large and important province. It afterwards fell into the hands of the Mahrattas, from whom it was wrested by the British in 1817.

AJMEER, an ancient city of Hindustan, the capital of the British district of the same name, 228 miles west from Agra. It is situated in a picturesque and rocky valley, at the foot of the mountain of Taragurh, which is crowned by a fort, once strong, but now dismantled. The city is surrounded by a stone wall, with five lofty and handsome gateways on the west and north. Most of the streets are narrow and dirty, but some of them are spacious, and contain many fine residences, besides several mosques and temples of very massive architecture. A. is the seat of a British political agency, a medical school, and an English and Oriental school. The tomb of the Mussulman saint, Kwajah, within the town, is held in veneration, and pilgrimages are made to it even by Hindus. The emperor Akbar journeyed to it from Agra on foot in 1570, in fulfilment of a vow after the visit of his son Jehanghir. In October, a great annual fair is held in honor of the saint, at which ridiculous miracles are pretended to be wrought. The pop. of A. in 1871 was 34,763.

AJURUOCA, a town of the province of Minas Geraes, Brazil, 100 miles north-west from Rio de Janeiro. It is situated in a fertile country, at the northern base of the Sierra Mantiqueira, on the river Ajuruoca, one of the head-waters of the Parana. The surrounding district once yielded much gold, which has apparently been exhausted; but it produces excellent crops of tobacco, millet, mandioc, sugar, and coffee. Swine are reared for the market of Rio de Janeiro. Pop. (including district) about 12,000.

AKBAR (i. e., 'Very Great'), properly JELALED-DIN-MOHAMMED, emperor of Hindustan, the greatest Asiatic monarch of modern times. His father, Humayun, was deprived of the throne by usurpers, and had to retire for refuge into Persia; and it was on the way thither, in the town of Amerkote, that A. was born, in 1542 A. D. Humayun recovered the throne of Delhi after an exile of twelve years; but died within a year. The young prince at first committed the administration to a regent-minister; but finding his authority degenerating into tyranny, he, by a bold stroke, shook it off, and took the power into his own hands (1558). At this time, only a few of the many provinces once subdued by the Mongol invaders were actually subject to the throne of Delhi; in ten or twelve years, A.'s empire embraced the whole of Hindustan south of the Deccan; but although great in subduing, A. was yet greater in ruling. The wisdom, vigor, and humanity with which he organized and administered his vast dominions, are unexampled in the east. He promoted commerce by constructing roads, establishing a uniform system of weights and measures, and a vigorous police. He exercised the utmost vigilance over his viceroys of provinces and other officers, to see that no extortion was practiced, and that justice was impartially administered to all classes of his subjects. For the adjustment of taxation, the lands were accurately measured, and the statistics taken, not only of the population, but of the resources of each province. For a Mohammedan, the tolerance with which he treated other religions was wonderful. He was fond of inquiries as to religious beliefs; and Portuguese missionaries from Goa were sent at his request to give him an account of the Christian faith. He even attempted to promulgate a new religion of his own, which, however, never took root. Literature received the greatest encouragement. Schools were established for the education both of Hindus and Mohammedans; and numbers of Hindu works were translated from Sanscrit into Persian. Abu-l-Fazl, the able minister of A., has left a valuable history of his master's reign, entitled *A.-namch* (History of A.); the third volume, containing a description of A.'s empire, derived from the statistical inquiries above mentioned, and entitled *Ayin-i-Akbari* (Institutes of A.), has been translated into English by Gladwin (3 vols., Calcutta, 1786; and London, 1800). A.'s latter days were embittered by the death of two of his sons from dissipation, and the rebellious conduct of the third, Selim (known as Jehanghir), who succeeded his father at his death in 1605.

AKBARPU'R, a town of India, in the British district of Cawnpore, 28 miles west from Cawnpore, on the route from Cawnpore to Etawa. It is the capital of a pergunnah of the same name. Pop. 6330.

AKEE' (*Cupania* or *Blighia sapida*), a fruit-tree belonging to the natural order *Sapindaceæ* (q. v.), a native of Guinea, introduced into Jamaica in the end of last century. It grows to the height of 20—25 feet or upwards, with numerous branches and alternate pinnate leaves, resembling those of the ash. The flowers are small, white, on axillary racemes; the fruit is about the size of a goose's egg, with three cells and three seeds, and its succulent aril has a grateful subacid flavor. The fruit is little inferior to a nectarine. Boiled down with sugar and cinnamon, it is used as a remedy for diarrhœa. The distilled water of the flowers is used by negro women as a cosmetic. The A. sometimes produces fruit in stoves in Britain. In order to obtain this, the roots should be cramped in pots.—The AKI of New Zealand is a totally different plant, *Metrosideros buxifolia*, of the natural order *Myrtaceæ*, a shrub, which sends out lateral roots, and so attains the summits of the loftiest trees.

À KEMPIS, THOMAS. See KEMPIS, THOMAS À.

A'KENSIDE, MARK, an author of considerable celebrity, in his own day, on account of his didactic poem, *The Pleasures of the Imagination*, and some medical works. He was born November 9, 1721, at Newcastle-on-Tyne, where his father was a butcher. Being intended for the Presbyterian Church, he was sent to study theology at Edinburgh, but soon abandoned it for that of medicine. He graduated as a physician at Leyden in 1744, and practised at Northampton, then at Hampstead, and finally in London. His success as a practising physician was never very great, owing, it is said, to his haughty and pedantic manner. He died in London (June 23, 1770), soon after being appointed one of the physicians

to the queen. At Leyden, he had formed an intimacy with Jeremiah Dyson, and this rich and generous friend allowed him £300 a year. Some of his medical treatises, as those on the lymphatic vessels and on dysentery, possess considerable merit. His later poetry, consisting chiefly of odes and hymns, did not attain the same reputation as his *Pleasures of the Imagination*, which was written in his twenty-third year, and to which is owing whatever celebrity has attached to his name. Dyson published his poetic works in 1772, and another edition appeared in 1807. In *Peregrine Pickle*, Smollett has satirically sketched the character of A., under that of the pedant who undertakes to give an entertainment after the manner of the ancients. A. has little originality of conception, or even of expression; the reader is carried along for a time by the evident enthusiasm of the poet, and rapid and stately march of lofty images and ideas; but, as it has been well expressed, 'all is operose, cumbrous, and cloudy, with abundance of gay coloring and well-sounding words, but filling the eye oftener than the imagination, and the ear oftener than either.' A. became dissatisfied with his juvenile production, and at his death, had written a portion of a new poem on the same subject. Both poems were published in the complete edition of his works, Lond. 1773. His life has been written by Bucke: *Life, Writings, and Genius of A.* (8vo, Lond. 1832).

AKETON, another name for a portion of armor used in the feudal times, called the Gambeson (q.v.).

A'KJERMANN, or AKKERMANN, a town of Russia, in Bessarabia, on the Black Sea, at the mouth of the Dniester, with a citadel and harbor; pop. (1880) 28,944. It is the Alba Julia of the Romans; and called, by the Poles, Bialogrod, which, as well as A., signifies the *white town*. It is of some importance, on account of its harbor, fortifications, commerce, and especially its extensive salt-pits.

The Treaty (supplementary of that of Bucharest, 1812) concluded at A. in 1826, between Russia and Turkey, secured to Russia the free navigation of the Black Sea, and indemnification for losses sustained by her subjects from the Barbary corsairs; the institution of divans in Moldavia and Wallachia, and the power of re-electing the hospodars after their term of office; and the restoration of the privileges of Servia, in which Turkish troops were only to retain possession of the fortresses. The boundaries in Asia were to remain as they then stood; Russia consequently retaining the Turkish fortresses of which she had gained possession. The non-fulfilment of this treaty on the part of the Porte, occasioned the war of 1828, which was terminated by the peace of Adrianople.

AKHALZI'KH, or AKI'SKA, a town of Russian Armenia, 90 miles west from Tiflis, on the left bank of the Dalka, an affluent of the Kur. It is situated in a valley of the Keldir Mountains, and at such an elevation above the sea, that the winter is severe, although the summer is very hot. A. was anciently called Keldir or Chaldir. It is without walls, but has a strong citadel, built on a rock. The mosque of Sultan Ahmed, built on the model of St. Sophia, in Constantinople, has a library attached to it, which was accounted one of the most valuable in the East; but the Russians, after acquiring possession of A., carried off great part of its most valuable treasures to St. Petersburgh. Maize, wheat, barley, flax, cotton, silk, grapes, figs, and honey are produced in the surrounding district. Some manufactures are carried on in the town, and it maintains an active trade with various places on the Black Sea. Pop. (1867) 15,977, two-thirds of whom are Armenians.

AK-HISSA'R (anc. *Thyatira*), a town of Asia Minor, in Anatolia, 52 miles north-east from Smyrna, on somewhat elevated ground in the valley of the Hyllus. The streets are paved with carved stone, and other relics of antiquity abound; but there are no ruins of ancient buildings. Cotton goods are exported. Pop. estimated at 10,000, of whom two-thirds are Turks, and the remainder mostly Greeks.

AKHLA'T, or ARDI'SH, a town of Asiatic Turkey, in the vilayet of Van, and 58 miles north-west from Van. It is situated on the north-west shore of Lake Van, and is surrounded by a double wall and moat, and further protected by towers and a citadel. Pop. estimated at 6000. The old city of A., at a little distance from the present town, in a ravine, was the residence of the kings of Armenia, and was the scene of many conflicts between the Greeks, Armenians, and Persians. It was taken and devastated in 1228 by Jelal-ud-deen, and completely destroyed by an earthquake in 1246.

AKHTY'RKA, a town of European Russia, in the government of Kharkov, and 58 miles north-west from Kharkov. It is situated on a small river of the same name, an affluent of the Dnieper. It was founded by the Poles in 1641. It has manufactures of light textile fabrics, and a great annual fair. The neighborhood is very fertile. Pop. (1880) 17,820.

A'KRON, a town of the state of Ohio, North America, the capital of Summit County. It is situated 36 miles south of Cleveland, on the Little Cuyahoga, which falls into Lake Erie, and at the junction of the Ohio and Erie Canal with the Pennsylvania and Ohio Canal, at the highest point in the course of the former canal, whence its name (Gr. a summit). It is also on the Cleveland and Zanesville Railway. It was first settled in 1825. It has woolen factories, flour-mills, a steam-engine factory, a stove factory, &c. The machinery of all its public works is driven by water-power. It has a considerable trade. Pop. (1870) 10,006; (1880) 16,512.

AK-SHE'HR (*White City*, anc. *Philomelion*), a city of Asiatic Turkey, in the pashalic of Karaman, five miles south of the salt lake of Ak-shehr, at the entrance of an extensive mountain valley. The houses rise in successive terraces on the slope of a hill. There is here a celebrated carpet manufactory. Pop. estimated at 6000.

AK-SU', a town of Eastern Turkestan, 260 miles north-east from Yarkand, on an affluent of the Tarim, and on the southern base of the Thian-shan Mountains. It was formerly the residence of the kings of Kashgar and Yarkand. While Eastern Turkestan formed part of the Chinese Empire, it was an important garrison town. In 1867, it was captured by the Atalik-Ghazee. In 1716, it was nearly destroyed by an earthquake, and in the beginning of the present century, suffered terribly from an inundation. It is celebrated for its manufactures of cotton cloth and saddlery. It is much resorted to by caravans, as an entrepôt of commerce between Russia, Tartary, and China. The pop. is very variously estimated from 6000 to 20,000 and upwards. Sheep and cattle are extensively reared in the neighborhood. See TURKESTAN, EASTERN.

AKYA'B, a town of Further India, the chief seaport of the district of Akyab or Aracan Proper, and the capital of the province of Aracan. It was formerly called Twet-twe, and sometimes still receives that name. It is situated on the eastern side of the island of Akyab, at the mouth of the Kuladyne or Coladyne. The houses are well built, the streets broad and regular. The town is rapidly rising in commercial importance. Light-houses have been erected for the benefit of the harbor. Pop. (1872) 19,230.

ALABA'MA, one of the states composing the Union of North America, was first known to Europeans in the year 1541, half a century after the discovery of America. The celebrated exploring expedition of De Soto had to fight its way fiercely through the tribes who peopled its wilds at that period, and who were much less savage and far more numerous than the northern aborigines. In one instance, a chief's house measured 120 feet by 40, and included small buildings like offices. Upon the Savannah River, at Silver Bluff, there was found a remarkable temple, 100 feet long, 40 feet wide, and proportionably high. In the beginning of the 18th c., the French built a fort on Mobile Bay, but the city of that name was not commenced till nine years later (1711). In 1763, when the entire French possessions east of the Mississippi (except New Orleans) fell into the hands of the English, A. was incorporated first with Georgia, afterwards, in 1802, with the Mississippi territory; but finally, in the year 1819, it became an independent member of the great American confederacy, and is now the fourth in point of population among the southern states.

A. very nearly forms a rectangle, widening a little towards the south-east and south-west, so that we would naturally expect a fine sea-board; but of this it is deprived by Florida, which occupies fully three-fourths of the coast-line. It lies between 30° 10′ and 35° N. lat., and between 85° and 88° 30′ W. long.; being about 330 miles in extreme length from north to south, and 300 miles in breadth. It contains an area of 50,722 square miles, or 32,462,080 acres, only 5,062,204 of which, or rather less than one-sixth, were improved in 1870. The country is neither mountainous nor level, but rugged and broken, especially in the center, with many picturesque views and wild romantic gorges. The Alleghanies terminate in the north in a series of elevated hills, and the ground gradually slopes to within 60 miles of the Gulf of Mexico, when it becomes level. There are three bays in A., the principal of which is Mobile Bay, stretching north for about 30 miles. There are also three large rivers—the Tennessee, the Tombigbee, and the A.; the first of which only makes a sweep into the state at the north-east angle, and then another sweep out at the north-west; the second comes into A. from Mississippi, receives an affluent (Black Warrior), and flows due south, until it is joined by the A., flowing out of Georgia in a south-westerly direction. After the union, the river is called the Mobile, and discharges its waters into the Gulf of Mexico. The Tombigbee is about 500 miles in length, and navigable for steam-boats throughout its entire course in Alabama. The A. is about 600 miles long, and may be ascended in steam-boats to Wetumpka (on the Coosa branch), 460 miles from the Gulf; but the navigation of the Tennessee, which has 130 miles of its course in A., is obstructed by the Muscle-shoals, a series of rapids.

The climate of this state is almost tropical, as it reaches to within 7° of the torrid zone, and its productions are allied to those of the tropics. The thermometer ranges from 60° to 104° F. in summer,

and in winter from 82° to 18°; the mean temperature of the year being about 63°. The heat rarely passes 95°. The lowlands are very unhealthy, near the rivers and mussel-shoals, but the hilly regions are salubrious. The soil is exuberantly fertile; the cotton crop of A. in 1880 came next in value to those of Mississippi, Georgia, and Texas, there are fine grazing-lands in the low hills of the north, where the Alleghanies terminate, and the long flat valleys between them are extremely rich. The central part is a great, broken, and swelling prairie, remarkably fertile; while the southern, though often sandy and inferior in productiveness, has many fertile alluvial bottoms, which yield rice. Besides cotton, A. produces large quantities of Indian-corn, oats, sweet potatoes, and butter; a considerable amount of wheat, rye, rice, wool, hay, pease, beans, potatoes, fruits, market-vegetables, and sugar; some tobacco, barley, buckwheat, wine, cheese, grass-seeds, hops, flax, and silk, are also raised. In 1870, 14,961,178 acres of land in A. were in farms, averaging 222 acres in size, with a live-stock valued at 26,690,095 dollars, and products worth 67,522,335 dollars. There is abundance of wild deer and turkeys; and wild geese and ducks frequent the Muscle-shoals of the Tennessee in immense numbers. Bears, wolves, and foxes are likewise still met with. The trees, like the animals, are numerous, but not remarkably varied. In the center and north, there are oaks, poplar, hickory, chestnut, and mulberry; in the south cypress and loblolly: pine is also abundant south of the mountains. A. is, however, very rich in mineral treasures, particularly in coal, iron, limestone, and marble. Red ochre, lead, and manganese are also found. A vein of bituminous coal of superior quality runs eastward from Tuscaloosa into Georgia. There are, in various sections of the state, salt, sulphur, and chalybeate springs. At Blount's Springs, a fashionable watering-place, there are several different varieties of sulphur waters. A gold-mine was also wrought for a short time in St. Clair County, while the statuary granite of A. is admitted to be the best in the whole of the United States.

The state receipts for the year ending September 1880 were 930,601 dollars; the state debt in that year, 11,532,252 dollars. In 1870 there were in the state 2188 manufacturing establishments, which produced goods to the value of 13,040,644 dollars. The most important manufactures were those for flouring-mill products and cotton goods: 102 establishments, producing goods worth 1,670,332 dollars, being engaged in the former; and 13 establishments, with products valued at 1,088,767, in the latter. Among the other manufactures are machinery, iron, sawed lumber, carriages, and wagons, besides the 'neighborhood industries' of boot and shoe making, blacksmith's work, carpentering, &c.

In 1880, there were in A. 2086 miles of railroad completed, and several hundreds in course of construction. The commerce of A. is very extensive; for the steamboat navigation on her rivers (1500 miles in all) affords an outlet not only for her own productions, but also for those of Mississippi and Georgia.

Education is progressing satisfactorily in A. In 1870 there were 10 colleges, 2812 public schools, and 147 academies and other schools. The number of pupils at school in 1880 was above 112,000. The annual income of the state university located at Tuscaloosa, is $15,000. The newspaper and periodical literature, as everywhere else in America, is very prolific. There are 100 publications of different kinds. The annual number of copies issued, is 9,198,980, with a circulation of 91,165: of which the daily papers have 16,420, and the weekly 71,175. Religious denominations exhibit a similar fecundity; but the Baptists and Methodists have a vast preponderance over the others. There are various public institutions in A., such as a lunatic asylum at Tuscaloosa, a blind asylum at Mobile, a deaf and dumb asylum, and a state penitentiary at Wetumpka. The buildings of A. University are very fine, and cost 150,000 dollars. In 1870, there were 298 libraries, with 86,577 volumes, in the state.

A. was one of the slave-states. Its government resembles that of the other states in its general features. The senate consists of 33 members, elected for 4 years; and the house of representatives of 100, elected for 2, both by the people. The judiciary consists of a supreme court, a court of chancery, nine circuit courts, and the city court of Mobile. The preponderance of the farming interests is very remarkable; though, of course, extremely natural, and even inevitable. While grocers, shoemakers, engineers, wheelwrights, masons, &c., are reckoned only by the hundred, there are upwards of 66,000 farmers—that is, more than eight times the number of persons employed in manufacturing establishments throughout the state. After the war the government became provisional. In 1868 A. acceded to the demands of Congress, and the direction of state affairs was restored to the civil powers. Pop. in 1870, 996,992; in 1880, 1,262,794, of whom 664,986 were white, and 600,358 colored. The commercial metropolis is Mobile, pop. (1880) 48,602; but the state metropolis is Montgomery, pop. 52,392. The other chief towns are Selma, Huntsville, and Marion. See ALABAMA in AM. SUPP.

ALABA'MA, THE, an armed vessel of the Confederate States of America, which inflicted terrible injury upon the shipping of the Northern States of the American Union during the civil war which broke out in 1861. The career of the A. was in more than one respect unparalleled in the history of any previous naval war. She was, for a war-ship, a small vessel, built for speed, carrying a few guns, and intended not for fighting, but for preying upon defenceless merchant-ships. She was almost the only vessel the Confederate States had upon the open seas; but the destruction she wrought was so great, and in effect so alarming, as to produce a very marked diminution in the number of commercial vessels carrying the flag of the United States. She was built, too, in a British port, and never, at any time, entered a port of the state by which she was commissioned; there was no port available for the disposal of her prizes, and, ship and cargo, they were usually burned. Her career demonstrated how completely, in the present state of commerce, under the conditions of navigation and naval warfare produced by steam and long-range artillery, belligerents fairly matched might ruin each other at sea; and it raised international questions between the United States and Great Britain, which more than once threatened to issue in the gravest consequences to both nations. Even the end of the A. was singular and instructive; perhaps it was too honorable an end for such a career as hers. She went down in an artillery duel, quixotically entered upon for a fancied point of honor, with a vessel protected by armor; illustrating the impotence, in modern naval warfare, of the gallantry of the most gallant of seamen against advantages derived from speed, armament, and armor.

At the beginning of the civil war in 1861, the Confederate States were without a navy, and apparently without the means of acquiring one. Their population was agricultural; they had neither ships nor seamen; and the Northern States promptly instituted an effective blockade of nearly all their ports. The able men who had planned the secession of the Southern States from the American Union had not overlooked the subject of a navy; but events had been against them. They had reckoned upon securing a part of the United States fleet; and before the war commenced, they had determined upon fitting out small and swift vessels, carrying a few heavy guns, to cruise against the Northern commerce. They had no lack of able naval officers; for a majority of the senior naval officers of the United States were Southern men, and were at their command. Early in 1861, while parleying was still going on between the North and the South, and hopes of a peaceable separation were not extinct, Captain Raphael Semmes had been empowered by the Southern leaders to purchase ships and stores for the South; but as regards ships, Captain Semmes appears to have been unsuccessful. It was not till several months after the war began, in June, 1861, that the Confederate States were able to send their first armed cruiser to sea. This was the *Sumter*, a small steamer, which had previously traded between New Orleans and Havana. Captain Semmes, who was appointed her commander, was singularly qualified for the work expected of him.

He was a native of Maryland, about 51 years of age; he had been a Commander in the United States navy, and now held the same rank in the service of the Southern States. Besides possessing high professional abilities and attainments, he was a man of acute intellect and of decided character; and he was thoroughly instructed in the principles and details of international law and etiquette. He seems to have united with the good qualities of a naval officer the qualifications of an able lawyer, diplomatist, and publicist. He could be trusted to secure for a war-vessel of the Confederacy, however small, every advantage to which she was entitled from neutral powers; to give to subjects of neutral powers, and of the other belligerent alike, nothing which was not strictly their due; to carry out without flinching, unmoved by taunts and abuse, the work of destruction which was expected at his hands. His career in the *Sumter* is a record of triumphs won over neutral governors and ministers, who were disinclined to admit the little *Sumter* to the position of a belligerent war-vessel; of clever avoidance of the enemy's cruisers, of which several were always on his track; and of the destruction of valuable ships and cargoes belonging to citizens of the United States. The *Sumter* and her captain were soon known throughout the world The enemy called Captain Semmes a pirate, and could they have caught him, would probably have treated him as a pirate. But he appears to have done nothing but what it was his right as a belligerent to do; at any rate, he was scrupulous not to exceed the precedents of international law. It was upon his system of burning his captures, not upon the captures themselves, that the people of the Northern States founded their charge of piracy; but no Confederate port was open to him for the disposal of his prizes; and his treatment of them, though it greatly shocked an age which had seen scarcely anything of naval warfare, was warranted by precedents, and was probably, though not unquestionably, within his right. As an occasional resource, to be adopted upon an emergency, the burning of captures made at sea is undoubtedly lawful; it is not so certain that a belligerent is at liberty to carry out a *system* of burning captures, made without the hope of being able to bring

them into port for adjudication before a prize court. The cruise of the *Sumter*, which began on the 30th June 1861, with her escape from New Orleans, then strictly blockaded, was over before the end of the year; but she had captured 18 vessels, had spread alarm through the Northern seaports, and had put shipowners and merchants to heavy charges for insurance; and by disinclining merchants to ship their goods in Northern vessels, had seriously injured the shipping-trade of the Northern States. Eventually, she was laid up at Gibraltar, and declared unfit for further service: had she been seaworthy, it would have been very difficult to carry her out of a port where she was diligently watched by Northern cruisers. She had, however, verified the anticipations of the Confederate government; and in 1862, this government found a successor for her, much better fitted for the work to be done, and destined to far greater celebrity. This was the *Alabama*.

This vessel was built for the Confederate government by Messrs Laird and Sons at Birkenhead. She was a screw steam-sloop of 1040 tons register, built of wood, and for speed rather than strength. She was barque-rigged, and was fitted with two engines of 350 horse-power each; she was pierced for 12 guns, and had the means of carrying two heavy pivot-guns amidships. She cost £47,500 without her equipment; including her equipment, £51,716. Semmes, a captain in the Confederate service, was, in June 1852, appointed to superintend her equipment, and take command of her when ready for sea. Both Captain Semmes and Commander Bullock, who had superintended the building, were enjoined by the Confederate government to keep the destination of the vessel as secret as possible, and carefully to avoid any infringement of public law, or of the municipal law of Great Britain, which would give the British government a pretext for seizing her. These instructions were carefully acted upon. The destination of the 'No. 290,' as she was called from her number in the list of steamships constructed by the Messrs Laird, was so well concealed, that she was nearly finished before it was suspected by the emissaries of the United States. According to previous practice, there was no great difficulty in avoiding the infringement of the public and of the municipal law in such a case. It had been held lawful to build vessels for a belligerent in neutral ports, and lawful to purchase guns and stores in neutral ports, though they might be for the equipment of vessels thus built. What had been held unlawful was the equipment with guns and warlike stores of a vessel built for a belligerent in a neutral port previous to her leaving the neutral jurisdiction. Captain Semmes did not intend to equip his vessel at Birkenhead, and therefore, supposing the rules of public law to have remained unchanged, he intended no infringement of the law. But the United States minister called upon the British government to detain the 'No. 290,' submitting some evidence that she was intended for a Confederate war-vessel. He maintained, or, at anyrate, it has since been maintained on the part of the United States, that her construction, being that of a war-vessel, was so different from that of vessels built for trade, as itself in some measure to constitute an equipment for war. The British government consulted the crown lawyers, who at first thought the evidence of destination insufficient. Afterwards, when further evidence was presented, a delay was caused by the illness of Sir John Harding, the Queen's Advocate. When an opinion favorable to the detention of the vessel was at length given, 'No. 290' was gone. The builders, made aware of the danger of a seizure, had made haste with their work; the vessel, though unfinished, was got ready for sea; under pretense of a trial trip, she made her way down the Mersey to Moelfra Bay, where the work remaining to be done was actively carried on; and on the morning of the 31st July 1862, warning having been given that she was to be seized that day, the 'No. 290' steamed away from the British coast. The ablest English lawyers were of opinion that there had been no infringement of the law, but that a case had been presented which the British government was bound to submit to a court of law. The detention of the vessel during a protracted lawsuit would have served the purposes of the United States almost as well as her condemnation; and as she must have been detained but for the delay caused by Sir J. Harding's illness, it is not without a show at least of reason that the United States government claimed from Great Britain indemnification for the losses consequent upon her escape.

'No. 290' made for Terceira, one of the Western Islands, where she arrived on the 13th of August—her speed and sea-going qualities being fully proved upon the voyage; and a few days after she was joined by the *Agrippina* of London, carrying her guns, stores, and supply of coal, and by the *Bahama*, with Captain Semmes and his officers on board. By the 24th of August, she had shipped her armament and stores, and was ready for sea; and now Captain Semmes produced his commission to the sailors, named the vessel the A., and hoisted the Confederate flag. The sailors on board the A. and her consorts were Englishmen, all entered for a feigned voyage; but with few exceptions, they enlisted under Captain Semmes, though the terms upon which they insisted were exorbitant. The crew now consisted of 80 men all told; and the armament of eight 32-pounders. By the end of August, the vessel was got into good order; and she made her first capture on the 5th of September. Within eleven days of that date, she captured and burned property the value of which exceeded her own cost. The people of the United States were filled with indignation against Great Britain for permitting the escape of such a destroyer. Their indignation against 'the pirate Semmes' was only less than the alarm with which they regarded the depredations of the A. Several fast-sailing cruisers were sent in search of her.

Captain Semmes made for the American coast, which he had determined to make his first cruising-ground. He was ambitious of making a few captures within sight of New York; but running short of coal, he was obliged to give up this somewhat daring scheme, and make for a coaling-station. He afterwards lay on the track of the California mail-steamers running between Aspinwall and New York; and after waiting for some time, he captured the *Ariel* mail-steamer, with 140 marines, several United States officers, and 500 other passengers on board. A heavy gun and a quantity of specie were all that he took by this capture, but it greatly raised the prestige of the A., and increased the alarm of American shipowners. The passengers and crew of the *Ariel* were too numerous to be taken on board the A.; and as Captain Semmes found yellow fever raging at Kingston in Jamaica, at which port he intended to have landed them, he was unable to destroy the vessel, and had to set her free, after taking a bond for a large sum to be paid on the conclusion of the war. Shortly after, on the 11th January 1863, an encounter occurred between the A. and a United States vessel, which still further augumented the reputation of the former. Cruising off Galveston in Texas, the A. gave battle to the United States gun-boat *Hatteras*, an old vessel, somewhat her inferior in armanent, and sunk her after a few broadsides. The destruction of the *Hatteras* and the capture of the *Ariel* were the most remarkable events in the career of the A. until her closing scene arrived. Her history consists of a monotonous succession of captures made in different seas, her prizes being merchant-vessels incapable of resistance, which were burned, or, when there was convincing evidence of the neutral ownership of the cargo, which did not often happen, liberated upon bond. She captured in all 65 vessels; and the value of the property she destroyed has been estimated at 4,000,000 dollars: It was, however, by the heavy insurance for war-risks to which she subjected them, and still more by the difficulty she caused them in getting freights, that the A.'s career inflicted the greatest injury upon the shipowners of the United States. When the pursuit after her became too hot on the American coast, she sailed for the Cape of Good Hope, and cruised in the eastern seas. Returning to Europe, she arrived in the English Channel in June 1864, and on the 11th of June entered the French port of Cherbourg to refit and supply herself with stores. She had been nearly two years at sea, and had got into bad condition; her speed and sailing qualities were considerably impaired. Permission to make the necessary repairs was given by the authorities of the port of Cherbourg.

But within a few days, the United States steamer, *Kearsage*, commanded by Captain Winslow, a former shipmate of Captain Semmes, arrived at Cherbourg; and she made a demonstration which the officers and crew of the A.—writhing under the abuse that had been heaped upon them, and aware that their career had been inglorious—regarded and resented as a challenge. Captain Semmes, knew, and probably shared their feelings, and determined to gratify them; he sent notice to the United States consul that he would sail out and fight the *Kearsage*. The two ships were to appearance, not unequally matched, in reality the *Kearsage* had considerably the advantage in number of crew, armament, speed, and general condition; besides that, she was protected amidships by armor. The fact of her being thus protected, and the extent of her superority, seem to have been unknown to Captain Semmes. The fight took place on Sunday, the 19th of June, outside the port of Cherbourg, all Cherbourg gazing at it from the neighboring heights. The *Kearsage*, having the superiority in sailing, was able to keep at a distance of about 500 yards from her enemy; her armor in a great measure protected her from the enemy's shot; and as might be expected, her guns were better served than those of the Alabama. Before the fight had lasted an hour, Captain Semmes found his ship was sinking, and gave orders to pull down his flag. The boats were got out, and the wounded placed in them; but before the *Kearsage* could come to the rescue, the A. went to the bottom. The boats of the *Kearsage* saved many of the crew. Others, including Captain Semmes, were picked up by an English yacht, the *Deerhound*, which had been allowed by Captain Winslow to help in rescuing the A.'s crew. These the *Deerhound* immediately carried within the neutral jurisdiction. Semmes and the others saved by this vessel were afterwards charged with having broken their faith as prisoners who had asked for quarter from the *Kearsage*. As regards the *Deerhound*, the seamen of the A., once upon its deck were entitled to the protection of Great Britain, and

no previous compact could have deprived them of it.—See *The Cruise of the Alabama and the Sumter*, compiled from the papers of Captain Semmes.

The 'Alabama Question' was fairly raised in the winter of 1862—1863, when Mr. Seward, in his diplomatic correspondence, declared that the Union held itself entitled at a suitable time to demand full compensation for the damages inflicted on American property by the Anglo-rebel vessels; and the question never ceased to be a source of irritation between the two peoples till its final settlement by special tribunal of arbitration. This court, consisting of the representatives of England and the United States, and of three other members appointed by the king of Italy, the president of the Swiss Confederation, and the emperor of Brazil, met at Geneva, 17th December 1871, and the claim for indirect damages to American commerce having been allowed to drop, gave its final award, 15th September 1872. It was decreed that Great Britain should pay a sum of £3,229,166, 13*s*. 4*d*. See ALABAMA CLAIMS in AM. SUPP.

A'LABASTER. This name is given to two kinds of white stone, chemically distinct, but resembling each other in appearance, and both used for ornamental purposes. A. proper is a white, granular, semi-transparent variety of gypsum (q. v.) or *sulphate* of lime. It occurs in various countries, but the finest is found near Volterra, in Tuscany, where it is worked into a variety of the smaller objects of sculpture, vases, time-piece stands, &c. Gypseous A. of good quality is also found in Derbyshire, and many ornamental articles are made of it at Matlock and other places. Not being quite insoluble in water, it cannot be exposed to the weather; and its softness makes the surface easily become rough and opaque. Nor is it generally found in sufficient masses for large works. The other stone is a compact, crystalline *carbonate* of lime deposited from water in the form of a stalagmite, &c. It is distinguishable from the gypseous alabaster by its effervescing with an acid, and by its hardness; real alabaster may be scratched with the nail.—The name is derived from Alabastron, a town in Upper Egypt, where this kind of stone was abundant, and was manufactured into pots for perfumes. Such pots were called *alabastra*, even when made of other materials.

Alabastra.

ALAGO'AS, a maritime province of Brazil, which formed at one time a district of the province of Pernambuco. It is bounded on the N. and W. by Pernambuco, and on the S. it is divided from the province of Sergipe by the navigable river San Francisco. The country, which is mountainous in the north-west, and low, marshy, and unhealthy on the coast, contains (1872) 348,009 inhabitants. The chief productions are the sugar-cane, cotton-plant, mandioc or cassava, maize, rice, &c., and also timber and dye-woods. The capital A., is situated on the Lake Manguaba. The name A. is derived from the lakes (*lagoas*) in which the province abounds.

ALAIS, a town in the dep. of Gard, France, situated in a fertile plain, on the right bank of the Gardon, at the base of the Cevennes Mountains, 23 miles north-west from Nimes, with which it is connected by railway. It embraced the Protestant cause in the religious wars of France; and Louis XIII. in person, accompanied by the Cardinal de Richelieu, besieged it, and having taken it in 1629, demolished its walls. Three years later, the Baron of Alais having taken part in the rebellion of Montmorency, the castle was destroyed. Protestantism still prevails to a considerable extent. A. is a very flourishing town, and owes its prosperity chiefly to the mineral wealth of the surrounding district, which produces coal, iron, lead, zinc, and manganese. The coal and iron mines are of chief importance. There are large iron-foundries in the town and neighborhood. There are also manufactures of ribbons, stockings, gloves, vitriol, and earthenware. A. is an episcopal seat. Pop. (1872) 15,384.

ALAJUE'LA, a city of the state of Costa Rica, Central America, 23 miles west-north-west from Cartago, and a little on the western side of the water-shed between the Atlantic and the Pacific. It contains many good houses, and has extensive suburbs of detached houses, embowered among trees and flowering shrubs. The neighborhood is chiefly devoted to the culture of the sugar-cane. Pop., including suburbs, 12,575.

ALAMA'NNI, LUIGI, a distinguished Italian poet, born at Florence, Oct. 28, 1495. His father, a man of noble birth, was a zealous partisan of the Medici, and Luigi stood high in their favor, till, in revenge for some real or fancied wrong, he conspired against the life of Cardinal Guiliano, the representative of Leo X. This being found out, A. fled to Venice, and thence, on the accession of the cardinal to the papal chair, to France. In 1527, encouraged by the pope's reverses, he returned to Florence, and urged the Republic to seek the protection of Charles V., by means of Andrea Doria's friendly mediation. The Republic declared such a proposal treachery, and A. sailed with Doria for Spain. Finally, he settled in France, employed as a diplomatist by Francis I. and Henry II. A. died at Amboise in 1536. He wrote epics, dramas, and minor poems, much admired in their day, and disputes with Trissino the claim of first introducing blank verse into Italian poetry.

A'LAMOS, LOS (i. e. *The Poplars*), a town of Mexico, in the state of Sonora, and department of Sinaloa, 110 miles north-north-west from Sinaloa. It is situated in a barren plain, but in a region famous for its silver mines. The houses are mostly of stone or brick, covered with stucco. Provisions are dear, being brought from a distance, and the town is very insufficiently supplied with water. Pop. 10,000.

A'LAND ISLANDS (pronounced Oland), a numerous group of small islands and rocks at the entrance of the Gulf of Bothnia, opposite Abo, about 25 miles from the Swedish coast, and 15 from that of Finland. They are called, by the Finns, Ahvenammaa. About 80 of them are inhabited. Although these rocky isles are covered with but a thin stratum of soil, they bear Scotch fir, spruce, and birch trees, and with proper cultivation, produce barley and oats, besides affording subsistence to a hardy breed of cattle. The inhabitants are of Swedish origin, skilful sailors, fishermen, and seal-hunters. The total population is about 16,000. The largest of the islands, which gives its name (signifying 'Land of Streams') to the whole group, is about 18 miles long by 14 broad. It is tolerably wooded and fruitful, and contains nearly 11,000 inhabitants. These islands belonged formerly to Sweden, but were seized by Russia in 1809. Previous to this, they had several times changed hands between these two powers. In 1717, the Swedes were defeated by the Russians in a naval engagement near Aland, the first important exploit of the Muscovite navy. The importance of these islands as a military position led to the construction, in the reign of the Emperor Nicholas, of those strong fortifications at Bomarsund which, in August 1854, were destroyed by the Anglo-French force, commanded by Sir Charles Napier and Baraguay d'Hilliers. Two thousand prisoners were taken. This extensive fortress (which is supposed to have been but the first of an intended series of similar menacing fortifications in the Baltic) commanded the anchorage of Ytternæs, capable of containing a large fleet.

ALANGIA'CEÆ, a natural order of dicotyledonous plants, allied to *Myrtaceæ* (q. v.), and containing only about eight known species, trees and large shrubs, of which the greater number belong to the American genus *Nyssa* (see TUPELO), differing from the rest of the order in the absence of petals. The one-celled fruit, and pendulous albuminous seeds, constitute marks of distinction from Myrtaceæ. The fruit of *Alangium decapetalum* and *A. hexapetalum*, natives of the East Indies, are eatable, but mucilaginous and insipid. The timber is good, the roots aromatic.

ALARCON Y MENDOZA, JUAN RUIZ DE, one of the most eminent of Spanish dramatists, born at the town of Tasco in Mexico, about the end of the 16th c. He belonged to the ancient family of the Ruizes of Alarcon, of which a branch had emigrated to America. Having studied at the college that had been instituted in Mexico, he removed to Spain, where he is mentioned as *Relator del real consejo de las Indias* (Reporter of the royal council of the Indies) in 1622. The success that early attended his pieces, joined to the haughty disdain with which, in the consciousness of his own powers, he treated the opinion both of the public and of his brother-writers, excited the envy and jealousy of his contemporaries, so that he became the object of venomous epigrams by the most famous poets of the time, in which the deformed upstart from New Spain, with his pride and contemptuousness, was held up to public ridicule. This kind of persecution continued till his death, which occurred in 1639. Even during his lifetime, his best pieces were attributed to others, and were printed and represented under the names of more favored poets. This early withdrawal and oblivion of his name, together with the scarcity of his works, have been the cause that he has seldom been mentioned, and still less appreciated by historians of literature, even down to the latest times. Yet some of the best critics rank him next to Calderon and Lope de Vega as a dramatic writer. Besides many single or detached pieces printed in collections, he published a number in his *Comedias* (vol i., Madrid, 1628; vol. ii., Barcelona, 1634). Hartzenbusch began a collected edition at Madrid, 1848. A. attempted almost all the kinds of drama in vogue in his time; and was especially eminent in the heroic, as the best specimens of which may be mentioned, *El Tejedor de Segovia*, and *Ganar Amigos*, or *La que mucho vale mucho cuesta*. A.'s mastery in delineating character is shown in the *Comedias de Costumbres*, or character-comedies, of which he may be held as the creator.

The best known are *La Verdad Sospechosa* (imitated by Corneille in his *Menteur*) and *Las Paredes Oyen* (Walls have Ears), which

are yet represented on the Spanish stage. Of his comedies of intrigue, the best specimen is *Todo es ventura*. It does not appear that A. wrote any *Autos* or sacramental allegorical dramas, though his two pieces, *El Antichristo*, and *Quien mal ande en mal acaba*, betray a tendency to ascetic mysticism. Although, through the artifices of his contemporaries, as well as the *éclat* of Lope de Vega's and Calderon's dramas, the compositions of A. were soon driven from the stage, yet he remains, together with Tirso de Molina, the most distinguished and original among the successors of Lope. Lope and Calderon, the coryphæi of that age, are the only dramatists that excel A. Combining, in no mean degree, the characteristics of both, he excels them in purity of language and elevation of moral feeling.

A'LARIC I. (in German Al-ric, i. e., all rich) belonged to one of the noblest families of the Visigoths. He makes his first appearance in history in 394 A.D., as leader of the Gothic auxiliaries of Theodosius in his war with Eugenius; but after the death of the former he took advantage of the dissensions and weakness that prevailed in the Roman Empire to invade (395) Thrace, Macedon, Thessaly, and Illyria, devastating the country, and threatening Constantinople itself. Rufinus, the minister of Arcadius, appears to have sacrificed Greece in order to rescue the capital, and Athens was obliged to secure its own safety by ransom. A. proceeded to plunder and devastate the Peloponnesus, but was interrupted by the landing of Stilicho in Elis with the troops of the west. Stilicho endeavored to hem in the Goths on the Peneius; but A. broke through his lines, and escaped with his prisoners and booty to Illyria, of which he was appointed governor by the Emperor Arcadius, who was frightened by his successes, and hoped by conferring this dignity on him, to make him a peaceful subject instead of a lawless enemy (396). In 402, he invaded Upper Italy, and Honorius, the emperor of the west, fled from Rome to the more strongly fortified Ravenna. On the way to Gaul, A. was met and defeated by Stilicho at Pollentia on the Tanaro; but it was not till the following autumn that the result of the battle of Verona forced him to retire into Illyria. Through the mediation of Stilicho, A. concluded a treaty with Honorius, according to which he was to advance into Epirus, and thence attack Arcadius in conjunction with the troops of Stilicho. The projected expedition did not take place, yet A. demanded indemnification for having undertaken it; and Honorius, by the advice of Stilicho, promised him 4000 pounds of gold. When, after the death of Stilicho (q. v.), Honorius failed to fulfil his promise, A. advanced with an army, and invested Rome, which he refused to leave till he had obtained promise of 5000 pounds of gold, and 30,000 of silver. But neither did this negotiation produce any satisfactory result, and A. again besieged Rome (409 A.D.). Famine soon rendered it necessary that some arrangement should be made; and in order to this, the senate proclaimed Attalus, the prefect of the city, emperor instead of Honorius. But Attalus displayed so little discretion, that A. obliged him publicly to abdicate.

The renewed negotiations with Honorius proved equally fruitless with the former, and A. was so irritated at a perfidious attempt to fall upon him by surprise at Ravenna, that he advanced on Rome for the third time. His victorious army entered the city on August 24, 410, and continued to pillage it for six days, A. strictly forbidding his soldiers to dishonor women or destroy religious buildings. When A. quitted Rome, it was only to prosecute the conquest of Sicily; the occurrence of a storm, however, which his ill-constructed vessels were not able to resist, obliged him to abandon the project for the time; and his death, which took place at Cosenza, in Calabria, soon after (410), prevented his resuming it. In order that his remains might not be discovered by the Romans, they were deposited in the bed of the river Busento, and the captives who had been employed in the work were put to death. Rome and all Italy celebrated the death of A. with public festivities; and the world enjoyed a momentary repose. But A. himself was much less barbarous than his followers. He admired those monuments of civilization with which the Eternal City abounded, and sought to preserve them; he checked the excesses of his fierce soldiery, and at times gave indications that the lessons of Christianity which he had learned from the Arian missionaries had not been altogether forgotten. Yet through him, the Goths learned the way to Rome.

ALARIC II., eighth king of the West Goths, or Visigoths, succeeded his father in 484 A.D. He was of a peaceful disposition, and wished to live on friendly terms with the Franks. His dominions were very extensive. Besides Hispania Tarraconensis and Bætica, he possessed numerous rich provinces in Gaul, and formed an alliance, which still further increased his power, with Gondeband and Theodoric, the latter of whom was his father-in-law, and king of the East Goths. At length, however, he came into collision with the Frankish monarch, Clovis, whose cupidity had been excited by the extent and fertility of the territories over which A. ruled. An excuse was found for breaking the peace which existed between the two nations, in the fact that A. was a zealous Arian. This circumstance had given great offence to many of his subjects, who were orthodox Catholics; and ostensibly to vindicate the true doctrine, the newly converted barbarian, Clovis, declared war against him. The result was fatal to A. He was slain by the hand of Clovis himself at Vouillé, near Poitiers, and his forces completely routed.

A. is said to have been indolent and luxurious in his youth; but this may simply imply that he was not fond of those sanguinary pleasures which captivated his savage contemporaries. He was tolerant in his religious convictions. Though an Arian, he did not persecute the Catholics. He enacted several useful statutes, and kept a watchful eye on all parts of his kingdom. It was during his reign that the *Breviarium Alaricianum*, or code of A., was drawn up. It is a selection of imperial statutes and writings of the Roman jurisconsults. A. sent copies of it to all his governors, ordering them to use it, and no other. An edition of it was published by Sichard, at Basle, in 1528.

ALA'RM. In military matters, the word alarm has a more defined meaning than mere terror or fright. An alarm, among soldiers in an army, is not so much a danger, as a warning against danger. An alarm, signified by the firing of a gun or the beating of a drum, denotes to an army or camp that the enemy is suspected of intending a sudden surprise, or that the surprise has actually been made. There is an *alarm-post* in camp or garrison arrangements, to which the troops are directed to hasten on any sudden alarm being given.

ALA-SHEHR (i. e., *The Exalted City*, ancient *Philadelphia*), a city of Asia Minor, in the pashalic of Anatolia, 75 miles east-by-south from Smyrna at the north-east base of Mount Tmolus. It was founded by Attalus Philadelphus, king of Pergamos, about 200 B.C., and is famous as the seat of one of the 'Seven Churches of Asia.' It is still a place of considerable importance, and carries on a thriving trade by caravans, chiefly with Smyrna. It is surrounded by a wall, and is of large extent; but the streets are narrow and dirty. There are many interesting remains of antiquity. Pop. about 8000, including 250 Greek families.

ALA'SKA, the name now given to the whole of what was once Russian America, in the north-west corner of North America, but acquired from Russia by the United States, in 1867, at a price of 7,200,000 dollars. The name *Aliaska* is attached to the peninsula of A,, of which the Aleutian Isles form the natural continuation, and which was at first regarded by the Russians as an island. The connection of the peninsula with the continent was left to be ascertained by Captain Cook in his explorations in search of an arctic passage. The *territory* of A. embraces an area of 577,390 sq. m., with a population, according to the census of 1880, of 30,156; in 1870, it was guessed at 70,000. A volcanic mountain-chain runs along the coast of A., and out into the peninsula. The chief river is the Yukon, which rises in the Rocky Mountains, and has a course of 2000 miles. The vegetable productions of A. are very scanty, but its whale, salmon, cod, &c. fisheries are important. The moose, reindeer, and bears abound. The chief settlement is Sitka, formerly called New Archangel. Attached to A. are the Prybilov Islands, the seal fishery of which brings an annual rental to the United States of £60,000, while A. itself has hitherto been an actual charge upon the state treasury. See ALASKA in AM. SUPP.

ALATE'RNUS, according to some a genus of plants of the natural order *Rhamnaceæ* (q. v.), a kin to *Rhamnus* (see BUCKTHORN); but more generally regarded as a sub-genus of Rhamnus, consisting of evergreen shrubs, of which the best known is *Rhamnus A.*, or *A. phillyrea*, a large shrub, densely branched with shining alternate leaves, which are more or less ovate. The flowers are dioecious, racemed, numerous, and small, much sought after by bees. This shrub is abundant in the south of Europe, and is often planted in town-gardens in England to conceal walls and other objects, being of rapid growth, and not easily injured by smoke. The bark and wood have been used in dyeing.

ALAU'SI, a town of the republic of Ecuador, South America, in the province of Chimborazo, 70 miles east from Guayaquil, at an elevation of 7980 feet above the sea, in a valley of the Andes, on the river Alausi, which flows into the Gulf of Guayaquil. The valley of the Alausi is extremely fertile, producing sugar, grain, and fruits. There are manufactures of woollen and cotton cloth in the town. Pop. 6000.

ALA'VA, DON MIGUEL RICARDO DE, a Spanish general, born at Vittoria, in 1771, of a noble family in the province Alava. He entered the navy in early life; but afterwards changed to the land-service. After the abdication of Ferdinand VII., he was for a time a zealous partisan of France; however, in 1811, when he saw the fortunes of Joseph beginning to wane, he abandoned the cause of this prince, to embrace that of the national party, and accepted the office of Spanish commissary on the staff of Wellington. He gained the confidence of this general, and from this time manifested the strongest predilection for England and Eng-

lish institutions. The war of independence furnished him with numerous occasions of distinguishing himself. After the restoration of the king, however, he was arrested, on the suspicion of entertaining liberal opinions; but on the application of his uncle, Ethenard, the inquisitor, seconded by the influence of Wellington, he was not only liberated, but appointed ambassador to the Hague. He returned to Spain in 1820, after the revolution; became captain-general of Aragon, made himself conspicuous among the Exaltados, and figured in the ranks of the militia on occasion of the revolt of the royal guard at Madrid, July 7, 1822. In the Cortes assembled at Seville in 1823, he voted for the suspension of the royal authority, and took part in the negotiation carried on with the Duke of Angoulême, at Cadiz. The re-establishment of absolute monarchy in the Peninsula drove him, as a political refugee, to Brussels and England, till, at the death of Ferdinand, he was recalled by the regent, Maria Christina. In 1834, he was appointed Spanish ambassador to London; and towards the end of 1835, he undertook a mission to Paris. Under the administration of Isturiz, A. showed himself as zealous for the moderate system as he had been for the preceding one, and advocated the French intervention, which he had opposed during his embassy to London. After the insurrection of La Granja, he refused to swear to the constitution of 1812, declaring that he was tired of constantly taking new oaths; he gave in his resignation accordingly, and retired to France, where he died in 1843.

A'LBA, or A'LVA, FERDINAND ALVAREZ VON TOLEDO, Duke of, prime-minister, and general of the Spanish armies under Charles V. and Philip II., was born in 1508, of one of the most illustrious families of Spain. He was educated under the eye of his grandfather, who instructed him in the arts of war and of government. He fought, while yet a youth, at the battle of Pavia, and had the custody of Francis I. while a prisoner. He commanded under Charles V. in Hungary, was present at the siege of Tunis, and accompanied the expedition against Algiers. He defended Perpignan against the dauphin, distinguished himself in Navarre and Catalonia, and was in consequence created Duke of A. His cautiousness and his taste for political intrigue afforded as yet no very high evidence of his military talents; and even Charles V., whom he counseled, when in Hungary, to build a bridge of gold for the Turks, rather than hazard a decisive battle, seems to have intrusted him with the command rather as a matter of personal favor than recognition of his abilities. His pride was hurt at the low estimation in which he was held; and his real genius began to show itself. The victory which Charles V. gained at Mühlberg over John Frederic, Elector of Saxony, in 1547, was due to the able generalship of the Duke of A. Under his influence, as president of the council of war, the captive elector was condemned to death; and it was entirely against his wish that the emperor commuted the sentence. He took part under the emperor in the expedition against Henry II., king of France, who had taken possession of Metz; but here his exertions, as well as those of the emperor, proved unavailing. He was more fortunate in Italy against the combined armies of the pope and the French king, which he repeatedly defeated during the campaign of 1555. After the abdication of the emperor Charles V. in 1556, he continued to hold the command of the army, and overran the States of the Church, which, after the retreat of the French army in 1557, lay entirely at his mercy. He was obliged, however, by the command of Philip II., to conclude a peace with Pope Paul IV., and restore all his conquests. Being recalled from Italy, he appeared in 1559 at the court of France, with which Spain had become reconciled by the peace of Château-Cambresis (April 3, 1559); and, as proxy for his sovereign, espoused Elizabeth, Henry II.'s daughter.

When the inhabitants of the Netherlands, who had been accustomed to freedom, revolted against the tyranny of Spain, and especially against the hated inquisition, the Duke of A.'s counsel was to suppress the insurrection forcibly and with rigor. The king accordingly committed the matter to his hands, and sent him to the Netherlands, 1567, with unlimited power and a large military force. His first step on arriving was to establish what was called the 'Bloody Council,' in which he himself at first presided, and over which he afterwards appointed the sanguinary Don Juan de Vargas. This tribunal condemned all without distinction whose opinions appeared dubious, or whose wealth excited jealousy. The present and the absent, the living and the dead, were subjected alike to trial, and their property confiscated by the council. A number of the merchants and mechanics emigrated to England; above 100,000 abandoned their native country, and many others enlisted under the banners of the proscribed princes, Louis and William of Orange. A., rendered still more savage by a defeat which befell his lieutenant, the Duke of Aremberg, put to death the Counts Egmont and Horn on the scaffold. He afterwards defeated Prince Louis, and compelled William of Orange to retire to Germany; upon which he entered Brussels in the greatest triumph on the 22d December 1568.

The pope presented him with a consecrated hat and sword, as Defender of the Catholic faith; an honor which, having been hitherto conferred only on crowned heads, increased his insolence to the highest degree. He caused a statue to be cast, in which he was represented as trampling under foot two human figures, representing the nobles and people of the Netherlands; and this he set up in Antwerp. His executioners shed more blood than his soldiers; and none now withstood his arms except Holland and Zealand. But these provinces continually renewed their efforts against him, and succeeded in destroying the fleet which had been equipped by his orders. This disaster, and perhaps still more the apprehension that he might lose the king's favor, induced him to request that he might be recalled. Philip gladly acceded; as he perceived that the obstinacy of the rebels was only increased by these cruelties; and he was desirous of trying the effect of milder measures. A. accordingly resigned the command of the troops to Don Louis de Requesens, and (December 18, 1573) left the country, in which, as he himself boasted, he had executed 18,000 men. The war which he had kindled burned for sixty-eight years, and cost Spain 800,000,000 dollars, her finest troops, and the loss of seven of the richest provinces of the Netherlands.

A. was received at Madrid with the highest distinction, but did not long enjoy his former consideration. Don Frederic, one of his sons, having seduced one of the queen's ladies of honor under promise of marriage, and being arrested on this account, the father assisted him to escape, and in opposition to the desire of the king, united him in marriage to one of his relatives. He was in consequence banished from the court to his castle of Uzeda, where he lived two years. But now the troubles in Portugal, the crown of which Philip claimed as his hereditary right, induced the king to draw A. anew from his retreat. The duke accordingly led an army into Portugal, and drove out Don Antonio, who, as grandson of John III., had taken possession of the throne. The whole country was speedily conquered (1581); and A., with his accustomed cruelty and rapacity, seized the treasures of the capital himself, while he allowed the soldiers to plunder without mercy the suburbs and the surrounding country. Philip, dissatisfied with these proceedings, desired to have an investigation of the conduct of the duke; but the haughty bearing of the latter, and the fear of a revolt, induced him to abandon it. A. died at Lisbon, December 11, 1582, at the age of 74. He had a fine countenance, with a haughty air and a robust frame; he slept little, while he both labored and wrote much. It has been said of him, that during sixty years of military service he never lost a battle, and never allowed himself to be surprised.

A'LBA (ancient *Alba Pompeia*), a very ancient city of North Italy, in the province of Cuneo, on the right bank of the Tanaro, 31 miles south-east from Turin. It is situated in a plain surrounded by hills. The neighborhood produces much wine and silk, besides corn, oil, and fruits. The town has an extensive trade in cattle. It is an episcopal seat; the cathedral was founded in 1486. Pop. 6600.

ALBACE'TÉ, a town of Spain, capital of the province of the same name, in Murcia, 138 miles south-east from Madrid, and a station on the railway from Madrid to Alicante. It stands in a fertile but treeless plain, is built with some degree of regularity, and contains a number of squares and many good houses. It is a place of considerable trade, and has great cattle-fairs in September. It is noted in Spain for the manufacture of knives and other steel goods, which, however, are very inferior of those of Sheffield. Pop. 18,976.—The province of Albacete is partly formed from the former kingdom of Murcia, and partly from New Castile. It is generally hilly, and in some parts mountainous, some of its mountains attaining an altitude of 5000 feet; but it contains also rich plains and fertile valleys. Agriculture is in a more advanced state than in most parts of Spain; corn and wine are largely produced, as also oil, hemp, tobacco, saffron, fruits of various kinds, and honey. Great numbers of sheep, goats, oxen, horses, mules, and asses are reared. The mineral wealth of the province appears to be considerable, but is not turned to much account. The area of the province is 5966 sq. m.; pop. (1877) 219,122.

A'LBA LO'NGA, one of the most ancient cities of Italy, situated on the rocky ridge that runs along the eastern shore of the Alban Lake, between the lake and the Alban Mount. See ALBANO. According to legendary history, it was built by Ascanius, the son of Æneas, about 300 years before the foundation of Rome, which is represented as a colony of A. Notwithstanding this, the Romans, under Tullus Hostilius, destroyed the city, and removed the inhabitants to Rome. It seems certain that A. was an important city long before the existence of Rome, and the head of a confederation of Latin towns, and that when it was destroyed, many of its inhabitants settled at Rome. Some traces of its walls are yet to be seen.

A'LBAN, ST, the first martyr of Britain, was born at Verulam, in the 3d c., and after having long lived as a heathen, was con-

verted to Christianity, but put to death at the commencement of Diocletian's persecution of the Christians. His anniversary is celebrated on the 22d June. The town of St. Albans (q. v.), which bears his name, is believed to stand on the site of his birthplace, or the scene of his martyrdom.

ALBA'NI is the name of a rich and celebrated family of Rome, who came originally from Albania in the 16th c., and settled first at Urbino. The great influence of the family dates from the accession (1700) of Giovanni Francesco A. to the papal throne, as Clemens XI. It has since furnished a succession of cardinals. It was Cardinal Alessandro A. (b. 1692—d. 1779) who formed the famous collection of objects of art in the VILLA A., outside the Porta Salaria at Rome. It is still a rich collection, although part of it was carried off by the French. The pieces taken away were restored in 1815; but the then possessor being unable to pay for their removal to Rome, sold them to the king of Bavaria.

ALBANI, FRANCESCO, a painter of the Bolognese school, of the time of the Caracci; born at Bologna, 1578, and died there in 1660. He studied, along with Guido Reni, first under Calvert, and afterwards under the Caracci. He has painted above fifty altar-pieces, worthy of the Caracci school; but his inclination lay more to the representation of scenes of a playful and pastoral, or of a mythical kind, and of this nature are the greater part of his pieces. He had by his second wife a family of twelve children of extraordinary beauty, in whom he found exquisite models for his Venuses, Galateas, and angels' heads; with the disadvantage, however, of imparting a certain uniformity to the countenances of his figures. His representation of the Four Seasons, so often imitated, gained him great renown. A.'s chief defect lies in the expression of life and feeling.

ALBA'NIA forms the south-west district of European Turkey, and occupies the west of the Balkan Peninsula, from Bosnia and Montenegro to the Greek frontiers, which the Berlin Congress of 1878 recommended should be advanced to the Kalamas River. Upper or Northern Alabania corresponds to the Illyria of the Romans, and Lower or Southern Albania corresponds to the ancient Epirus. On the east boundary, forming the water-shed of the peninsula, rises the range of the Bora-dagh and the Pindus. The first detaches itself from the wild masses of the Tshar-dagh (dagh in Turkish means *mountain*) and Argentaro mountains; and west of it lie parallel chains, enclosing on the one side, long elevated valleys, and sinking on the other in terraces, down to level strips along the coast, consisting mostly of unhealthy swamps and lagoons. Pindus, to the south is also flanked by isolated basins or hollows, whose western edges pass into the jagged and thick-wooded Epirotic highlands. These highlands advance to the sea, forming steep rocky coasts; one promontory, the Acroceraunian, projecting in Cape Linguetta far into the sea, reaches a height of 4—5000 feet.

The chief rivers are the Bojana, the Drin, the Skombi, Ergent, Vojussa, Glykys or Acheron (which follows for some distance a subterranean channel, and on reappearing, is called Mauropotamos), the Arta, and the upper course of the Aspropotamos. Among the lakes, those of Bojana, Ochri, and Janina, are the most important.

A fine climate, the heat of which is tempered by high mountains and the proximity of the sea, and a favorable soil, would seem to invite the inhabitants to agriculture; but for the most part in vain. In the north, little or nothing is cultivated but maize; in the moist valleys, a little rice and barley are produced; but the mountain-terraces are used as pastures for numerous herds of cattle and sheep. In Epirus, there is more variety. Here the slopes of the lower valleys are covered with olives, fruit and mulberry trees, intermixed with patches of vines and maize, while the densely wooded mountain-ridges furnish valuable supplies of timber. The plateau of Janina yields abundance of grain; and in the valleys opening to the south, the finer fruits are produced along with maize, rice, and wheat. Even cotton and indigo might be profitably cultivated in the moist valleys; but in its present wretched condition, the country can barely support its scanty population.

The inhabitants, estimated at about a million, form a peculiar people, the Albanians or Arnauts; they call themselves Skipetars. They are descendants of the ancient Illyrians, mixed with Greeks and Slaves, and not to be confounded with the Albani that live on the Caspian Sea. The Albanians are half-civilized mountaineers, frank to a friend, vindictive to an enemy. They are constantly under arms, and are more devoted to robbery and piracy than to cattle-feeding and agriculture. They live in perpetual anarchy, every village being at war with its neighbor, and even the several quarters of the same town carrying on mutual hostilities. Many of them serve as mercenaries in other countries, and they form the best soldiers of the Turkish army. At one time, the Albanians were all Christians; after the death of their last chief, the hero Scanderbeg, and their subjugation by the Turks, a large part became Mohammedans, who distinguished themselves by cruelty and treachery towards the tribes that remained true to their old faith. There are three main divisions of the Albanians—the *Gheg* (*Ghegides*), in Upper A., the purest representatives of the ancient Illyrian stock; the *Toshk* (*Toskides*), in Central and Lower A.; and the *Epirots*, largely mixed with Greeks, in the south. To the latter section belong the Suliots (q. v.). The Mirdites, who are Catholics, are the noblest of the northern tribes. The Albanian or Skipetar language, which is a distinct and peculiar tongue, belongs to the Indo-European group, and is derived from the ancient Illyrian, mixed with Greek, Turkish, and other intrusive elements. There are two main dialects, northern and southern. A. was officially divided by the Turks into the vilayets of Scutari and Janina. The Berlin Congress of 1878 granted a considerable addition of territory to Montenegro, including Podgoritza and Antivari. This cession, as also that of Dulcigno, demanded from the Porte by the western powers in 1880, was opposed by the Albanians, who formed a national league to prevent it. A Conference of Plenipotentiaries, held at Berlin in 1880, insisted that the Porte should carry out the recommendation of the Berlin Congress, and cede to Greece the portion of A. lying south of the Kalamas River. Turkey, however, agreed in 1881 to cede only the portion east of the river Arta, with the town of Arta.

ALBA'NO, a town of Italy, about 18 m. from Rome, on the declivity of the lava-walls which encompass the lake Albano, and opposite the site of Alba Longa. It is the seat of a bishop, and is surrounded by the mansions of wealthy Romans. A valuable wine is made here. Pop. 6200.

THE ALBAN LAKE, or Lago di Castello, is formed in the basin of an extinct volcano, and has a circumference of 6 miles, with the enormous depth of more than 1000 feet. Its elevation is nearly 1000 feet above the sea-level. While the Romans were at war with the Veientes (390 B.C.), this lake rose to an extraordinary height in the heat of summer, and without any apparent cause. Etruscan diviners declared that the conquest of Veii depended upon letting off the waters of the lake. Stimulated by this, the Romans, under the direction of the Etruscans, opened an emissary or tunnel through the lava-wall which bounds it. In the execution of this work they acquired the art of mining, which they now applied to undermine the walls of Veii. The tunnel, which still remains, and still fulfils its ancient office, is 1½ miles in length, with a height of 7 feet, and a width of 4 feet. On the eastern bank of the lake, rises Monte Cavo, the ancient Mount Albanus, 3000 feet high, affording an extensive and magnificent view from its summit. Upon it once stood the magnificent temple of Jupiter Latialis, which was approached by a paved way, for the ascent of the solemn processions of the Latin confederation (*Feriæ Latinæ*), and for the ovations of Roman generals. The road remains, in great part, perfect to this day.

The Albano stone, called Peperino, was much used in Roman buildings. It is a kind of volcanic tufa, of an ash-color, and is still quarried extensively at A.

A'LBANS, ST, an ancient borough in Hertfordshire, situated at the top and northern side of a picturesque hill 21 miles north-west from London. The Ver, a small tributary of the Colne, separates it from the ancient Verulamium (Verulam), an important station in the time of the Romans, and the scene of a terrible slaughter in the insurrection under Boadicea. In honor of St. Alban, said to have suffered martyrdom here in 297, a Benedictine monastery was founded by Offa, king of Mercia, in 796. The foundation of the town is supposed to be due to Ulsig (or Ulsin), who was abbot about 150 years later. Two battles were fought near St. A. during the Wars of the Roses, in 1455 and 1461. In the first, Henry VI. became a captive; in the other, he was set at liberty by his brave queen, Margaret of Anjou. The old abbey-church, restored in 1875 by Sir Gilbert Scott, is a cruciform building of irregular architecture, 547 feet in length, by 206 in breadth, with an embattled tower 146 feet high. The abbot of St. A. had a seat in the House of Peers, and had precedence of all other English abbots. In St. Michael's Church is to be seen a monument to the memory of the great Bacon, who bore the titles of Baron Verulam and Viscount St. A. More recently, the Beauclerk family have taken from this place the title of duke, and the Grimston family that of earl. The borough was disfranchised in 1852 for bribery; pop. (1881) 10,930, many of whom are employed in straw-plaiting. St. A. has recently been made the center of a new diocese of the Church of England; its first bishop having been enthroned in June 1877.

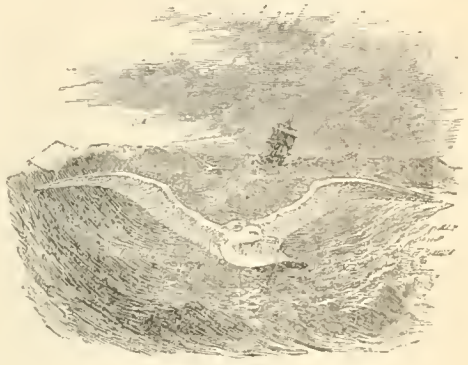
A'LBANY, or ALBAINN, an ancient name for the Highlands of Scotland, and retained in some degree of use down to our own day. Connected with it is the term *Albiones*, applied to the inhabitants of the entire British island in Festus Avienus's account of the voyage of Hamilcar, the Carthaginian, in the 5th c. B.C.; also the term *Albion*, which appears as the name of the island in Aristotle's Treatise of the World. It may, indeed, be pretty safely assumed that Albion or Albany was the original name of Britain among the Celtic population; and that it only became restricted to the north-west provinces of Scotland, when the Celts

had for the most part become confined to the same region. Albainn means a country of heights (the root being *alb* or *alp*, a height); and it is remarkable to find Albania also a mountainous country. The modern use of the name A. may be said to have taken its rise in an act of a Scottish council held at Scone in June 1398, when the title of Duke of A. was conferred on the brother of King Robert III., then acting as regent of the kingdom. The title, being forfeited in the son of the first holder, was afterwards conferred on Alexander, second son of King James II., in the person of whose son, John, it became extinct in 1536. Subsequently it was conferred in succession on Henry Lord Darnley, on Charles I. in infancy, on James II. in infancy, and (as a British title) on Frederick, second son of George III. Prince Charles Stuart assumed the appellation of Count of A. as an incognito title, and gave the title of Duchess of A. to his legitimated daughter. The title was restored in 1881, when the Queen conferred it upon Prince Leopold.

ALBANY, the capital of New York, U. S., is situated on the west bank of the Hudson River, 145 m. north of New York city, in lat. 42° 39′ N., and long. 73° 45′ W. After Jamestown and St. Augustine, in Virginia, it is the oldest town in the Union, having been founded by the Dutch in 1623, though it did not receive its present appellation until 1664, when it came into the possession of the English, and was so named in honor of the Duke of York and Albany. It is situated in the midst of a fertile and well-cultivated country, and is one of the most flourishing cities in the States, being the chief emporium for the transit-trade of the coast-towns with those of the north and north-west. It is advantageously built for commerce, being situated at the point where the United Erie and Champlain Canals join the Hudson. It is also the center in which a number of railways meet, connecting it with New York, Buffalo, Boston, and other important cities. One of the most important articles in its commerce is timber. It is one of the largest timber-markets in the world; receiving yearly many millions of cubic feet, valued at over 7,000,000 dollars. In the year 1873, the total number of vessels which belonged to the port was 586, and their tonnage amounted to 68,682 tons; of this number of vessels, 101 were steamers. Viewed from some parts of the river, A. has a picturesque and imposing appearance. Its streets are not generally very regular, or its houses very elegant; nevertheless, it contains some of the most splendid edifices in the Union. The Capital, erected at great cost, in the Renaissance style, is one of the finest public buildings in America. The City Hall is built of marble, and ornamented with a gilded dome. A. is distinguished for its educational and literary institutions. The university, incorporated in 1852, has for its aim the discipline of the American youth in the most important branches of practical science. The medical college, founded in 1839, has one of the best museums in the States, and is otherwise amply furnished with the means of instruction. There is likewise a large number of public schools. Pop. in 1870, 69,422; in 1880, 90,903. See ALBANY in AM. SUPP.

ALBANY, LOUISA-MARIA CAROLINE, also ALOYSIA, COUNTESS OF, wife of the unfortunate Prince Charles-Edward (q. v.), grandson of James II. of England. She was the daughter of the Prince Gustavus Adolphus of Stolberg-Gedern, who fell in the battle of Leuthen in 1757. This lady was born in 1753, and, during her married life, bore the name of the Countess of A. She had no children; her marriage proved an unhappy one; and in order to escape from the ill-usage of her husband, who lived in a state of continual drunkenness, she sought refuge in a nunnery, 1780. At the death of the Prince in 1788, the court of France allowed her an annual pension of 60,000 livres. She outlived the House of the Stuarts, which became extinct at the death of her brother-in-law, the Cardinal of York, in 1807. She died at Florence, which was her usual place of residence, on the 29th of January, 1824. Her name and her misfortunes have been transmitted to posterity through the works and autobiography of Alfieri (q. v.), to whom she was privately married. Their remains repose in the same tomb in the Church of Santa Croce at Florence, between the tombs of Macchiavelli and Michael Angelo.

A′LBATROSS (*Diomedea*), a genus of web-footed birds of the family of the *Laridæ*, nearly allied to gulls and petrels. Their feet have no hind-toe nor claw; they have a large strong beak—the upper mandible, with strongly marked sutures, and a hooked point. The common Albatross (*D. exulans*), also called the Wandering A., is the largest of web-footed birds, the spread of wing (usually 11 ft.) being sometimes 17 ft. and the weight 20 pounds or upwards. The wings, are, however, narrow in proportion to their length. This bird is often seen at a great distance from land, and abounds in the southern seas, particularly near the Cape of Good Hope, whence sailors sometimes call it the Cape Sheep. It often approaches very near to vessels, and is one of the objects of interest which present themselves to voyagers far away from land, particularly when it is seen sweeping the surface of the ocean in pursuit of flying-fish. It seems rather to float and glide in the air than to fly like other birds, as, except when it is rising from the water, the motion of its long wings is scarcely to be perceived. The plumage is soft and abundant, mostly white, dusky on the upper parts, some of the feathers of the back and wings black. The bill is of a delicate pinky-white, inclining to yellow at the tip. The A. is extremely voracious; it feeds chiefly on fish and mollusca, but has no objection to the flesh of a dead whale, or to any kind of carrion. It is not a courageous bird, and is often compelled to yield up its prey to sea-eagles, and even to the larger kinds of



Albatross.

gulls. When food is abundant, it gorges itself like the vultures, and then sits motionless upon the water, so that it may sometimes be taken with the hand. Not unfrequently, however, on the approach of a boat, it disgorges the undigested food, and thus lightened, it flies off. Its cry has been compared to that of the pelican; it also sometimes emits a noise which has been likened to the braying of an ass. Its flesh is unpalatable. It heaps up a rude nest of earth not far from the sea, or deposits its solitary egg in a slight hollow which it makes in the dry ground. The egg is about four inches long, white, and spotted at the larger end; it is edible. There are seven species of this genus. One of these (*D. fuliginosa*), chiefly found within the Antarctic Circle, is called by sailors the Quaker Bird, on account of the prevailing brown color of its plumage. Albatrosses appear in great numbers towards the end of June, about the Kurile Islands and Kamtchatka. The Kamtchadales take them by baited hooks, blow up the entrails for floats to their nets, and make tobacco-pipes and various domestic articles of the wing-bones.

ALBAY′, a town of the island of Luzon, Philippine Islands, the capital of a province of the same name, in the south end of the island. It is situated about two miles from the bay of Albay, which is an excellent harbor, and very near a volcano also called Albay, which is in a state of constant activity. Earthquakes are frequent, but the province is very fertile. The town is regularly built, contains some good houses, and is a place of considerable trade. Pop. 13,115.

ALBE, or ALB (Lat. *Albus*, white), the long white linen vestment worn in early times by all ecclesiastics at divine service. It differed from the more modern surplice (q. v.), which is only a modification of it, in having narrower sleeves. At the foot and wrists were embroidered ornaments called *apparels*. In the ancient church, newly baptized persons were obliged to wear a similar garment for eight days; and hence catechumens were called *albati*; and the Sunday after Easter, on which they usually received baptism, came to be called Dominica in Albis. See WHIT-SUNDAY.

Albe.

ALBERO′NI, GIULIO, CARDINAL, the son of a poor vine-dresser, was born on the 31st of May, 1664, at Firenzuola in Parma. From being merely a chorister in a church at Piacenza, he quickly rose, through his abilities, to the dignity of chaplain and favorite of Count Roncovieri, Bishop of St. Donino. He was afterwards sent to Madrid as *chargé d'affaires*, by the Duke of Parma, where he gained the favor of Philip V. of Spain, and had the honors successively conferred on him of grandee, cardinal, and prime-minister. In this last capacity he was of singularly great service to Spain, overthrowing the intriguing family of Ursini, bringing about the second marriage of Philip V. with Elizabeth Farnese, and stimulating the expiring energies of Spain. A new life dawned upon the nation, which learned to forget the hardships

it had suffered in the Spanish Wars of Succession; although, on the other hand, it must be admitted that it was principally through his instrumentality that the last liberties and rights of the people were sacrificed in favor of absolutism. He was ambitious, and ambition is always despotic and unscrupulous; hence, to gratify the covetous desires of his new mistress, he suddenly invaded Sardinia, in violation of the Peace of Utrecht, cherishing the hope of re-establishing the monarchy of Charles V. and Philip II., and startling Europe by his insolent audacity. The Regent of France broke off his alliance with Spain, and united himself with England and the Emperor; but A. was not dismayed. Even when the Spanish fleet in the Mediterranean was destroyed by an English one, he contemplated an extensive war by land, in which all the European powers would have been entangled. He patronized the Pretender, to annoy England, and the French Protestants, to annoy Louis.

He sought to unite Peter of Russia and Charles XII. with him, to plunge Austria into a war with the Turks, to stir up an insurrection in Hungary, and, through his influence with one of the parties at the French court, he actually accomplished the arrest of the Regent himself (the Duke of Orleans). But so universal became the complaints against A., that Philip lost courage, and concluded a treaty of peace, the chief condition of which was that the cardinal should be dismissed, which was effected through the influence of Elizabeth herself, now weary of the arrogance of her late favorite. On the 20th of December, 1720, A. received a command to quit Madrid within twenty-four hours, and the kingdom within five days. Exposed to the vengeance of every power whose hatred he had drawn upon himself, he knew no land where he could remain. Not even to Rome could he venture, for Clement was more bitterly inimical to him than any secular potentate. He wandered about in disguise, and under fictitious names. At length, he was imprisoned in the Genoese territory, through the solicitations of the pope and the Spanish monarch; but he speedily recovered his liberty, and two years after the death of Clement, was reinstated by Innocent XIII. in all the rights and dignities of a cardinal. In 1740 he retired to Placenza, where he died twelve years after (June 26, 1752) at the age of 88. He bequeathed his possessions in Lombardy to Philip V., while his cousin and heir, Cæsar A. became possessor of 1,000,000 ducats.

A'LBERT, Alexander Martin, a member of the Provisional Government of France after the revolution of February 1848, was born at Bury (Oise) in 1815. His father was a peasant, and he himself learned a mechanical trade at Paris. He took part in the revolution of July 1830, and was implicated in the celebrated trial of 1834; after which he devoted himself to the study and discussion of political questions, yet not abandoning his workshop. He commenced at Lyon the republican journal called *La Glaneuse*, on account of which he was condemned to a fine of 5000 francs when the insurrection broke out at Lyon. In 1840 he began *L'Atelier*, a paper conducted exclusively by operatives, and devoted to their interests. On the evening before the proclamation of the republic in February 1848, he was making buttons in his workshop; and on the nomination of Louis Blanc, he was called to take part in the Provisional Government. He was afterwards chosen president of the Commission for National rewards; but he soon resigned this post. He was elected by a large majority of voices as the representative of the department of the Seine in the National Assembly; but involving himself in the attempt of May 15, 1848, against the government as it then existed, he was arrested, and sentenced to transportation. He was, however, soon liberated.

ALBERT, Count of Bollstadt, usually called Albertus Magnus, also Albertus Teutonicus, a man less distinguished for orginality, than for the extent of his requirements and his efforts for the spread of knowledge, especially of the works and doctrines of Aristotle, was born at Lauingen, in Swabia, in 1205, or, as some say, in 1193. After finishing his studies at Padua, he entered the order of the Dominican friars, and taught in the schools of Hildesheim, Ratisbon, and Cologne, where Thomas Aquinas became his pupil. In 1230 he repaired to Paris, where he publicly expounded the doctrines of Aristotle, in spite of the prohibition of the Church. In 1249, he became rector of the school at Cologne; and in 1254, provincial of the Dominican order in Germany. In 1260, he received from Pope Alexander IV. the bishopric of Ratisbon. But in 1262, he retired to his convent at Cologne, to devote himself to literary pursuits; and here he composed a great number of works, especially commentaries on Aristotle. He had fallen into dotage some years before his death, which occurred in 1280. The fullest edition of his works was prepared by Pierre Jammy, the Dominican (21 vols., Lyon and Leyden, 1651); but it is far from being complete. Many of the writings attributed to A. seem to be spurious; among others that entitled *De Secretis Mulierum*, which was widely circulated during the middle ages. The extensive chemical and mechanical knowledge which A. possessed, considering the age in which he lived, brought upon him the imputation of sorcery; and in German tradition he has a very ambiguous reputation. It is recorded, for instance, that in the winter of 1240, he gave a banquet in the garden of his convent, at Cologne, to William of Holland, king of the Romans; and that during the entertainment, the wintry scene was suddenly transformed into one of summer bloom and beauty. This myth rests most likely on the fact of A. having had a greenhouse.—The scholastics who followed A.'s opinions took the name of *Albertists*.

ALBERT, Francis (Albert) Augustus-Charles-Emmanuel, Prince of Saxe-Coburg-Gotha, Consort of Victoria, Queen of Great Britain, born August 26, 1819, was the second son of the late Duke of Saxe-Coburg-Gotha, by his first marriage with Louisa, daughter of the Duke of Saxe-Gotha-Altenburg. The Prince, after a careful domestic education, along with his elder brother, the reigning Duke, attended the university of Bonn, where, in addition to the sciences connected with state-craft, he devoted himself with ardor to the study of natural history and chemistry, and displayed great taste for the fine arts, especially painting and music. Several compositions of his obtained publicity, and an opera was afterwards performed in London, said to have been composed by him. Gifted with a handsome figure, he attained expertness in all knightly exercises. It was this accomplished Prince that the young Queen of Great Britain selected as her partner for life. The marriage was celebrated in London on the 10th of February 1840. On his marriage, Prince Albert received the title of Royal Highness, was naturalized as a subject of Great Britain, and obtained the rank of Field-marshal, the knighthood of the Order of the Bath, and the command of a regiment of Hussars. As the union proved, in the highest degree, a happy one, the prince was loaded with honors and distinctions both by the Queen and the nation. The title of Consort of Her Most Gracious Majesty was formally conferred in 1842, and that of Prince Consort, in 1857, made him a prince of the United Kingdom. He was also made a member of the Privy Council, Governor and Constable of Windsor Castle, Colonel of the Grenadier Guards, Acting Grand Master of the Order of the Bath, Chancellor of the University of Cambridge, Master of the Trinity House, &c. Notwithstanding his high and favored position, the Prince, with rare prudence and tact, abstained from meddling with state affairs and thus escaped the jealousy and detraction of parties. When the Whig ministry of 1840 proposed for him the income of £50,000, as Consort of Queen Victoria, the Tories, in conjunction, with the Radicals, succeeded in limiting the sum to £30,000. This appears to have been the only instance of any manifestation of party feeling with reference to the Prince. On the other hand, he opened for himself an influential sphere of action, in the encouragement and promotion of science and art, appearing as the patron of many useful associations and public undertakings. The Exhibition of 1851 owed much to the Prince. He died 14th December 1861. His *Life* by Theodore Martin, in five volumes, appeared between 1874 and 1880.

ALBERT or ALBRECHT. Five sovereign dukes of Austria (q. v.) bore this name, of whom two (I. and V.) were also emperors of Germany. A. I., Duke of Austria and Emperor of Germany, was the eldest son of Rudolph I., and born in the year 1248. Rudolph, about the close of his career, made an effort to have A. appointed his successor; but the electors, tired of his authority, and emboldened by his age and infirmities, refused to comply with his request. After Rudolph's death, Austria and Styria revolted; but A., having vigorously crushed the insurrection, had the audacity to assume the insignia of the empire without waiting for the decision of the Diet. This violent measure induced the electors to choose, in preference to him, Adolphus of Nassau. Disturbances in Switzerland, and a disease which cost him an eye, now rendered him more humble; he delivered up the insignia which he had so rashly assumed, and took the oath of allegiance to the new emperor, who, however, after some years, so completely disgusted his subjects, that A. began to entertain hopes of recovering his imperial dignity. In 1298, Adolphus was deposed, and A. elected; but the former having resolved to maintain his title, A. was obliged to fight for the crown. The rivals drew up their forces near Worms, where a battle ensued, in which Adolphus was defeated and slain. A., feeling that he might now safely display magnanimity, voluntarily resigned the crown which had been recently conferred upon him; and, as he had anticipated, was unanimously re-elected. His coronation took place at Aix-la-Chapelle, in August 1298. But the pope, Boniface VIII., denied the right of the princes to elect A., declared himself the only true emperor and legitimate king of the Romans, summoned the former before him, required him to ask pardon and do penance, forbade the princes to acknowledge him, and released them from their oath of allegiance. A., on the other hand, with his usual intrepidity, defied his Holiness, formed an alliance with Philip the Fair of France, secured the neutrality of Saxony and Brandenburg, invaded the electorate, of Metz, and forced the archbishop to break off his aliance with Boniface and to form one with himself for the

next five years. The pope was alarmed by his success, and entered into negotiations with him. A., whose duplicity and unscrupulousness equalled his courage, suddenly broke off his alliance with Philip, admitted the western empire to be a papal grant, and declared that the electors derived their right of choosing from the Holy See. Moreover, he promised upon oath to defend the rights of the Romish court whenever he was called upon. As a reward, Boniface gave him the kingdom of France, excommunicating Philip, and declaring him to have forfeited the crown; but the latter severely chastised the pope for his insolence in daring to give away what was not his own. In the following year, A. made war unsuccessfully against Holland, Zealand, Friesland, Hungary, Bohemia, and Thuringia. Shortly afterwards, news reached him that a rebellion had broken out amongst the Swiss in Unterwalden, Schweitz, and Uri, in January 1308. A. had not only foreseen, but desired this, in order that he might find a pretext for completely subjugating the country. A new act of injustice, however, occasioned a crime which put an end to his ambition and life. His nephew, Duke John, claimed Swabia as his rightful inheritance, and had set his claims before A., but in vain. When the latter was departing for Switzerland, the former renewed his demand. A. scoffingly refused; and Duke John resolved to be revenged. Along with four others, he conspired against his uncle's life, and assassinated him on the way to Rhinefelden, while separated from his followers by the river Reuss. The emperor expired, May 1, 1308, in the arms of a beggar-woman sitting by the wayside—a spectacle calculated to excite stern reflection on the vanity of human ambition. His daughter Agnes, queen of Hungary, frightfully revenged her father's death. See JOHN, THE PARRICIDE. A. left five sons and five daughters, the children of his marriage with Elizabeth, daughter of the Count of Tyrol.

ALBERT THE BEAR (so called, not from any peculiarity of character or appearance, but from the heraldic cognizance that he assumed), Margrave of Brandenburg, one of the most remarkable princes of his age, was born 1106. He was the son and successor of Otho, the rich Count of Ballenstädt, and of Elicia, eldest daughter of Magnus, Duke of Saxony. Having proved faithful to the Emperor Lothario, he received from the latter Lusace, to be held as a fief of the empire; but the Duchy of Saxony, to which he had the best claim, was given to Henry of Bavaria (1127), the son of the youngest daughter of the duke. As a compensation, A. was made Margrave (Markgraf) of the Northern March or Marck (Salzwedel); but in the year 1138, Henry having been put under the imperial ban, the duchy reverted to the former, when he took the title of Duke of Saxony. Henry, however, again got the upper hand, and A. was compelled to fly, and to content himself with the margraviate of Northern Saxony, and the government of Swabia, which was given to him as an indemnity. Returning to his own country, he got himself invested with the lands which he had conquered from the Wends as a hereditary fief of the empire, and thus became the founder and first Margrave of the new state of Brandenburg. Under A. the Margravedom was afterwards raised to be an Electorate, and he himself became Elector of Brandenburg. After he had quelled a revolt of the Wends in 1157, he determined to take extreme measures against the vanquished. He almost depopulated their country, and then colonized it with Flemings. On his return from a pilgrimage to Palestine in company with his wife in 1159, he exerted himself to suppress the language and paganism of the Wends, and to introduce Christianity amongst them. He died in 1170, at Ballenstädt, where he was buried. Brandenburg continued in the possession of his descendants for two centuries, and finally (1415) fell to the house of Hohenzollern (q. v.).

ALBERT, last grand-master of the Teutonic Order, and first Duke of Prussia, was born in 1490. He was the son of the Margrave Frederic of Anspach and Baireuth, who, having several children, wished to make him enter the church. He was educated under the care of Archbishop Hermann, of Cologne, where he became canon. He did not, however, neglect knightly exercises. He accompanied the emperor Maximilian I. in his expedition against Venice, and was present at the siege of Pavia. In 1511, when scarcely twenty-one years old, he was chosen grand-master of the Teutonic Order, the knights expecting their feudal allegiance to Poland to be abolished, on account of his near relationship to Sigismund, the monarch of that country, while they also hoped for protection against the latter from his friends in Germany. He was consecrated at Mergentheim with his father's consent. In 1512 he removed to Königsberg, having been acknowledged by Poland likewise; but refusing to take the oath of allegiance, he was plunged into a war with Sigismund in 1520. The year after, a four years' truce was agreed to at Thorn. A. next made his appearance at the imperial Diet at Nürnberg, as a German prince of the empire, to induce the other princes to assist him against the Poles. But Germany could at that time grant no assistance to any one. Disappointed in his hopes, A. threw himself into the cause of the Reformation, which had rapidly spread into Prussia, and broken the last strength of the declining order, whose possessions now appeared a certain prey to Poland. A. still hoped to preserve these, by acting upon Luther's advice, which was, to declare himself secular Duke of Prussia, and place his land under the sovereignty of Sigismund. This was done with great pomp at Cracow, on the 8th April 1525, the duchy being secured to him and his descendants. During the remainder of his life, A. zealously sought to further the welfare of his duchy. He regulated the administration of all affairs, both secular and ecclesiastical, established the ducal library, founded in 1543 the university of Königsberg, gathered many literary men around him, and caused their works to be printed. In 1527, he married Dorothea, daughter of Frederic, king of Denmark. A. earnestly desired peace, but his was not an age in which peace could be purchased. The transition period from the old to the new is always violent, and the duke found himself entangled in conflicts with the nobles, and in theological disputes, which, along with other crosses of a more personal character, saddened the close of his life. He died in 1568. See PRUSSIA.

ALBERT, Archbishop of Magdeburg, and Elector of Mentz, generally called A. of Brandenburg, younger son of the elector, John Cicero of Brandenburg, was born in 1489. In 1513 he became Archbishop of Magdeburg; in the same year, also, Administrator of the bishopric of Halberstadt, and in the following year, Archbishop and Elector of Mentz. Leo X. having granted him permission to sell indulgences, on condition that he should deliver up half the booty to the papal exchequer, A. appointed the Dominican Tetzel 'indulgence-preacher,' who, by the shameless manner in which he went about his work, first stirred Luther to post up his well-known ninety-five theses. Even in the archbishop's own diocese, the reformer's doctrines found not a few adherents, so that A. was compelled, at the imperial Diet at Augsburg, to act the part of peace-maker. When he joined the Holy Alliance against the Treaty of Schmalkald, Luther made a fierce attack on him in writing. He was the first of all the German princes who received the Jesuits into his dominions. In 1541, he granted religious liberty to his subjects, under the condition that they should pay his debts, amounting to 500,000 florins. He did this, not from any love of religious liberty, but either because of the consideration referred to, or from a dreaded popular compulsion. The last days of his life were spent in Aschaffenburg where he died in 1545.

ALBERT, or ALBRECHT, Archduke of Austria, born in 1559, was the third son of the emperor Maximilian II. He was brought up at the Spanish court, and dedicated himself to the church. In 1577 he was made cardinal, in 1584, Archbishop of Toledo, and during the years 1594—96, held the office of viceroy of Portugal. He was next appointed Stadtholder of the Netherlands, where he continued until his death, the representative of the Spanish monarch, discharging the duties of his function with prudence and dignity. Cardinal Bentivoglio, who resided a considerable time at his court, praises his uprightness, his moderation, his love of serious study, his industry, his perseverance, and his discretion, though he does not conceal the fact that he was a prince better fitted for peace than for war. He displayed at first both courage and enthusiasm, but afterwards he was accused of dilatoriness and timidity. Meanwhile, he did not receive from Spain the promised help; and, moreover, affairs had reached such a pitch, that they could hardly become worse. A., however, did the best that could be done. His mild, moderate, and unpersecuting character, essentially contributed to the re-establishment of the Spanish authority in the Netherlands. Philip employed him to mediate amid the disturbed provinces. A. now abandoned his ecclesiastical profession, and married, (1598) the Infanta, Isabella, who received the Netherlands for her dowry. He died in 1621.

A'LBERT N'YANZA (the Little Luta Nzige of Speke), a large lake of East Central Africa, one of the reservoirs of the Nile, situated in a deep rock basin, 80 miles west of the Victoria N'yanza. The A. N. is of an oblong shape, and, as proved by M. Gessi, one of Colonel Gordon's party in 1876, is 140 miles long from north to south, and 40 miles broad. It is crossed by the equator near its center. On the east, it is fringed by precipitous cliffs, having a mean altitude of 1500 feet, with isolated peaks, rising from 5000 o 10,000 feet. The surface of the lake is 2720 feet above the sea, and 1470 feet below the general level of the country; its water is fresh and sweet, and it is of great depth towards the center. The north and west shores of the lake are bordered by a massive range of hills, called the Blue Mountains, which have an elevation of about 7000 feet. The existence of this vast lake first became known to Europeans through Speke and Grant, who, in 1862, heard of the Luta Nzige as a narrow reservoir forming a shallow back-water of the Nile. See map to article NILE. When Speke and Grant, after the discovery of the Victoria N'yanza, were, in 1863, descending the Nile on their return to Europe, they met, at Gondokoro, Mr. (now Sir) Samuel White Baker (q. v.), who was ascending the river in the hope of meeting with and aiding these

travelers. As soon as they informed him of the reputed great lake, Baker agreed to undertake its exploration. Joining a trading party, he traveled south-eastwards to Latooka, which he describes as the finest country he had seen in Africa. His course was now south and south-west, through the countries Obbo and Madi, crossing the Asua, a tributary of the Nile, on 9th January 1864. Journeying next in a south and south-eastward direction over uninhabited prairies and swampy hollows, he came upon the Nile at the Karuma Falls, lat. 2° 17′ N., at the identical spot where it had been crossed by Speke and Grant. Being prevented, by the jealousy of King Kamrasi, from following the course of the stream to the westward, he was forced to proceed, by slow marches southward on the west side of the Somerset or Nile, to M'rooli, leaving which, his course lay south-west on the south side of the Kafoor River. After a toilsome march of eighteen days from M'rooli, the party came in sight of the glorious expanse of water. Baker says: 'Weak and exhausted with more than twelve months' anxiety, toil, and sickness, I tottered down the steep and zigzag path, and in about two hours reached the shore. The waves were rolling upon a bank of sand; and as I drank the water, and bathed my face in the welcome flood with a feeling of true gratitude for success, I named this great basin the Albert N'yanza, in memory of a great man who had passed away.'

The spot where the party first reached the lake, Vacovia, is in lat. 1° 14′ N., 30° 40′ E. Embarking thence in canoes, the party coasted north-eastward, and in 13 days arrived at Magungo, lat. 2° 16′ N., near the mouth of the Somerset River. At this part, the lake was under 20 miles in width, and appeared to stretch away in a north-west direction. From Magungo, 250 feet above the lake, the travelers had a view of the Nile Valley for 15 or 20 miles northwards. Ascending the Somerset, at a distance of 25 miles from its mouth, the canoe-voyage was interrupted by a grand cataract 120 feet high, which was named the Murchison Falls. The explorers proceeded south-eastwards for about 30 miles to Kisoona, and then a march north-east for about the same distance brought them to the Karuma Falls, where they first entered the lake region. The name Somerset is adopted from Speke's first map, in order to distinguish that river from the Nile proper. It issues from the Victoria N'yanza at the Ripon Falls, and flowing north-west and west for about 230 miles, it enters the A. N. within 30 miles of its northern extremity, and soon quits it to form the true Nile. From the Ripon Falls for 30 miles north, and from the Karuma to the Murchison Falls, 45 miles, the Somerset forms a series of rapids. The A. N. receives the drainage of a great equatorial mountain range, where rain falls during ten months of the year. The scenery of the lake is described as extremely beautiful. Salt, which is very abundant in the soil on the eastern shores of the lake, is now the only article of trade to the inhabitants. Formerly, Magungo was a large town, when the trade from Karague, in lat. 2° S., was conducted in large boats sent by Rumanika, the king of the country, with cowrie shells and brass bracelets from Zanguebar, to be exchanged for ivory.

ALBE'RTUS MAGNUS. See ALBERT OF BOLLSTADT.

A'LBI, capital of the department of Tarn in France, is built on a height. It is very old, and suffered greatly during the religious wars which devastated the land in the time of the Albigenses. Besides the usual government offices, it possesses a public library of 12,000 volumes, and a museum. The chief buildings are the cathedral, built in the style of the 13th c., the old palace of the Count of Albigeois, and the theater. There is considerable trade in corn, wine, fruit, &c., and linen, cotton, woollen, and leather manufactures. Pop. (1872) 13,698.

A'LBIGENSES is a name applied loosely to the 'heretics,' belonging to various sects, that abounded in the south of France about the beginning of the 13th c. The chief sect was the Cathari (q. v.); but they all agreed in renouncing the authority of the popes and the discipline of the Romish Church. The name arose from the circumstance that the district of Albigeois in Languedoc —now in the department of Tarn, of which Albi is the capital— was the first point against which the crusade of Pope Innocent III., 1209, was directed. The immediate pretence of the crusade was the murder of the papal legate and inquisitor, Peter of Castelnau, who had been commissioned to extirpate heresy in the dominions of Count Raymond VI. of Toulouse; but its real object was to deprive the count of his lands, as he had become an object of hatred from his toleration of the heretics. It was in vain that he had submitted to the most humiliating penance and flagellation from the hands of the legate Milo, and had purchased the papal absolution by great sacrifices.

The legates, Arnold, Abbott of Citeaux and Milo, who directed the expedition, took by storm Beziers, the capital of Raymond's nephew, Roger, and massacred 20,000—some say 40,000—of the inhabitants, Catholics as well as heretics. 'Kill them all,' said Arnold; 'God will know his own!' Simon, Count of Montfort, who conducted the war under the legates, proceeded in the same relentless way with other places in the territories of Raymond and his allies. Of these, Roger of Beziers died in prison, and Peter I. of Aragon fell in battle. The conquered lands were given as a reward to Simon of Montfort, who never came into quiet possession of the gift. At the siege of Toulouse, 1218, he was killed by a stone, and Counts Raymond VI. and VII. disputed the possession of their territories with his son. But the papal indulgences drew fresh crusaders from every province of France, to continue the war. Raymond VII. continued to struggle bravely against the legates and Louis VIII. of France, to whom Montfort had ceded his pretensions, and who fell in the war in 1226. After hundreds of thousands had perished on both sides, a peace was concluded, in 1229, at which Raymond purchased relief from the ban of the church by immense sums of money, gave up Narbonne and several lordships to Louis IX., and had to make his son-in-law, the brother of Louis, heir of his other possessions. These provinces, hitherto independent, were thus, for the first time, joined to the kingdom of France; and the pope sanctioned the acquisition, in order to bind Louis more firmly to the papal chair, and induce him more readily to admit the inquisition. The heretics were handed over to the proselytizing zeal of the order of Dominicans, and the bloody tribunals of the Inquisition; and both used their utmost power to bring the recusant A. to the stake, and also, by inflicting severe punishment on the penitent converts, to inspire dread of incurring the church's displeasure. From the middle of the 13th c., the name of the A. gradually disappears. The remnants of them took refuge in the east, and settled in Bosnia. Compare Fauriel, *Croisade contre les Albigeois* (Par. 1838); Faber, *Inquiry into the History and Theology of the Vallenses and Albigenses* (Lond. 1838); Peyrat; *Hist. des Albigeois* (Par. 1870).

ALBI'NOS—called also Leucœthiopes, or white negroes, and by the Dutch and Germans Kakerlaken—were at one time considered a distinct race; but closer observation has shown that the same phenomenon occurs in individuals of all races, and that the peculiar appearance arises from an irregularity in the skin, which has got the name of *leucopathy* or *leucosis*. It consists in the absence of the coloring matter which, in the normal state, is secreted between the cuticle and the true skin, and also of the dark pigment of the eye; so that the skin has a pale, sickly white color, while the iris of the eye appears red, from its great vascularity. As the pigment in the coats of the eye serves to diminish the stimulus of the light upon the retina, A. generally cannot bear a strong light; on the other hand, they see better in the dark than others. The coloring matter of the hair is also wanting in A., so that their hair is white. All these differences are of course more striking in the darker varieties of the species, and most of all in the negro albinos.

Albinoism is always born with the individual, and occurs not only in men, but also in other mammalia, in birds, and probably in insects. It is not improbable that the peculiarity may, to some extent, be hereditary. The opinion that A. are distinguished from other men by weakness of body and mind, is completely refuted by facts.

A'LBION is the most ancient name on record of the island of Great Britain. See ALBANY or ALBAINN.

A'LBOIN, the founder of the Lombard dominion in Italy, succeeded his father in 561 A.D., as king of the Lombards, who were at that time settled in Pannonia. His thirst for action first vented itself in aiding Narses against the Ostrogoths; and afterwards, in a war with the Gepidæ, whom he, in conjunction with the Avari, defeated in a great battle (566), slaying their king Cunimond with his own hand. On the death of his first wife, Klodoswinda, he married Rosamond, daughter of Cunimond, who was his prisoner. Some of his warriors, who had accompanied Narses into Italy, brought back reports of the beauties and riches of the country, This determined A., in 568, to enter Italy with his own nation of Lombards, the remains of the Gepidæ, and 20,000 Saxons. He soon overran and subdued the north of the country as far as the Tiber, fixing his principal residence at Pavia—which long continued to be the capital of the Lombards; when his barbarity cost him his life. During a feast at Verona, he made his queen drink out of the skull of her father, which he had converted into a wine-cup. In revenge, she incited her paramour to murder her husband, who fell 574. Strangely enough, A. was a just and beneficent ruler. He was beloved by his subjects, whom he stimulated into that vital activity that characterized, their descendants for ages. For several centuries, his name continued to be illustrious among the German nations, who celebrated his praises in martial songs. To escape the fury of the Lombards, Rosamond fled with her associate and the treasure to Longinus, the exarch, at Ravenna. Longinus becoming a suitor for her hand, she administered poison to Helmichis, her paramour, who, discovering the treachery, caused her to swallow the remainder of the cup, and die with him.

ALBORNOZ, ÆGIDIUS ALVAREZ CARILLO, a warlike prelate of the middle ages, was born at Cuença. He studied at Toulouse,

and subsequently became almoner to Alfonso XI., king of Castile, who appointed him Archdeacon of Calatrava, and finally Archbishop of Toledo. He took part in the wars against the Moors, saved the life of the king in the battle at Tarifa, and was present at the siege of Algeciras, where the king dubbed him knight. On account of the Christian boldness with which he denounced the criminal excesses of Peter the Cruel, he fell into disgrace, and had to flee to Pope Clement VI., at Avignon, who made him a cardinal. Innocent VII. also recognized his political talents, and sent him as cardinal-legate to Rome, where, by his tact and vigor, he secured, in spite of the intricate complication of affairs, the restoration of the papal authority in the States of the Church (1353—62). Pope Urban V. owed the recovery of his dominions to him, and out of gratitude, appointed him legate at Bologna, in 1367. In the same year he died at Viterbo, but expressing a wish to be buried at Toledo, almost royal honors were rendered to his dead body by the Spanish monarch, Henry of Castile; and Urban even granted an indulgence to all who had assisted in the transference of his remains from Viterbo to Toledo. He left a valuable work upon the constitution of the Romish Church, printed for he first time at Jesi in 1473, and now very rare.

ALBOSTA'N, a town of Asiatic Turkey, in the pashalic of Marash, and 39 miles north-east-by-north from Marash. Pop. estimated at 9000.

ALBO'X, a town of Andalusia, Spain, in the province of Almeria, 42 miles north-east from Almeria, on a small affluent of the Almanzora, which divides the town into two parts. It has some good streets and buildings, and a fine square. Blankets, coarse linen and hempen fabrics, and earthenware are manufactured. There are also corn and oil mills. There is a great annual fair in November, lasting for a fortnight. Pop. 9430.

ALBUE'RA, in the Spanish province of Estremadura, an insignificant hamlet, famous for the battle of May 16, 1811, between the combined English, Spanish, and Portuguese forces under General Beresford; and the French under Marshal Soult, who were scarcely so numerous, but had an abundant artillery. The object of the latter was to compel the English to raise the siege of Badajos. The result was, that Soult was obliged to retreat to Seville, with the loss of 9000 men; the loss of the allied forces was about 7000. In proportion to the numbers engaged, the battle was the most sanguinary in the whole contest. The French had at first got possession of a height which commanded the whole position of the allied army, but they were driven from it by 6000 British, only 1500 of whom reached the top unwounded.

ALBUFE'RA (an Arabic word meaning 'The Lake'), a lake near Valencia, in Spain, about 10 miles in length and the same in breadth, divided from the sea by a narrow tongue of land; a canal connects it with the city of Valencia. It is rich in fish and fowl, and is said to have been excavated by the Moors. From it, Marshal Suchet (q. v.) took the title of Duke.

ALBU'GO is a term employed in Surgery to designate the white opacity that often follows ulceration of the cornea of the eye. In infancy, the comparatively rapid interchange of materials will often diminish to a great extent and density of these spots; but in after-life, they do not undergo similar absorption, nor are they amenable to surgical relief.

A'LBUM, amongst the Romans, was a white tablet overlaid with gypsum, on which were written the *Annales Maximi* of the pontifex, edicts of the prætor, and rules relative to civil matters. It was so called, either because it was composed of a white material, or because the letters used were of that color. To tamper with the names written on an A. was regarded by the Romans as a serious offence, and involved a severe penality. In the middle ages, the word was used to denote any list, catalogue, or register, whether of saints, soldiers, or civil functionaries. In the gymnasia and universities on the continent, the list of the names of the members is called the A. The name is also applied to the 'black board' on which public notifications of lectures, &c., are written up. But its popular signification in modern times is that of a book for containing photographs, or a blank book for a drawing-room table, and intended to receive fugitive pieces of verse, or the signatures of distinguished persons, or sometimes merely drawings, prints, marine plants, &c.

ALBU'MEN is an organic compound, found both in animal and vegetable substances. It forms the chief ingredient in the white of egg, and abounds in the blood and chyle, and more or less in all the serous fluids of the animal body: it also exists in the sap of vegetables, and in their seeds and other edible parts. A. forms the starting-point of animal tissues, for in an egg during incubation all the parts of the chick are formed out of it. The organized substances, fibrine and caseine, have a chemical composition similar to A.; and hence, along with A., they are called albuminous compounds. A. may be considered the raw material of fibrine, and fibrine as animalized A.

The chief component elements of A. are carbon, hydrogen, nitrogen, and oxygen, with small proportions of phosphorus and sulphur. It is believed to be a definite chemical compound, though the exact proportions and the rational formula have not been definitely ascertained. Carbon forms about 54 per cent. of it; nitrogen, 16; and sulphur, 2. It is the sulphur of the A. that blackens silver when brought in contact with eggs, and the smell of rotton eggs arises from the formation of sulphuretted hydrogen during the decomposition.

A. is soluble in water, and in such a state of solution is found in the egg, the juice of flesh, the serum of blood, and the juice of vegetables; but when heated from 140° to 160° it coagulates, and is no longer soluble in water. With bichloride of mercury (corrosive sublimate), sulphate of copper (blue vitriol), acetate of lead (sugar of lead), nitrate of silver (lunar caustic), it forms insoluble compounds, and is therefore used as an antidote to these poisons. The property of coagulating with heat adapts A. for the purpose of clarifying in sugar-refining and other processes. The A. is added to the liquid in the cold state, allowed to mix thoroughly therein, and then, when heated, it coagulates, entangling and separating all the impurities suspended in the liquid. A. is likewise coagulated by the majority of the mineral acids, but not by acetic acid. Alcohol, ether, creasote, and tannic acid likewise cause the coagulation of A., and hence the efficacy of these substances, especially the two latter, in coagulating and thereby killing the nerves which cause so much pain in toothache. The importance of A. as an article of diet, will be discussed under FOOD.

ALBUMEN, in Botany, a store of nutritive matter, distinct from the embryo, but enclosed along with it within the integuments of the seed. It is also known by the names *Perisperm* and *Endosperm*. When a seed has a store of A. separate from the embryo, it is said to be *albuminous* or *perispermic*. When the nutritive matter is stored up in the cotyledons or lobes of the seed itself, as in the bean, pea, wall-flower, &c., the seed is said to be *exalbuminous* or *aperispermic*. In these the A., as a distinct part of the seed, is wanting, and the entire seed consists of embryo and integument. When the A. is present, it is sometimes very small as in the nettle; in other instances, on the contrary, it is very much larger than the embryo, as in the cocoa-nut, of which it forms the edible part. It is also the edible or useful part of many other seeds—as in the different kinds of corn—and in coffee, nutmeg, &c. It is sometimes *mealy* or *farinaceous*, as in the cereals; *oily*, as in the poppy; *horny*, as in coffee; *cartilaginous*, as in the cocoa-nut; *mucilaginous*, as in the mallow. Vegetable ivory is the A. of a palm (genus *Phytelephas*) which grows on the banks of the Magdalena, and is used in place of ivory. The presence or absence, and various peculiarities of A., afford botanical characters of great value. The A. appears to be a store provided for the nourishment of the embryo, and consists of starchy, oily, and albuminous matter. *Vegetable A.*, in a chemical sense, exists, and often in large quantity, even in seeds, which, according to the language of descriptive botany, are exalbuminous or destitute of A.; and to prevent confusion, *perisperm* has begun to be employed as the botanical term; but it is not yet in general use.

ALBUÑO'L, a town of Spain, in the province of Granada, 41 miles south-east from Granada, and about 3 miles from the coast of the Mediterranean. It is a well-built town, with clean paved streets. The surrounding district abounds in vineyards, and is also very productive of figs and almonds. The making of wine and brandy, and the drying of raisins, are the chief occupations of the inhabitants of the town itself. Pop. 8764. The port of A. is a small place called La Rabitá.

ALBUQUE'RQUE, a town of Estremadura, Spain, in the province of Badajoz, and 24 miles north of Badajoz. It is a decaying place. Cotton and woollen fabrics are manufactured, also earthenware, soap, and chocolate. The neighborhood is fruitful, producing corn, wine, oil, flax, honey, and fruits. Pop. 7470.

ALBUQUERQUE, a town of Bernalillo County, New Mexico, U. S., on the left bank of the Rio del Norte, 41 miles south-southwest from Santa Fé. Pop. (1870) 1307.

ALBUQUERQUE, ALFONSO THE GREAT, viceroy of the Indies, and also called the Portuguese Mars, was born, in 1453, near Alhandra, a town not far from Lisbon, of a family of the royal blood of Portugal. In that age the Portuguese people were distinguished for heroism and a spirit of adventure. They had discovered and subjugated a great part of the western coast of Africa, and were beginning to extend their dominions over the seas and the people of India. A. being appointed viceroy of these new possessions, landed on the coast of Malabar on September 26, 1503, with a fleet and some troops; conquered Goa, which he made the seat of the Portuguese government, and the center of its Asiatic commerce; and afterwards the whole of Malabar, Ceylon, the Sunda Isles, the peninsula of Malacca, and (in 1515) the island of Ormuz at the entrance of the Persian Gulf. When the king of Persia sent for the tribute which the princes of this island had formerly rendered to him, A. presented bullets and swords to the

ambassador, saying: 'This is the coin with which Portugal pays her tribute.' He made the Portuguese name profoundly respected among the princes and people of the East; and many of them, especially the kings of Siam and Pegu, sought his alliance and protection. All his undertakings bore the stamp of an extraordinary mind. He maintained strict military discipline, was active, far-seeing, wise, humane, and equitable, respected and feared by his neighbors, while beloved by his subjects. His virtues made such an impression on the Indian people, that long after his death, they resorted to his grave, to implore his protection against the misgovernment of his successors. Notwithstanding his valuable services, A. did not escape the envy of the courtiers and the suspicions of King Emmanuel, who appointed Lopez Soarez, a personal enemy of A., to supersede him as viceroy. This ingratitude affected him deeply. Ismaël, the shah of Persia, offered his assistance to resist the arbitrary decree of the Portuguese court; but A. would not violate his allegiance. A few days after, commending his son to the king in a short letter, he died at sea near Goa, December 16, 1515. Emmanuel honored his memory by a long repentance, and raised his son to the highest dignities in the state. His life is well portrayed in the *Commentarios do Grande Alfonso de A.* (Lisbon, 1576 and 1774), published by his son Blasius.

ALBU'RNUM, or SAP-WOOD, in Botany, is that part of the wood of exogenous trees which is still imperfectly hardened, and, consisting of the woody layers most recently formed, is interposed between the *bark* (q. v.) and the *heart-wood* or *duramen* (q. v.). There is often a very marked division between it and the duramen, in trees whose age is such that the latter has been perfected. The A. differs from the duramen in having its tubes still open for the passage of fluids; and these tubes appear to be the vessels which chiefly serve for the ascent of the sap. (See SAP.) It gradually hardens, and is transformed into duramen, new layers being added externally. It is almost always of a white or very pale color, whilst in many trees the duramen is highly colored. The A. is pale even in ebony, in which the duramen is black. In general, the A. is much inferior in value to the hardened or perfected wood, and the different proportions which they bear to each other in the thickness of the stem, go far to determine the relative values of some kinds of trees. These proportions, however, are different not only in trees of different kinds, but even in trees of the same kind at different ages, and according as circumstances have been favorable or otherwise to rapidity of growth. When there is a great proportion of A., the wood dries slowly, and with difficulty, owing to the quantity of sap it contains.

A'LCA and ALCADÆ. See AUK.

ALCÆ'US, of Mitylene, one of the greatest lyric poets of Greece, flourished about the end of the 7th, or the beginning of the 6th c. B.C. His odes, in the Æolic dialect, are occupied with his grief for the dissensions of his country, his hatred of tyrants, his own misfortunes, and the sorrows of exile; while on other occasions he celebrates the praises of love and wine. He is said to have been an admirer of Sappho, who was a contemporary. A. himself took part in the civil war, first as the coadjutor of Pittacus, but afterwards against him, when he proved tyrannical. Being banished from Mitylene, he endeavored, at the head of other exiles, to force his way back; but in this attempt he fell into the hands of Pittacus, who, however, granted him his life and freedom. He was the inventor of the form of verse which after him is called the Alcaic, and which Horace, the happiest of his imitators, transplanted into the Latin language. Of the ten books of A.'s odes, only fragments remain, which are collected in the *Cambridge Museum Criticum*, and in Bergk's *Poetæ Lyrici Græci* (Leip. 1843).

ALCALA' DE HENARES (*El Calaat*, in Arabic, means 'the castle'), a town in Spain, in the province of New Castile, situated on the Henares, 22 miles from the capital, pop. 12,000. It is built in the old style, and boasts of a university, which was founded by Cardinal Ximenes, in 1510, and once enjoyed a world-wide fame, second to that of Salamanca alone. When Francis I. visited it, while a prisoner in Spain, he was welcomed by 11,000 students. The library contains the original of the celebrated polyglot Bible which was printed in this town, and called the Complutensian, from the ancient name of the place (Complutum). A. has besides a military academy, and a celebrated powder and leather factory It is said to have been the birthplace of Cervantes, and various other distinguished persons.—There are several other towns in Spain which bear the name of ALCALA; as A. of Chisberte, in Valencia (pop. 6000); A. de Guadaira, near Seville (8000), and A. la Real, in Jaen (16,000), with superior wine, fruit, sheep, &c.

ALCALA' DE GUADAI'RA (*The Castle of the Guadaira*), the ancient Carthaginian *Hienippa* ('place of many springs'), a town of Andalusia, Spain, in the province of Seville, and 7 miles east-by-south from Seville. It stands near the Guadaira, partly on a hill, so that some of the streets are very steep, and is overlooked by the ruins of an ancient Moorish castle, once one of the most important, as its ruins are still among the finest, in Spain. This town is beautifully situated, and on account of the salubrity of its climate, is much resorted to as a summer residence by the inhabitants of Seville. It is celebrated for producing the finest bread in Spain; there are more than fifty bakeries in the town, and Seville is chiefly supplied from it. The water-mills and mule-mills for making flour are more than 200 in number, and with the bakeries, give employment to great part of the population. Every process connected with the making of bread is conducted with the greatest care. Seville is also supplied with water from the hill above A., which is perforated by tunnels, some of them 6 miles in length, forming underground canals. Some of the tunnels are believed to be Roman works, but most of them are known to have been made by the Moors. The water flowing through the subterranean canals is as clear as crystal. The neighborhood of A. is fertile, producing corn, wine, oil, silk, honey, and fruits, also sheep and oxen. Pop. 8000.

ALCALA' LA REA'L (*The Royal Castle*), a city of Andalusia, Spain, in the province of Jaen, and 26 miles north-west from Granada. It is situated on a conical hill, in a narrow valley, on the north side of the mountains which separate the province of Jaen from that of Granada, at an elevation of nearly 3000 feet above the sea. It is a very picturesque town, irregularly built, with steep and narrow streets and bold towers. It was the stronghold of the Alcaide Ibn Zaide; and being taken in 1340, by Alonso XI. in person, it obtained the name *Real*. It has a hospital, formerly an abbey, a very fine building. The neighborhood produces grain and fruits of the finest quality, and the inhabitants of the town are mostly engaged in agriculture. There is some trade in wine and wool. Pop. 15,901.

ALCA'LDE, a corruption of the Arabic *el-cadi*, 'the judge,' a word introduced by the Moors. It is still used in Spain as the general title of judicial and magisterial office, the special function being denoted by another term. Thus, there are *alcaldes de aldea*, village-justices; *alcaldes pedaneos*, justices of the peace; *alcaldes de corte*, judges of the court, &c.

A'LCAMO, a town of Sicily, in the province of Trapani, and 23 miles east from Trapani, in the Val di Mazzara, on the high-road between Palermo and Trapani. It is said to have been founded by the Arabs, on their first invasion of Sicily in 827. The original town stood on a hill, and long retained a Moslem population, who were driven out by the Emperor Frederick II. in 1233, and the new town was built at the foot of the hill. A. is surrounded by a battlemented wall of the 14th century. The houses are mostly mean, and the streets irregular and dirty; the whole place having an air of poverty and decay. It contains, however, some fine old churches and palaces. Pop. (1872) 20,890.

ALCAÑI'Z, a town of Aragon, Spain, in the province of Teruel, 63 miles south-east from Saragossa. It is situated on a rising ground on the right bank of the Guadalupe, which is here crossed by a bridge of nine arches. It is a well-built town, with wide paved streets, and a number of squares. It has a magnificent collegiate church, in which are many fine tombs and pictures. There are manufactures of silk, woollen, and coarse linen fabrics, hats, and soap; there are also flour and oil mills, and some trade in grain, cattle, and the manufactures of the town. Pop. 7400.

ALCA'NTARA (*Al-kantarah*, Arabic, 'the bridge'), the Norba Cæsarea of the Romans, an old fortified Spanish town, built by the Moors in the province of Estremadura. The present population is about 4000. It was plundered by the French under General Lapisse in 1809. The bridge from which it takes its name was built for Trajan, 105 A.D. It consists of six arches, the two central ones with a span of 110 feet; the whole length is 670, and the height 210 feet. This remarkable structure was partially blown up by the English in 1812, and was again destroyed during the civil war of 1836; and though it might be easily repaired, it is left in a state of ruin, the lazy Spaniards being ferried over in a lumbering boat.

Order of Alcantara.

THE ORDER OF A. (formerly St. Julian), one of the religious orders of Spanish knighthood, was founded (1156) as a military fraternity for the defence of Estremadura against the Moors. In 1197, Pope Celestine III. raised it to the rank of a religious order of knighthood; bestowed great privileges on it, and charged it with the defence of the Christian faith, and the maintenance of eternal war with the infidel. Alphonso IX., having taken the town of Alcantara, ceded it in 1218 to the order of Calatrava (q. v.); but the knights of this order, unable to hold it along with their other great possessions, yielded it to the knights of St. Julian, who transferred to it their seat, and henceforth were known by its name. At length the grand-mastership of the order was, by Pope Alexander VI., united to the Spanish crown in 1495. The order is still richly en-

dowed. The knights, who follow the rule of St. Benedict, take now only the vows of obedience and poverty, having, since 1540, been absolved from that of celibacy. A special vow binds them to defend the immaculate conception of the Virgin. At their nomination, they must prove four generations of nobility. For a time, the knights of A. acknowledged the superiority of the knights of Calatrava, but they were latterly absolved from it. Both the costume, however, and the cross are still the same, with exception of the color, which is green. The crest of the order is a pear-tree.

ALCA'NTARA, a seaport town of Brazil, in the province of Maranham, near the month of the Bay of St Marcos. Most of the houses are only of one story. The more wealthy residents are mostly cotton-planters; the poorer classes live chiefly by fishing, and by making hammocks of some of the peculiar fibres of the country. There are salt-pits not far from the town. Cotton, rice, and salt are exported. Pop. 10,000.

ALCARA'Z, a town of La Mancha, Spain, in the province of Albacete, and 36 miles west-south-west from Albacete. It stands on the slope of an isolated hill, on the left bank of the Guadarmena, a feeder of the Guadalquivir. A ruined castle crowns the summit of the hill; and there are also the remains of a fine Roman aqueduct. Some of the streets are very steep. The inhabitants are partly employed in weaving and iron-working, partly in agriculture. Pop. 4325.

ALCAUDE'TE (anc. *Uditunum*), a town of Andalusia, Spain, in the province of Jaen, and 22 miles south-west from Jaen. It is situated in a hollow, enclosed by three hills, on an affluent of the Guadalquivir, is overlooked by the ruins of an ancient castle, and is tolerably well built. There are fine pictures in some of the churches. Oil and rope making, weaving, and agriculture are the chief employments of the inhabitants. Grain, silk, oxen, sheep, goats, pigs, mules, and asses are produced in the neighborhood. Pop. 8242.

ALCA'ZAR DE SAN JUA'N (anc. *Alce*), a town of New Castile, Spain, in the province of Ciudad Real, and 49 miles north-east from Ciudad Real, on the Madrid and Alicante Railway. It is regularly built, and has two good squares. There are manufactories of soap, nitre, and gunpowder. Pop. 8540.

ALCE'DO. See KINGFISHER.

ALCHEMI'LLA. See LADY'S MANTLE.

A'LCHEMY is to modern chemistry what astrology is to astronomy, or legend to history. In the eye of the astrologer, a knowledge of the stars was valuable only as a means of foretelling, or even of influencing, future events. In like manner, the genuine alchemist toiled with his crucibles and alembics, calcining, subliming, distilling, not with a view to discover the chemical properties of substances, as we understand them, but with two grand objects, as illusory as those of the astrologer—to discover, namely, (1) *the secret of transmuting the baser metals into gold and silver*, and (2) *the means of indefinitely prolonging human life*.

Tradition points to Egypt as the birthplace of the science. Hermes Trismegistus (q. v.) is represented as the father of it. The word is doubtless derived from the Greek *chemeia*, chemistry, apparently a later form of *chumeia*, a mingling, from *cheein*, to pour. The Greeks and Romans under the Empire would seem to have become acquainted with it from the Egyptians; there is no reason to believe that, in early times, either people had the name or the thing. The word *chemeia* occurs in the lexicon of Suidas, written in the 11th c., and is explained by him to be 'the conversion of silver and gold.' It is to the Arabs, from whom Europe got the name and the art, that we owe the prefixed article *al*. As if *chemia* had been a generic term embracing all common chemical operations, such as the decocting and compounding of ordinary drugs, the grand operation of transmutation was denominated *the chemia* (*al*-chemy)—the chemistry of chemistries. The Roman emperor Caligula is said to have instituted experiments for the producing of gold out of orpiment (sulphuret of arsenic); and in the time of Diocletian, the passion for this pursuit, conjoined with magical arts, had become so prevalent in the empire, that that emperor is said to have ordered all Egyptian works treating of the chemistry of gold and silver to be burnt. For at that time, multitudes of books on this art were appearing, written by Alexandrine monks and by hermits, but bearing famous names of antiquity, such as Democritus, Pythagoras, and Hermes.

At a later period, the Arabs took up the art; and it is to them that European A. is directly traceable. The school of polypharmacy, as it has been called, flourished in Arabia during the kalifates of the Abbasides. The earliest work of this school now known is the *Summa Perfectionis*, or 'Summit of Perfection,' composed by Gebir (q. v.) in the 8th c.; it is consequently the oldest book on chemistry proper in the world. It contains so much of what sounds very much like jargon in our ears, that Dr. Johnson ascribes the origin of the word 'gibberish' to the name of the compiler. Yet when viewed in its true light, it is a wonderful performance. It is a kind of text-book, or collection of all that was then known and believed. It appears that these Arabian polypharmists had long been engaged in firing and boiling, dissolving and precipitating, subliming and coagulating chemical substances. They worked with gold and mercury, arsenic and sulphur, salts and acids; and had, in short, become familiar with a large range of what are now called chemicals. Gebir taught that there are three elemental chemicals—mercury, sulphur, and arsenic. These substances, especially the first two, seemed to have fascinated the thoughts of the alchemists by their potent and penetrating qualities. They saw mercury dissolve gold, the most incorruptible of matters, as water dissolves sugar; and a stick of sulphur presented to hot iron penetrates it like a spirit, and makes it run down in a shower of solid drops, a new and remarkable substance, possessed of properties belonging neither to iron nor to sulphur. The Arabians held that the metals are compound bodies, made up of mercury and sulphur in different proportions. With these very excusable errors in theory, they were genuine practical chemists. They toiled away at the art of making 'many medicines' (polypharmacy) out of the various mixtures and reactions of such chemicals as they knew. They had their pestles and mortars, their crucibles and furnaces, their alembics and aludels, their vessels for infusion, for decoction, for cohabitation, sublimation, fixation, lixiviation, filtration, coagulation, &c. Their scientific creed was transmutation, and their methods were mostly blind gropings; and yet, in this way, they found out many a new body, and invented many a useful process.

From the Arabs, A. found its way through Spain into Europe, and speedily became entangled with the fantastic subtleties of the scholastic philosophy. In the middle ages, it was chiefly the monks that occupied themselves with A. Pope John XXII. took great delight in it, though it was afterwards forbidden by his successor. The earliest authentic works on European A. now extant are those of Roger Bacon (b. 1214, d. 1284) and Albertus Magnus (b. 1205, d. 1280). Roger Bacon (q. v.) appears rather the earlier of the two as a writer, and is really the greatest man in all the school. He was acquainted with gunpowder. Although he condemns magic, necromancy, charms, and all such things, he believes in the convertibility of the inferior metals into gold, but does not profess to have ever effected the conversion. He had more faith in the elixir of life than in gold-making. He followed Gebir in regarding potable gold—that is, gold dissolved in nitro-hydro-chloric acid or *aqua regia*—as the elixir of life. Urging it on the attention of Pope Nicholas IV., he informs his Holiness of an old man who found some yellow liquor (the solution of gold is yellow) in a golden phial, when ploughing one day in Sicily. Supposing it to be dew, he drank it off. He was thereupon transformed into a hale, robust, and highly accomplished youth. Bacon no doubt took many a dose of this golden water himself.—Albertus Magnus (q. v.) had a great mastery of the practical chemistry of his times; he was acquainted with alum, caustic, alkali, and the purification of the royal metals by means of lead. In addition to the sulphur-and-mercury theory of the metals, drawn from Gebir, he regarded the element water as still nearer the soul of nature than either of these bodies. He appears, indeed, to have thought it the primary matter, or the radical source of all things—an opinion held by Thales, the father of Greek speculation.—Thomas Aquinas (q. v.) also wrote on A., and was the first to employ the word *amalgam* (q. v.).—Raymond Lully (q. v.) is another great name in the annals of A. His writings are much more disfigured by unintelligible jargon than those of Bacon and Albertus Magnus. He was the first to introduce the use of chemical symbols (q. v.), his system consisting of a scheme of arbitrary hieroglyphics. He made much of the spirit of wine (the art of distilling spirits would seem to have been then recent), imposing on it the name of *aqua vitæ ardens*. In his enthusiasm, he pronounced it the very elixir of life. One of the most celebrated of the alchemists was Basil Valentine (q. v.), (b. 1394), who introduced antimony into medical use. He, along with some previous alchemists, regarded salt, sulphur, and mercury as the three bodies contained in the metals. He inferred that the philosopher's-stone must be the same sort of combination—a compound, namely, of salt, sulphur, and mercury; so pure, that its projection on the baser metals should be able to work them up into greater and greater purity, bringing them at last to the state of silver and gold. His practical knowledge was great; he knew how to precipitate iron from solution by potash, and many similar processes, so that he is ranked as the founder of analytical chemistry.

But more famous than all was Paracelsus (q. v.), in whom alchemy proper may be said to have culminated. He held, with Basil Valentine, that the elements of compound bodies were salt, sulphur, and mercury—representing respectively earth, air, and water, fire being already regarded as an imponderable—but these substances were in his system purely representative. All kinds of matter were reducible under one or other of these typical forms; everything was either a salt, a sulphur, or a mercury, or, like the metals, it was a 'mixt' or compound. There was one element, however, common to the four; a fifth essence or 'quintessence' of

creation; an unknown and only true element, of which the four generic principles were nothing but derivative forms or embodiments; in other words, he inculcated the dogma, that there is only one real elementary matter—nobody knows what. This one prime element of things he appears to have considered to be the universal solvent of which the alchemists were in quest, and to express which he introduced the term *alcahest*—a word of unknown etymology, but supposed by some to be composed of the two German words *alle geist*, 'all spirit.' He seems to have had the notion, that if this quintessence or fifth element could be got at, it would prove to be at once the philosopher's-stone, the universal medicine, and the irresistible solvent.

After Paracelsus, the alchemists of Europe became divided into two classes. The one class was composed of men of diligence and sense, who devoted themselves to the discovery of new compounds and re-actions—practical workers and observers of facts, and the legitimate ancestors of the positive chemists of the era of Lavoisier. The other class took up the visionary, fantastical side of the older alchemy, and carried it to a degree of extravagance before unknown. Instead of useful work, they compiled mystical trash into books, and fathered them on Hermes, Aristotle, Albertus Magnus, Paracelsus, and other really great men. Their language is a farrago of mystical metaphors, full of 'red bridegrooms' and 'lily brides,' 'green dragons,' 'ruby lions,' 'royal baths,' 'waters of life.' The seven metals correspond with the seven planets, the seven cosmical angels, and the seven openings of the head—the eyes, the ears, the nostrils, and the mouth. Silver was Diana, gold was Apollo, iron was Mars, tin was Jupiter, lead was Saturn, and so forth. They talk for ever of the powder of attraction, which drew all men and women after the possessor; of the alcahest, and the grand elixir, which was to confer immortal youth upon the student who should approve himself pure and brave enough to kiss and quaff the golden draught. There was the great mystery, the mother of the elements, the grandmother of the stars. There was the *philosopher's-stone*, and there was the *philosophical-stone*. The philosophical stone was younger than the elements, yet at her virgin touch the grossest calx (ore) among them all would blush before her into perfect gold. The philosopher's-stone, on the other hand, was the first-born of nature, and older than the king of metals. Those who had attained full insight into the arcana of the science were styled Wise; those who were only striving after the light were Philosophers; while the ordinary practicers of the art were called Adepts. It was these visionaries that formed themselves into Rosicrucian Societies and other secret associations. It was also in connection with this mock-A., mixed up with astrology and magic, that quackery and imposture so abounded, as is depicted by Scott in the character of Dousterswivel in the *Antiquary*. Designing knaves would, for instance, make up large nails, half of iron and half of gold, and lacker them, so that they appeared common nails; and when their credulous and avaricious dupes saw them extract from what seemed plain iron an ingot of gold, they were ready to advance any sum that the knaves pretended to be necessary for pursuing the process on a large scale. It is from this degenerate and effete school that the prevailing notion of A. is derived—a notion which is unjust to the really meritorious alchemists who paved the way for genuine chemistry.

It is interesting to observe that the leading tenet in the alchemists' creed—namely, the doctrine of the transmutability of other metals into gold and silver—a doctrine which it was at one time thought that modern chemistry had utterly exploded—receives not a little countenance from a variety of facts every day coming to light. The multitude of phenomena known to the chemists under the name of *Allotropy* (q. v.), are leading speculative men more and more to the opinion that many substances hitherto considered chemically distinct, are only the same substance under some different condition or arrangement of its component molecules, and that the number of really distinct elements may be very few indeed. See Kopp's *Geschichte der Chemie; Alchemy and the Alchemists*, by Dr. Samuel Brown, in Chambers's *Papers for the People* (No. 66); and the article ALCHEMY in the 9th ed. (1875) of the *Encyclopædia Britannica*.

ALCIBI'ADES, a son of Clinias and Dinomache, born at Athens, 450 B.C. He lost his father in the battle at Chæronea; and was in consequence educated in the house of Pericles, his uncle. In his youth he gave evidence of his future greatness, excelling both in mental and bodily exercises. His handsome person, his distinguished parentage, and the high position of Pericles, procured him a multitude of friends and admirers. Socrates was one of the former, and gained considerable influence over him; but was unable to restrain his love of luxury and dissipation, which found ample means of gratification in the wealth that accrued to him by his union with Hipparete, the daughter of Hipponicus. His public displays, especially at the Olympic games, were incredibly expensive. He bore arms for the first time in the expedition against Potidæa (432 B.C.) where he was wounded, and where his life was saved by Socrates—a debt which he liquidated eight years after at the battle of Delium, by saving, in his turn, the life of the philosopher; but he seems to have taken no part in political matters till after the death of the demagogue Cleon, when Nicias brought about a treaty of peace for fifty years between the Athenians and Lacedæmonians. A., jealous of the esteem in which Nicias was held, persuaded the Athenians to ally themselves with the people of Argos, Elis, and Mantinea, and did all in his power to stir up afresh their old antipathy to Sparta. It was at his suggestion that they engaged in the celebrated enterprise against Sicily, to the command of which he was elected, along with Nicias and Lamachus. But while preparations were being made, it happened during one night that all the statues of Mercury in Athens were mutilated. The enemies of A. threw the blame of this mischief upon him, but postponed the impeachment till he had set sail, when they stirred up the people against him to such a degree, that he was recalled, in order to stand his trial. On his way home, he landed at Thurii, fled, and betook himself to Sparta, where, by conforming to the strict manners of the people, he soon became a favorite. He induced the Lacedæmonians to send assistance to the Syracusans, persuaded them to form an alliance with the king of Persia, and after the unfortunate issue of the Athenian expedition in Sicily, to support the people of Chios in their endeavors to throw off the yoke of Athens.

He went thither himself, and raised all Ionia in revolt against that city. But Agis and the other leading men in Sparta, jealous of the success of A., ordered their generals in Asia to have him assassinated. A. discovered this plan, and fled to Tissaphernes, a Persian satrap, who had orders to act in concert with the Lacedæmonians. He now resumed his old manners, adopted the luxurious habits of Asia, and made himself indispensable to Tissaphernes. He represented to the latter that it was contrary to the interests of Persia entirely to disable the Athenians. He then sent word to the commanders of the Athenian forces at Samos that he would procure for them the friendship of the satrap if they would control the extravagance of the people, and commit the government to an oligarchy. This offer was accepted, and Pisander was sent to Athens, where he got the supreme power vested in a council of 400 persons. When it appeared, however, that this council had no intention of recalling A., the army at Samos chose him as their commander, desiring him to lead them on instantly to Athens, and overthrow the tyrants. But A. did not wish to return to his native country till he had rendered it some service, and he accordingly attacked and defeated the Lacedæmonians both by sea and land. Tissaphernes now ordered him to be arrested at Sardis on his return, the satrap not wishing the king to imagine that he had been accessory to his doings. But A. found means to escape; placed himself again at the head of the army; beat the Lacedæmonians and Persians at Cyzicus; took Cyzicus, Chalcedon, and Byzantium; restored to the Athenians the dominion of the sea; and then returned to his country (407 B.C.), to which he had been formally invited. He was received with general enthusiasm, as the Athenians attributed to his banishment all the misfortunes that had befallen them.

The triumph of A., however, was not destined to last. He was again sent to Asia with 100 ships; but not being supplied with money for the soldiers' pay, he was obliged to seek assistance at Caria, where he transferred the command in the meantime to Antiochus, who, being lured into an ambuscade by Lysander, lost his life and part of the ships. The enemies of A. took advantage of this to accuse him and appoint another commander. A. went to Thrace, where he lived in voluntary exile in Pactyæ, one of the castles which he had built out of his earlier spoils. But being threatened here with the power of Lacedæmonia, he removed to Bithynia, with the intention of repairing to Artaxerxes, to gain him over to the interests of his country. At the request of the Thirty Tyrants of Athens, and with the concurrence of the Spartans, Pharnabazus, a satrap of Artaxerxes, received orders to put A. to death. He was living at this time in a castle in Phrygia; Pharnabazus ordered it to be set on fire during the night, and as his victim was endeavoring to escape from the flames, he was pierced with a volley of arrows. Thus perished A. (404 B.C.), about the forty-fifth year of his age. He was singularly endowed by nature, being possessed of the most fascinating eloquence (although he could not articulate the letter *r*, and stuttered in his speech), and having in a rare degree the talent to win and to govern men. Yet in all his transactions, he allowed himself to be directed by external circumstances, without having any fixed principles of conduct. On the other hand, he possessed that boldness which arises from conscious superiority, and shrunk from no difficulty, because he was never doubtful concerning the means by which an end might be attained. His life has been written by Plutarch and Cornelius Nepos.

ALCI'RA (anc. *Sabaticula*), a town of Spain, in the province of Valencia, 20 miles south-by-west from Valencia, on an island in the river Xucar, the two branches of which are here crossed by stone bridges. It is surrounded by old walls, with strong towers. The principal streets are wide, but the town is ill built. The in

habitants are chiefly employed in the manufacture of earthenware, the production of silk, and agriculture. The surrounding country is much intersected by canals, exhibiting an admirable specimen of the system of irrigation introduced by the Moors. Pop. 16,400.

ALCMAN, an ancient lyric poet, was born at Sardis, the capital of Lydia, in Asia Minor, but lived first as a slave, and afterwards as a freeman in Sparta. He is the earliest erotic poet, and is said to have introduced some new metrical forms called *Alcmanica metra*. He composed in the Doric dialect a poem on the Dioscuri, Parthenia, or songs sung by choruses of virgins, bridal-hymns, verses in praise of love and wine, &c. We possess only a few fragments of A., nor do these justify the high opinion entertained of his merits by the ancients, though some of them exhibit considerable beauty. A. died of a loathsome disease (*morbus pediculuris*).

ALCO, a variety of dog, domesticated in Mexico and Peru before the discovery of America by Europeans, and also found in a wild state in these countries. But whether it is originally a native of them, or has escaped from domestication, is uncertain, nor is the variety well known to naturalists. It is described as having a very small head and pendulous ears: the latter being in dogs one of the ordinary results of domestication. Humboldt supposed it to be allied to the shepherd's dog. It has been attempted to elevate it into a species under the name of *Canis A.* It is not improbable that the name A. was given to more varieties than one.

A'LCOHOL (ordinary or *ethyl* A.) is a limpid, colorless liquid, of a hot, pungent taste, and having a slight but agreeable smell. It is the characteristic ingredient of fermented drinks, and gives them their intoxicating quality. If we look at the extraordinary consumption of these liquors, for various purposes, it is seen to be one of the most important substances produced by art.

There is only one source of A.—namely, the fermentation of sugar or other saccharine matter. Sugar is the produce of the vegetable world. Some plants contain free sugar, and still more contain starch, which can be converted into sugar. The best vegetable substances, then, for yielding A. are those that contain the greatest abundance of sugar or of starch. See DIASTASE, FERMENTATION, and DISTILLATION.

Owing to the attraction of A. for water, it is impossible to procure pure A. by distillation alone. Common spirits, such as brandy, whisky, &c., contain 50 or 52 per cent. of A.; in other words, they are about half A., half water. *Proof-spirit*, which is the standard by means of which all mixtures of A. and water are judged, contains 57·27 per cent. by volume, and 49·50 per cent by weight, of A. The specific gravity of proof-spirit is 918·6; and when a spirit is called *above-proof*, it denotes that it contains an excess of A.; thus, *spirit of wine*, or rectified spirit, with specific gravity 838, is 54 to 58 overproof, and requires 54 to 58 per cent. of water to be added to it, to bring the strength down to that of proof-spirit; whilst the term *under-proof* has reference to a less strong spirit than the standard. See AREOMETER. The most primitive method of learning the strength of A. was to drench gunpowder with it, set fire to the spirit, and if it inflamed the gunpowder as it died out, then the A. stood the test or proof, and was called proof-spirit.

The highest concentration possible by distillation gives 90 per cent. of A., still leaving 10 per cent. of water. In order to remove this, fused chloride of calcium, quicklime, or fused carbonate of potash, is added to the alcoholic liquid, the whole allowed to stand for twelve hours, and then the spirit may be distilled off quite free from water. Spirit of wine may also be deprived of its remaining water by suspending it in a bladder in a warm place; the bladder allows much of the water to pass through and evaporate, but little of the A. The latter method is called Soemmering's process, and depends on the different degrees of rapidity with which the bladder admits of water and A. passing through it. Thus, introduce into one bladder eight ounces of water, and into a second, eight ounces of A., and allow both bladders to be similarly exposed on a sandbath, till all the water has evaporated through the pores of the membrane, which will be accomplished in about four days, and it will then be observed, that whilst eight ounces water have made their exit from the bladder, that only one ounce of A. has thus evaporated, and seven ounces still remain in the bladder. This experiment explains why smugglers, a few generations ago, could supply a whisky which was stronger, and hence esteemed preferable, as they carried the whisky in bladders around their persons, and the water escaping therefrom in much greater proportion than the A., a stronger spirit was left.

A. is used medicinally, both internally and externally. The more common form for internal use is brandy, and is that generally recommended by physicians. As a *stomachic stimulant*, A. is used in sea-sickness and indigestion. As a *stimulant and restorative*, it is employed with advantage in the later stages of fever. It is also employed internally as a *powerful excitant* to prevent fainting during operations, and to assist in restoration in cases of suspended animation. In cases of diarrhœa, unaccompanied by inflammation, it is often of great benefit. Externally, A. is applied to stop hemorrhage, to harden the cuticle over tender parts, as the nipples of females for some time before delivery, and to feet which have been blistered from long walking or tight-fitting shoes.

Absolute or anhydrous A. has a specific gravity of 793 at the temperature of 60°. It boils at 173°, and has not been frozen by any cold hitherto produced. Reduced to a temperature of —130°, A. becomes of an oily and greasy consistence; at —146°, it assumes the aspect of melted wax; and at —166°, it gets still thicker but does not congeal at the lowest attainable temperature. This property of non-freezing at any degree of cold to which the earth is subjected, has led to the employment of A. colored red by cochineal, in the thermometers sent out to the Arctic regions. It acts as a poison by abstracting the water from the parts it touches. It is highly inflammable; its combustion yielding only carbonic acid and water. When mixed with water, heat is evolved, and a condensation takes place. The formula of A. is $C_4H_6O_2$. In 100 pounds, therefore, of A., about 53 are carbon, 13 hydrogen, and 34 oxygen. Besides the A. consumed in wine, beer, and spirits, it is much employed in pharmacy and in the arts. It is a powerful solvent for resins and oils; and hence is employed in the preparation of varnishes. In Germany, a cheap spirit made from potatoes is much used for cooking on a small scale. See METHYLATED SPIRIT; and ALCOHOL, and ALCOHOLS. The use and abuse of alcoholic drinks will be considered under FOOD AND DRINK, and TEMPERANCE.

A'LCOHOL, PHYSIOLOGICAL AND POISONOUS ACTION OF. Alcohol, in a concentrated form, exerts a local irritant action on the membranes and tissues of the animal body. According to various circumstances, as, for example, its greater or less dilution, the quantity in which it is administered, the emptiness or fulness of the stomach, and the nature of the animal on which the experiment is made, alcohol may either act as a gentle stimulus, which assists the digestive process, or it may excite such a degree of irritation as may lead to the disorganization of the mucous membrane. It is well known that dilute alcohol, in contact with animal matter, at a temperature of from 60° to 90°, undergoes acetic fermentation, and it was maintained by Leuret and Lassaigne that a similar change took place in the stomach. It appears, however, that only a small part of the alcohol undergoes this change; and it is the small part thus changed which produces the penetrating and disagreeable acidity which characterizes the eructations and vomited matters of drunkards. Alcohol is, however, for the most part, rapidly absorbed in an unchanged state, either in the form of liquid or vapor; and this absorption may take place through the cellular (or connective) tissue, the serous cavities, the lungs, or the digestive canal. This is shown by the experiments of Orfila, who fatally intoxicated dogs by injecting alcohol into the subcutaneous cellular tissues, or by making them breathe an atmosphere charged with alcoholic vapor; and by Rayer, who injected about half an ounce of proof-spirit into the peritoneum of rabbits, which almost immediately became comatose, and died in a few hours. It is, however, only with absorption from the intestinal canal that we have to deal, in relation to man. Almost the whole of this absorption is effected in the stomach, and it is only when alcohol is taken in great excess, or is mixed with a great deal of sugar, that any absorption beyond the stomach occurs. The rapidity of the absorption varies according to circumstances. The absorption is most rapid when the stomach is empty and the drinker is fatigued; while the action is delayed by a full stomach, and especially by the presence of acids, tannin, or the mucilaginous and saccharine ingredients of many wines. Fatty matters have a similar action, and hence it is that (as we learn from Dr. Perrin's elaborate article on 'The Physiology of Alcohol,' in the *Dictionnaire Encyclopédique des Sciences Médicales*, vol. ii. p. 577, 1865) 'we must account for the English habit of taking a very fat soup, or even a glass of oil, before proceeding *aux libations*.' The mode of action of alcohol on the system, and the various phenomena of drunkenness, are sufficiently described in the article INTOXICATION. Previously to the year 1860, the actual presence of alcohol in the blood had been attempted to be proved by many chemists, but no satisfactory evidence upon this point had been adduced; and its presence had also been sought for in the expired air and in the secretions, but the results were equally doubtful; and Liebig's view, that alcohol was oxidized in the blood, and after passing through various stages of oxidation, was finally converted into, and eliminated from, the system as carbonic acid and water, was almost generally accepted.

In that year, however, an elaborate work, abounding in well-devised experience, and entitled, *Du Rôle de l'Alcohol et des Anesthesiques dans l'Organism*, was published by three well-known physiological inquirers, MM. Lallemand, Perrin, and Duroy, and received a prize with high commendation, from the Academy of Sciences. In this work, it seems to be proved beyond all doubt

that 'alcohol stays for a time in the blood, that it exercises a direct and primary action on the nervous centers, whose functions it modifies, perverts, or abolishes, according to the dose; that neither in the blood nor in the expired air are any traces to be found of its transformation or destruction; that it accumulates in the nervous centers, and in the liver; and that it is finally discharged from the system by the ordinary channels of elimination.'—Perrin, *op. cit.* p. 580. So far from carbonic acid being one of its final products, it is now ascertained that alcohol causes a diminished exhalation of that gas. The alcohol, when it has entered the blood, is diffused over the whole organism, remains during, apparently, different periods in different organs, and almost immediately begins to escape; and if as much wine or spirit is taken as contains 80 grammes, or rather more than 2½ ounces of alcohol, the urine passed some hours afterwards yields, by distillation, an amount of alcohol capable of burning; and the elimination by this channel continues for 16 hours or more. The elimination by the lungs continues for about 8 hours. The authors believe that in man the chief excreting channel is the skin, but they have no *data* to show how long this elimination is continued. They further show that, when a quantity of *vin ordinaire*, equivalent to half an ounce of alcohol, has been taken by a healthy man, the presence of alcohol may be readily detected in the blood, the expired air, the urine, and the cutaneous exhalation in the course of half an hour after the wine has been taken. In animals destroyed when intoxicated, the portions of the brain and of the liver are found to yield, weight for weight, considerably more alcohol than the blood. The fact of the retention and accumulation of alcohol in the nervous centers and liver, tends to throw much light on the special diseases of drunkards.

The action of any kind of alcoholic drink in moderate doses, is that of a somewhat rapid stimulant. The bodily and mental powers are for a time excited beyond their ordinary strength, after which there is a corresponding depression. Although the alcohol which is introduced into the system cannot act as a true food (for in that case it would not pass through the system unchanged), it indirectly takes the place of food, by diminishing the wear and tear of the system, and thus rendering less food sufficient: a fact which is proved by chemical experiments, showing that less carbonic acid and urea (which are the ultimate products of the carbonaceous and nitrogenous tissues) are given off when alcohol is administered in moderation, than when it is totally withheld.

The influence of an excessive dose of alcohol has been demonstrated by various series of experiments on animals, and unfortunately by many observed cases in man. If a poisonous dose of alcohol is given to an animal (a dog, for example), its action on the nervous system is the first point that is noticed. The dog ceases to exhibit the ordinary control over its muscular movements, which seem to be no longer under the influence of the will. It walks with uncertain and doubtful steps, till the hind legs lose their power, the fore-legs still preserving some activity. The general sensibility becomes more or less abolished, and the animal can no longer see or feel. Soon afterwards, the respiration fails; and finally, the circulation is arrested, and life ceases with the last beat of the heart.

As cases are of frequent occurrence in which it is almost impossible for non-professional persons (the police, for example) to distinguish between extreme drunkenness and certain other morbid conditions, as apoplexy, concussion of the brain, and opium-poisoning, it may be practically useful if we lay down a few rules on this subject. In concussion and in very extreme intoxication, there is profound coma or sleepiness; but in the latter case, the odor of the breath removes all difficulty of diagnosis. The most difficult cases are those in which the symptoms of concussion or apoplexy are associated with an alcoholic odor of the breath; in such cases, the head should be most carefully examined for marks of violence, and every effort should be made to obtain a history of the case from those who had previously seen the patient. In poisoning by opium or laudanum, the peculiar smell of the drug may generally be detected in the breath (a test which, however, fails if morphia has been taken). In poisoning by opium, the face is pale, and the pupils of the eyes are contracted; while in drunkeness, the face is flushed, and the pupils are generally dilated. Another difference (to which Dr. A. S. Taylor calls attention) is this—that while perfect remissions are rare in poisoning by opium, in poisoning with alcohol the patient often recovers his senses, and subsequently dies. In either kind of poison, the stomach-pump should be used, and the ejected contents of the stomach may facilitate our diagnosis. A sulphate of zinc emetic should be prescribed, if there is no stomach-pump at hand; and after the stomach has been well cleared out, coffee and other strong stimulants should be given.

ALCOHOLS. During the last few years, our knowledge of the properties of ordinary alcohol and of the general class of bodies to which the term *Alcohols* is applied, in consequence of their resemblance, in certain chemical reactions, to ordinary alcohol, has been very much enlarged. The alcohols are all compounds of carbon, hydrogen, and oxygen, and are perfectly neutral to test papers. They are chiefly characterized by yielding, on treatment with acids, neutral bodies called ethers, the formation of water being a part of the reaction. According to the theory of chemical types (see TYPES, CHEMICAL), the alcohols are divided into monatomic and polyatomic (see POLYATOMIC ALCOHOLS). According to their behavior on oxidation, they are further divided into primary, secondary, and tertiary.

Let us now consider the action of oxygen on ordinary alcohol. In a nearly anhydrous state, alcohol has little tendency to oxidation, but when freely diluted, and exposed to the air, it rapidly becomes oxidized into acetic acid. This conversion is, however, not a direct one, an intermediate compound, termed Aldehyde (q. v.), being first formed, which is rapidly oxidized into acetic acid. The oxidation of alcohol into aldehyde is represented by the equation,

$$\underbrace{C_4H_6O_2}_{\text{Alcohol.}} + 2O = \underbrace{C_4H_4O_2}_{\text{Aldehyde.}} + 2HO;$$

and the further oxidation of aldehyde into acetic acid is represented by

$$\underbrace{C_4H_4O_2}_{\text{Aldehyde.}} + 2O = \underbrace{C_4H_4O_4}_{\text{Acetic Acid.}}.$$

In the first reaction, alcohol loses two atoms of hydrogen, water being formed; in the second, aldehyde takes up two atoms of oxygen.

Every alcohol which like ordinary alcohol yields on oxidation an aldehyde, and on further oxidation an acid having the same number of carbon atoms as the alcohol itself, is termed a primary alcohol. To take another example, primary propyl alcohol ($C_6H_8O_2$) is oxidized first into propyl aldehyde ($C_6H_6O_2$), and then into propionic acid ($C_6H_6O_4$). Primary alcohols are subdivided into normal and iso-alcohols, but it would lead us too far to explain the meaning of this distinction.

Secondary alcohols on oxidation lose two atoms of hydrogen, and are converted into bodies known as acetones or ketones, which differ from aldehydes inasmuch as they are not converted on oxidation into acids having the same number of carbon atoms, but are split up into acids having a smaller number of carbon atoms. Thus secondary propyl alcohol is oxidized into acetone, and on further oxidation, acetone splits up into formic and acetic acids,

$$\underbrace{C_6H_8O_2}_{\text{Secondary Propyl Alcohol.}} + O_2 = \underbrace{C_6H_6O_2}_{\text{Acetone.}} + 2HO;$$

$$\underbrace{C_6H_6O_2}_{\text{Acetone.}} + O_6 = \underbrace{C_2H_2O_4}_{\text{Formic Acid.}} + \underbrace{C_4H_4O_4}_{\text{Acetic Acid.}}.$$

It will be observed that propyl alcohol and secondary propyl alcohol, aldehyde and acetone, are respectively isomeric (see ISOMERISM.)

Tertiary alcohols on oxidation give neither aldehydes nor ketones, but split up into acids having a smaller number of carbon atoms. Thus tertiary butyl alcohol ($C_8H_{10}O_2$), which is isomeric with primary and with secondary butyl alcohol, splits up on oxidation into acetic and formic acids. Only a comparatively small number of secondary and tertiary alcohols are at present known, and their properties and reactions have not been so thoroughly studied as those of the much more numerous class of primary alcohols. Theoretical considerations, however, lead to the belief that their number will be largely increased.

Ordinary or ethyl alcohol is monatomic —that is, it may be regarded as being derived from the type $\left.\begin{matrix}H\\H\end{matrix}\right\}O_2$, by the substitution of its radical ethyl, C_4H_5, for one atom of hydrogen. This is expressed by the formula $\left.\begin{matrix}C_4H_5\\H\end{matrix}\right\}O_2$

The *monatomic alcohols* are more abundant than all the polyatomic alcohols together. There are several series of them, of which the most important are alcohols whose radical is of the form $C_{2n}H_{2n+1}$ (as C_2H_3, C_4H_5, C_6H_7), and which are represented by the formula $C_{2n}H_{2n+2}O_2$, or $\left.\begin{matrix}C_{2n}H_{2n+1}\\H\end{matrix}\right\}O_2$. They are intimately related to the fatty acids, whose general formula is $C_{2n}H_{2n-4}O_4$, which may be formed from the alcohol by oxidation, O_2 being substituted for H_2. Thus alcohol, represented generally by $C_{2n}H_{2n+2}O_2$, yields the fatty acid represented by $C_{2n}H_{2n}O_4$; for example, methyl-alcohol, $C_2H_4O_2$, yields formic acid, $C_2H_2O_4$; ethyl-alcohol, $C_4H_6O_2$, yields acetic acid, $C_4H_4O_4$, and so on. The three highest alcohols of this set, cetylic, cerotylic, and melissylic alcohols, have the formulæ $C_{32}H_{34}O_2$, $C_{54}H_{56}O_2$, and $C_{60}H_{62}O_2$, and are solid, waxy, or fatty matters. There is one alcohol whose radical is $C_{20}H_{17}$, whose formula is $C_{20}H_{18}O_2$—viz., the solid substance known as

Borneo Camphor (see RESINS); and in cholesterin (an ingredient of the bile), whose formula is $C_{52}H_{44}O_2$, the radical is $C_{52}H_{42}$. *Diatomic alcohols* belong to the secondary water type $\left.\begin{matrix}H_2\\H_2\end{matrix}\right\}O_4$. Thus the most important diatomic alcohol, glycol, $C_4H_6O_4$, is represented, according to the theory of types, by the formula $\left.\begin{matrix}(C_4H_4)''\\H_2\end{matrix}\right\}O_4$, its radical, C_4H_4, being marked with two dashes, to indicate that it replaces two atoms of hydrogen. In the *triatomic* alcohols, we take $\left.\begin{matrix}H_3\\H_3\end{matrix}\right\}O_6$, or the tertiary type of water, and replace half the hydrogen—viz., three atoms, by one atom of an organic radical, which we consequently mark with three dashes. The well-known substance glycerine, $C_6H_8O_6$, is the only example of the triatomic alcohols. Its radical is C_6H_5; and as this replaces three atoms of hydrogen, its typical formula is $\left.\begin{matrix}(C_6H_5)'''\\H_3\end{matrix}\right\}O_6$. Erythrite, a substance obtained from the litmus lichen, is a tetratomic alcohol; one atom of its radical, C_8H_8, replaces four atoms of hydrogen, and its typical formula is written $\left.\begin{matrix}(C_8H_6)^{iv}\\H_4\end{matrix}\right\}O_8$; while Mannite (the chief ingredient of the well-known substance Manna, described in the article SUGAR) is a hexatomic alcohol, in which one atom of the radical, $C_{12}H_8$, replaces six atoms of hydrogen, its typical formula being $\left.\begin{matrix}(C_{12}H_8)^{vi}\\H_6\end{matrix}\right\}O_{12}$, while its ordinary formula is $C_{12}H_{14}O_{12}$.

Berthelot has shown that several substances not usually classed as alcohols, nevertheless possess an essential character of these bodies—viz., that of uniting with acids to form neutral compounds, water being found during the reaction. When heated with alkalies, these bodies reproduce the substances from which they were formed. These substances are chiefly of a saccharine nature. As examples, we may mention Pinite, a sugar from the *Pinus lambertina*, a Californian tree; Quercite, the sugar of acorns; Phycite, a sugar obtained from certain lichens; and Meconin, an acrid crystallizable substance obtained from opium. We will now add a few supplementary remarks concerning ordinary alcohol. Chlorine and alcohol react singularly on each other—the final products being hydrochloric acid, and a very remarkable colorless oily fluid of a peculiar penetrating and irritating odor, called chloral, which is represented by the formula, $C_4Cl_3HO_2$. Dilute alcohol distilled with chloride of lime (bleaching-powder), yields chloroform; and this is the most economical process for obtaining this invaluable compound. Heated with an excess of sulphuric acid, alcohol loses all its oxygen in the form of water, and is converted into ethylene, the result being shown by the equation,

$$\overset{\text{Alcohol.}}{\underset{\sim\sim}{C_4H_6O_2}} = \overset{\text{Ethylene.}}{\underset{\sim\sim}{C_4H_4}} + \overset{\text{Water.}}{\underset{\sim\sim}{2HO.}}$$

A less complete dehydration, under the action of sulphuric acid, converts alcohol into ether. The process is a complicated one, but the final result is expressed by the equation,

$$\overset{\text{Alcohol.}}{\underset{\sim\sim}{2(C_4H_6O_2)}} = \overset{\text{Ether.}}{\underset{\sim\sim}{(C_4H_5O)_2}} + \overset{\text{Water.}}{\underset{\sim\sim}{2HO.}}$$

The best tests for discovering the presence of alcohol are—1. Its hot pungent taste, its odor, and its great volatility. 2. Absorbed in asbestos, it burns with a pale blue flame, which deposits no carbon on white porcelain; and when burned in the mouth of an inverted test-tube, containing a few drops of solution of baryta, it produces a well-marked deposit of carbonate of baryta—carbonic acid and water being the products of its combustion. 3. It dissolves camphor. 4. When boiled with sulphuric acid and a few drops of a saturated solution of bichromate of potash, it reduces this salt to green chromic sulphate. The chromium test, originally discovered by Dr. Thomson in 1846, is that on which the French physiologists Lallemand, Perrin, and Duroy relied in their investigations regarding the presence of alcohol in the blood, urine, expired air, &c. See ALCOHOL, PHYSIOLOGICAL ACTION OF.

Alcohol is of a double use to the chemist, inasmuch as it furnishes a cleanly and valuable fuel when used in the spirit-lamp, and possesses remarkable solvent powers without in general exerting chemical action on the dissolved substances. It dissolves many of the gases more freely than water, as, for example, nitrous oxide, carbonic acid, phosphuretted hydrogen, cyanogen, and the hydrocarbons, as for instance, ethylene. Amongst the mineral substances which it dissolves may be mentioned iodine, bromine, boracic acid, the hydrates of potash and soda, the chlorides and calcium, strontium, magnesium, zinc, platinum, and gold, the perchloride of iron, corrosive sublimate, the nitrates of lime, magnesia, &c.; whilst amongst organic matters, it dissolves many organic acids, bases, and neutral bodies, the resins, the soaps, and the fats, which latter, however, dissolve more freely in ether than in alcohol. The alcoholic solutions of substances used in medicine are called *Tinctures*.

ALCOHOLO'METRY is the process of estimating the percentage of absolute alcohol in a sample of spirits. See AREOMETER.

ALCO'RA, a town of Valencia, Spain, in the province of Castellon, 40 miles N.N.E. of Valencia. Corn, grapes, silk, and hemp are among the principal productions of the neighborhood, and fruit is exported. Pop. (1877) 3633.

A'LCORAN. See KORAN.

ALCO'VE (Spanish, *alcoba*, which is derived from the Arabic, *El-kauf*, a tent), an architectural term, denoting a sort of niche or recess in a chamber where one may recline, or where a bed may be placed. An A. is either hung with curtains or closed with doors during the day. It was known to the ancients, and at one time very common in France, when the immoderate size of the apartments rendered it absolutely necessary as a preventive against the cold during sleep. It is no longer fashionable, the most eminent physicians having declared it to be prejudicial to health.

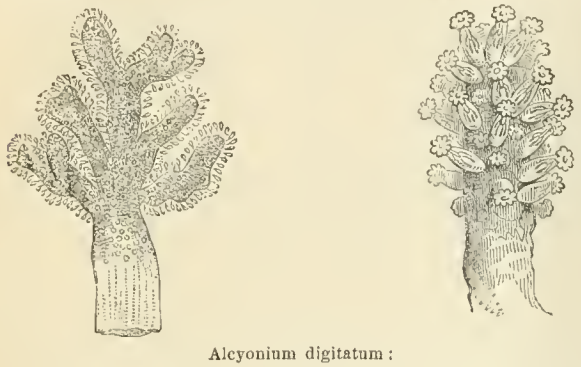
ALCO'Y, a town of Spain, in the province of Alicante, a portion of the former kingdom of Valencia. It is 'built in a funnel of the hills, on a tongue of land hemmed in by two streams, with bridges and arched viaducts.' The houses hang picturesquely over the terraced gardens and ravines. The walls of A. are of clay, and suffered considerable damage during the late war; but the town contains some new edifices, and has numerous manufactories. 'Here is made the *papel de hilo*, the book *Librito de fumar*, which forms the entire demi-duodecimo library of nine-tenths of Spaniards, and with which they make their *papelitos*, or little paper-cigars.' 200,000 reams are annually made, of which 10,000 are used for writing, 10,000 for packing, and 180,000 for the paper-cigars! A. is also famous for its sugar-plums. It has a consistory, town-hall, poor asylum, public granary, &c. Pop. (1877) 32,897.

ALCUDI'A, MANUEL DE GODOY, DUKE OF, known as the Prince of Peace, was born at Badajos, in Spain, 12th of May 1767. Poor, but handsome and musical, at the age of twenty, he entered the king's body-guard at Madrid, and soon became a favorite of the weak Charles IV., as well as of his queen. Honors and emoluments flowed in rapidly. In 1801, he led the Spanish army against the Portuguese, and signed the treaty of Badajos. In 1804, he was made generalissimo of the Spanish forces on sea and land, and invested with unlimited power. The alliance of Spain with France, and the war with England which ensued, in spite of the sums paid by Spain to secure neutrality, the defeat of Trafalgar, and consequent check to commerce—all tended to exasperate the public mind, and a court-party was formed against him, with the Prince of Asturias at its head. A. now resolved to shake off the French alliance, and to treat secretly with the Lisbon court. But however cautiously taken, his warlike measures reached the ears of Napoleon, and determined him to carry out his project of dethroning the Bourbons. Meanwhile, the people had been further exasperated against the favorite by his unprincipled accusations against the Prince of Asturias; and when, in 1808, Charles abdicated in favor of his son, the duke's life was only saved by the promise of his trial. This trial, however, never took place. Napoleon, who knew his influence over the minds of their Spanish majesties, had him liberated, and brought to Bayonne, where he instigated all measures taken by the ex-king and queen, retaining their favor till their death. After his fall, he lived chiefly in France. In 1808, his income had been estimated at five million piastres. After the revolution of 1830, we find him subsisting in Paris upon a small pension bestowed by Louis-Philippe. In 1847, his return to Spain was permitted, and his titles, together with great part of his wealth, restored. He died at Paris, 4th October 1851.

A'LCUIN, or FLACCUS ALBI'NUS, the most distinguished scholar of the 8th c., the confidant and adviser of Charlemagne, was born at York about the year 735. He was educated under the care of Archbishop Egbert, and his relative, Aelbert, and succeeded the latter as master of the School of York. Charlemagne became acquainted with him at Parma, as he was returning from Rome, whither he had gone to bring home the *pallium* for a friend; and in the year 782, this monarch invited him to his court, and availed himself of his assistance in his endeavors to civilize his subjects. A. became the preceptor of Charlemagne himself, whom he instructed in the various sciences. To render his instructions more available, Charlemagne established at his court a school called *Schola Palatina*, the superintendence of which, as well as of several monasteries, was committed to him. In the learned society of the court, A. went by the name of Flaccus Albinus. Most of the schools in France were either founded or improved by him. Among others, he founded the school in the

Abbey of St. Martin, in Tours (796), taking as his model the School of York; and in this school he himself taught after his retirement from court (801). While living at Tours, he frequently corresponded with Charlemagne. At his death, in 804, he left, besides numerous theological writings, a number of elementary works on philosophy, mathematics, rhetoric, and philology; also poems, and a great number of letters. His letters, while they betray the uncultivated character of the age generally, show A. to have been the most accomplished man of his time. He understood Latin, Greek and Hebrew. Good editions of his works appeared in 1777 and in 1873. See the life of A. by Lorenz (1829); Monnier's *A. et Charlemagne* (1864); and Mullinger's *Schools of Charles the Great* (1877).

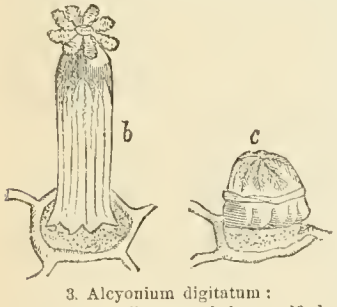
ALCYO'NIUM, a genus of Cœlenterata, the type of an order called *Alcyonaria*, belonging to the class *Actinozoa* (see article



Alcyonium digitatum:
1. Reduced general figure. 2. A portion showing the polypes protruded, and with extended tentacula.

ZOOLOGY), and consisting of a polype-mass with starlike pores and protrusive polypes. *A. digitatum* is extremely common on the British shores, on stones, old shells, &c., in deep water.

It sometimes appears as a mere crust, about the eighth of an inch in thickness, but commonly rises up in rounded cones, and often assumes forms which have procured for it the popular name of *Dead Man's Fingers*, and other similar appellations. The polype-mass is gelatinous within, and covered with a sort of leathery skin, the mass being traversed by a multitude of minute canals, terminating on the outer surface in starlike figures, which, if the whole is placed in sea-water, are seen to project considerably from the surface, and appear as polypes with eight tentacula or feelers; so that what seems to be a disgusting fleshy mass in the fisherman's net, proves to be, when placed in its proper element, a structure of wonderful beauty and full of animal life, existing under peculiar and wonderful conditions. The manner in which the polypes protrude and retract themselves, has been likened to that in which the horns of a snail are protruded and retracted. Their tentacula are short, obtuse, and elegantly fringed at the margins. The external part of the body of the polype is a membrane so transparent, that by the employment of a magnifying-glass the whole internal structure can be seen through it. See fig. 3, *b*. This delicate membrane, however, is composed of two very thin membranes, intimately united, the outer of which increases in thickness at the base of the polype, coalesces with that of adjacent polypes, and is continuous with the common leathery skin of the polype-mass. The inner membrane retains its extreme delicacy throughout; it extends into and lines the cell of the polype (see fig. 4) and the tube or canal which proceeds from the cell into the mass, and is thus also continuous with the corresponding membranes of other polypes; for the canals divide into branches in their course from the base of the polype-mass to the surface, and the intimacy of union in the whole is increased by fine tubular net-work which occupies the spaces between the principal canals.



3. Alcyonium digitatum:
b, the polype fully protruded, magnified; *c*, the polype partially protruded, magnified.

4. Alcyonium digitatum: Section showing internal structure.

If a portion of an A. is irritated, not only the particular polypes immediately subjected to irritation retract themselves as to withdraw from danger, but the gradual collapse and contraction of the whole polype-mass shows that the irritation has been felt through it all. The contraction of the mass is owing to a discharge of water, which the polypes, when protruded, imbibe, and which circulates through and distends the polype-mass, so that when the polypes are undisturbed, and in full activity, it has twice or three times the size which it has as we find it cast out upon the beach. The stomach of each polype is cylindrical (as may be seen in fig. 3, *b*, immediately under the oval disk or expanded tentacula), and beneath it is a comparatively large cavity, into which hang loosely (as may also be seen in the figure just referred to) eight twisted filaments or threads, the use of which is not well ascertained, and has been the subject of very different opinions among naturalists. In the gelatinous substance of the polype-mass which fills the interstices of the tubular net-work, numerous crystalline calcareous spicula lie immersed, like the *raphides* (q. v.) found in the intercellular passages of some plants. They are toothed on the sides, but are of various forms, and have no organic connection with any part of the animal structure; their only use apparently being to impart some degree of strength to the whole. These spicula are of general occurrence in zoophytes of this order, and are secreted by the common skin of the polype-mass. The polype-mass increases by *gemmæ* or buds, which grow into new branches; but the propagation of the species takes place by *ova* or eggs, which appear as minute smooth warts on the membrane of the canals in the interior. The constriction of the neck, by which they grow, separates them from the parent membrane, and they move through the canal by means of very minute vibrating cilia or hairs with which they are furnished, until they reach the stomach of a polype, into which they enter, and through which they more slowly proceed till at last they are ejected by the month (the only opening), and committed to the waves and tides. The ova seem as if capable of feeling whilst within the parent mass, and may be observed to move backwards and forwards, and to contract their sides as if by voluntary action in their passage through the body of the polype.

These wonderful phenomena of nature are the more easily observed, because the ova are of a deep vermilion color, beautifully contrasting with the pure white of the polype, through the tunic of which they are seen.—One of the most remarkable known species of A., and the largest, is that called *A. poculum* or Neptune's Cup, which was discovered by Sir Stamford Raffles upon the coral-reefs of Sumatra, and is found in the neighborhood of Singapore. It grows erect, sometimes attaining nearly three feet in height and eighteen inches in diameter. Specimens are now frequent in museums in this country.

The name Alcyonium was formerly also given to many zoophytes now found to be of very different structure, some of which now bear the name *Alcyonidium*, others that of *Alcyonella*. The genus *Alcyonidium* belongs to the class of Zoophytes called *Polyzoa*, order *Infundibulata*. See ZOOPHYTES. The most common British species is *Alcyonidium gelatinosum*. It resembles a sponge in appearance, but is more pellucid and gelatinous, and is full of polypes, each having 15 or 16 long slender tentacula. It is attached to old shells and stones, and is sometimes much lobed, as in the preceding figure, sometimes almost simple. The color varies from a very pale brown to clear yellow; the surface is speckled with minute dots, from which, when it is placed in sea-water, the polypes protrude. The polype differs widely from that of Alcyonium in having an intestine, which, proceeding from the stomach to the aperture of the cell, opens there by an orifice distinct from the mouth, a difference characteristic of the classes to which they respectively belong. The ova are clothed with cilia, and their motions either are or most strikingly resemble voluntary motions.—*Alcyonella* belongs to the class Polyzoa, order *Hypocrepia*. See ZOOPHYTES. There is one British species, *Alcyonella stagnorum*, found in stagnant waters, especially in autumn, in shapeless, jelly-like masses, of a blackish-green color, usually adhering to the leaves of aquatic plants. The jelly-like mass is traversed from base to surface by multitudes of tubes, which open by a roundish or 5-angled aperture; the heads of the polypes project a little way from the aperture, and expand into a circle of about fifty tentacula. About 1600 polypes are situated on a square inch of the surface of the mass. The number of tentacula on a specimen of moderate size has been computed at more than 5,000,000. The tentacula are covered with minute cilia, only to be observed with a high magnifying power.

Alcyonidium gelatinosum. Reduced.

by means of which a constant whirlpool is maintained centering in the mouth of the polype, and essential, probably, for breathing as well as for the supply of food. Each polype is organically connected with the mass, its tunic being continuous with the tube. The alimentary canal has two openings. The ova are to be found in vast numbers in the tubes which traverse the mass. They are dark brown, whilst the tubes are colorless or tinted with green, of a lens-like form and destitute of cilia. They are produced from all parts of the inner side of the gelatinous tubes; and as there seems to be no aperture for their escape, it is supposed that they are liberated from the parent mass only on its death and decomposition. The *Alcyonella* is an interesting object in a fresh-water aquarium, but is rather difficult to preserve. It is not, however, always to be found even in ponds where it might be expected, and is abundant in particular seasons and rare in others. The ova are probably capable of remaining long dormant, until some concurrence of circumstances favors the development of the germ of life which they contain. See Johnston's *History of British Zoophytes*, and more recent works on the Cœlenterata and other invertebrates.

ALDBOROUGH, a decayed town of the West Riding of Yorkshire, on the river Ure and on Watling Street. Before 1832 it sent two members to parliament. Extensive remains of the Roman town of Isurium have been found here.—There is another small coast town of the same name in the north-east of Suffolk.

ALDE'BARAN, the Arabic name of a star of the first magnitude in the constellation Taurus. It is the largest and most brilliant of a cluster of five which the Greeks called the Hyades. From its position, it is sometimes termed 'the Bull's Eye.'

A'LDEHYDE ($C_4H_4O_2$) is a volatile fluid produced by the oxidation and destructive distillation of alcohol and other organic compounds. Its discoverer, Döbereiner, called it *light oxygen ether;* its present term is an abbreviation of *alcohol dehydro-genitum*, its composition being represented by that of alcohol from which two atoms of hydrogen have been abstracted. In the article on this subject in Watt's *Dictionary of Chemistry*, ten different modes of obtaining this substance are given. We shall confine ourselves to the method described by Liebig. A mixture of two pints of alcohol, two pints of water, three pints of black oxide of manganese, and three pints of sulphuric acid, is distilled in a large retort connected with a receiver surrounded with ice. As soon as about three pints of the liquid have distilled over, the operation is stopped. The product thus obtained is rectified, and all that passes over above 140° is rejected. The impure aldehyde thus obtained is mixed with twice its volume of ether, and then saturated with ammonia gas. Crystals of aldehydate of ammonia are formed, which are then mixed with dilute sulphuric acid, and distilled in a flask. The vapors of aldehyde are first dried by passing them over chloride of calcium, and then condensed in a well-cooled receiver. The aldehyde thus prepared is a thin, transparent, colorless liquid, very inflammable, burning with a blue flame, and having a spec. gr. of 0.8. a boiling-point of about 71°, and a pungent, suffocating odor. It mixes in all proportions with water, alcohol, and ether, and dissolves sulphur, phosphorus, and iodine. As is shown in the article ALCOHOLS, it constitutes an intermediate stage in the oxidation of alcohol into acetic acid. When potassium is gently heated with aldehyde, one atom of H is replaced by one of K, the resulting compound being aldehydate of potash, $C_4H_3KO_2$. Various compounds of this kind may be formed, of which the most important is aldehydate of ammonia, or aldehyde-ammonia $C_4H_3(NH_4)O_2$, which is obtained in transparent shining crystals, and is a compound that has led chemists to the discovery of a large number of very remarkable derivatives.

ALDEHYDES are a class of organic compounds, intermediate between primary alcohols and acids; the ordinary aldehyde, described in the preceding article, being, as we have seen, intermediate between ordinary alcohol and its corresponding acid—viz., acetic acid. Each aldehyde is derived from the corresponding alcohol by the abstraction of two atoms of hydrogen, and each aldehyde is converted into its corresponding acid by the addition of two atoms of oxygen.

Nine aldehydes of the form of $C_{2n}H_{2n}O_2$, corresponding to n=2, 3, 4, 5, 7, 8, 11, 12, and 16, are at present known, the simplest being ordinary or acetic aldehyde, $C_4H_4O_2$, and the highest being palmitic aldehyde, $C_{32}H_{32}O_2$.

Amongst aldehydes not connected with the preceding group may be mentioned various organic compounds which have been recently shown to belong to this class—thus, acrolein, $C_6H_4O_2$, is acrylic aldehyde; camphor, $C_{20}H_{16}O_4$, is campholic aldehyde; bitter-almond oil, $C_{14}H_6O_2$, is benzoic aldehyde; oil of cumin, $C_{20}H_{12}O_2$, is cuminic aldehyde; oil of cinnamon, $C_{18}H_8O_2$, is cinnamic aldehyde. Most of these aldehydes are obtained directly from plants, and either exist in them ready formed, or are given off as volatile oils on distillation with water. Owing to their great tendency to oxidize into their corresponding acids, the aldehydes are powerful reducing agents. They reduce the silver in silver salts to the metallic state. On the other hand, by the action of nascent hydrogen upon the aldehydes, the corresponding alcohols are regenerated. Thus ordinary alcohol may be obtained from ordinary aldehyde.

$$\overbrace{C_4H_4O_2}^{\text{Acetic Aldehyde.}} + H_2 = \overbrace{C_4H_6O_2}^{\text{Ethyl Alcohol.}}$$

With the acid sulphites of the alkalies the aldehydes form sparingly soluble crystalline compounds. When treated with caustic alkali, the aldehydes are converted into resinous substances. The aldehydes have a great tendency to form polmeric compounds. Thus ordinary aldehyde passes readily into two polymeric modifications (see ISOMERISM): (1) Par-aldehyde, a liquid which does not boil till 247°; (2) Metaldehyde, a solid body which sublimes at 248°, and is converted into ordinary aldehyde at 356°.

For a good account of the aldehydes, see the chapter on that subject in Naquet's *Principes de Chimie, fondée sur les Théories Modernes*, in which will be found a full account of the aldehydes derived from the monatomic alcohols, of the modes of preparing them, of the properties common to all aldehydes, and those specially belonging to different series, the rational formulæ and constitution of aldehydes, and the aldehydes derived from diatomic alcohols or glycols, in which this chemist includes not only salicylous, salicylic, and glycolic aldehydes, but that remarkable product, Furfurol (q. v.).

ALDER (*Alnus*), a genus of plants of the natural order *Betulaceæ* (regarded by many as a sub-order of *Amentaceæ*; see BIRCH and AMENTACEÆ). The genus consists entirely of trees and shrubs, natives of cold and temperate climates; the flowers in terminal, imbricated catkins, which appear before the leaves; the male and female flowers in separate catkins on the same plant; the male or barren catkins loose, cylindrical, pendulous, having the scales 3-lobed, and each with three flowers whose perianth is single and 4-partite; the fertile catkins oval, compact, having the scales sub-trifid, and each with two flowers destitute of perianth; styles two; fruit, a compressed nut without wings.—The COMMON or BLACK A. (*A. glutinosa*) is a native of Britain, and of the northern parts of Asia and America. It has roundish, wedge-shaped obtuse leaves, lobed at the margin and serrated. The bark, except in very young trees, is nearly black. It succeeds best in moist soils, and helps to secure swampy river-banks against the effects of floods. It attains a height of 30—60 feet. Its leaves are somewhat glutinous. The wood is of an orange-yellow color, not very good for fuel, but affording one of the best kinds of charcoal for the manufacture of gunpowder, upon which account it is often grown as coppice-wood. Great numbers of small A. trees are used in Scotland for making staves for herring barrels. The wood is also employed by turners and joiners; but it is particularly valuable on account of its property of remaining for a long time under water without decay, and is therefore used for the piles of bridges, for pumps, sluices, pipes, cogs of mill-wheels, and similar purposes. The bark is used for tanning and for dyeing, also for staining fishermen's nets. It produces a yellow or red color, or with copperas, a black color. The leaves and female catkins are employed in the same way, by the tanners and dyers of some countries.

Alder-Tree.

The bark is bitter and astringent, and has been used for gargles, and also administered with success in ague. The seeds are a favorite food of greenfinches.—The Alder is one of the ornaments of many of the most exquisite landscapes in Britain. The dark green of its foliage, and the still darker hue of its bark, contrast beautifully with the colors of the other trees with which it is usually associated on the banks of our rivers. In boggy grounds it is often almost the only kind of tree that appears, and in many parts

of the Highlands, groups of alders are scattered over the lower and moister parts of the mountain-slopes. The individual tree viewed by itself may be regarded as somewhat stiff and formal in

Alder leaves, &c.:

a, a branchlet with male and female catkins, reduced; *b*, a branchlet with leaves and female catkins in a more advanced stage, reduced; *c*, the fruit-bearing female catkin; *d*, the same, cut across, to show the small nuts or seeds.

appearance; but in groups or clusters, it is always far otherwise.—The common A. ceases on the Swedish shore of the Gulf of Bothnia, in the south of Angermannland, and is there called the *Sea A.*, because it is only in the lowest grounds near the sea that it occurs.—The GRAY or WHITE A. (*A. incana*), a native of many parts of continental Europe, especially of the Alps, and also of North America, and of Kamtchatka, but not of Britain, differs from the common A. in having acute leaves, downy beneath, and not glutinous. It attains a rather greater height, but in very cold climates and unfavorable situations appears as a shrub. It occurs on the Alps at an elevation above that to which the common A. extends, and becomes abundant also where that species disappears in the northern part of the Scandinavian peninsula. The wood is white, fine-grained, and compact, but readily rots under water. The bark is used in dyeing.—*A. cordifolia* is a large and handsome tree, with cordate acuminate leaves, a native of the south of Italy, but found to be quite hardy in England. Some of the American species are mere shrubs. The bark of *A. serrulata* is used in dyeing.—Several species are natives of the Himalayas.—The BERRY-BEARING A., or A. BUCKTHORN, is a totally different plant. See BUCKTHORN.

A'LDERMAN, a title derived from the Anglo-Saxon *ealdorman*, compounded of *ealdor* (older) and *man*. Whether any definite and invariable functions were connected with the ancient rank of *ealdorman*, does not seem to be very clearly ascertained. The term was generally applied to persons of high and hereditary distinction, such as princes, earls, and governors. Its special signification in the titles 'A. of all England' (*Aldermannus totius Angliæ*) and 'King's A.' (*Aldermannus Regis*), is not distinctly indicated. There were also aldermen of counties, hundreds, cities, boroughs, and castles. In modern times, aldermen are officers invested with certain powers in the municipal corporations of England, Wales, and Ireland, either as civil magistrates, or as assessors of the chief civil magistrates in cities and towns corporate. The corresponding title in Scotland is Bailie. The London Court of Aldermen consists of twenty-six aldermen, including the Lord Mayor, and constitutes the bench of magistrates for the city, besides having judicial and legislative authority in the corporation. See ALDERMAN in AM. SUPP.

A'LDERNEY (Fr. *Aurigny*, Lat. *Aurinia*), an island in the English Channel (see CHANNEL ISLANDS), lat. 49° 45′ N., long. 2° 13′ W., separated from the coast of Normandy by a strait about 7 miles in breadth, called the Race of Alderney. Through this channel, which is very dangerous in rough weather, the remnant of the French fleet escaped after their defeat at La Hogue in 1692. The distances between Alderney and the nearest point of Guernsey, Jersey, and Great Britain, are respectively about 15, 33, and 60 miles. The length of the island is about 4 miles, the breadth about 1¼. The coast to the south-east is bold and lofty, to the north-east and north, it descends, forming numerous small bays, one of which, that of Crabby, affords the only anchorage in the island. A harbor of refuge and breakwater have been constructed on the north side of the island, the extensive works connected with which have greatly increased the population. Six miles to the west are the Caskets, a small cluster of rocks, on which are three lighthouses. The soil in the center of the island is highly productive; and the A. cows, a small but handsome breed, have always been celebrated. The climate is mild and healthy, and good water abounds. The population has been steadily on the decrease for some time. In 1851, it was 3333; in 1871, 2738; in 1881, 2039. Education to some extent is universal. The population was originally French, but half the inhabitants now speak English, and all understand it. Protestantism has prevailed here since the Reformation. A. is a dependency of Guernsey, and subject to the British crown. The civil power is vested in a judge appointed by the crown, and six *jurats* chosen by the people. These, with twelve popular representatives or *douzainiers* (who do not vote), constitute the local legislature. The court of justice is composed of the judge and jurats, the royal procurer and comptroller and registrar (*greffier*), nominated by the governor. There is a local militia, consisting of two companies of infantry, and a brigade of artillery. The 'Town,' situated in a picturesque valley near the center of the island, contains a few public buildings, among which is the old church, said to have been erected in the 12th c., and a new one in the early English style, with a tower 104 feet high. The living is a perpetual curacy in the archdeaconry and diocese of Winchester.

A'LDERSHOTT CAMP. When England and France declared war against Russia in 1854, in relation to Turkish affairs, the British army was known to be in an unsatisfactory state. Thirty-nine years of peace had allowed many important elements in military organization to fall into a state of inefficiency. Among others, the power of acting well together in brigades and divisions had scarcely been taught to our soldiers, who had been familiar with little more than the discipline and tactics of battalions and companies. To remedy in part these defects was the object held in view in establishing the camp at A. It was to be a permanent camp, with barracks and huts, instead of mere canvas tents; and was to be provided with all the appliances for a military school, valuable to officers as well as to privates. A dreary waste, on the confines of Surrey, Hants, and Berks, called A. Heath, was purchased by the government as the locality for the new camp. The area was 7063 acres, and the purchase price about £130,000. The spot was deemed suitable as being distant from any thickly inhabited district; as being within easy reach of three or four stations on the South-western and South-eastern railways, and as being conveniently placed for the quick transmission of troops to any part of the southern coast. The camp was ready for the reception of troops in 1855. At first, no brick structures were attempted. The soldiers were accommodated in wooden huts, each furnishing living and sleeping room for about twenty-five men. When the camp was inaugurated, in April of the year last named, by a review at which the Queen was present, there were 18,000 troops, regulars and militia, temporarily stationed there. The huts for each regiment were grouped apart, for the better maintenance of regimental discipline. Each hut had a range of iron bedsteads on either side, capable of being doubled up; and a long table through the middle, in a line with two doors at the ends of the huts. The officers' huts, though of course superior in construction and convenience, were as simple as they could well be. The cooking was performed in huts especially set apart for that purpose, provided with efficient cooking apparatus. The wooden huts have gradually been superseded by brick barracks, at a cost of more than a quarter of a million sterling. These will be briefly described in a future article (BARRACKS), as examples of the finest barracks hitherto constructed in this country. The Basingstoke Canal, running directly across the Heath, has occasioned a division into North Camp and South Camp; but each of these is susceptible of a good deal of extension. Reviews and sham-fights are frequently held, at some of which the Queen has been present, and there are various important operations carried on daily, and known to very few besides those immediately concerned.

There are many square miles of plain, heath, shrub, morass, valley, and hill surrounding the camp, on which soldiers, and especially the militia regiments, are exercised in the various evolutions and strategic movements connected with the battle-field and siege-works. It is no child's play; the men are often severely worked, and gain a foretaste of some of the fatigues of military life. On other days, they are exercised in various quiet duties of tents and huts, barracks and kitchens, intended to teach them many of the useful knacks in which French soldiers are acknowledged to be more skilled than the English. Different regiments, regulars as well as militia, artillery as well as cavalry and infantry, take it in turn, to experience camp-life at A. There are usually about from 10,000 to 15,000 troops at the camp, comprising infantry, cavalry, artillery and militia. The war authorities some years ago purchased or leased a portion of forest-land between A. and Winchester; camping arrangements of a temporary kind are made, and the troops are occasionally exercised with a tough march of a dozen miles. A thriving town (pop. in 1871, 11,615) has sprung up near the camp. An unfortunate circumstance is, that the barracks have been built at the very edge of the ground belonging to the government; as a consequence, private speculators built beer-houses and haunts of dissipation close to the barracks, greatly to the demoralization of the soldiers; and it is not easy to buy up these people, owing to the rise in value of the land. Some alleviation has arisen from the operation of the Contagious Diseases Acts of 1866 and 1869.

A'LDINE EDITIONS, the name given to the works that issued from the press of Aldo Manuzio (q. v.) (Lat. Aldus Manutius) and his family in Venice (1490–1597). Recommended by their intrinsic value, as well as by there handsome exterior, they have been highly prized by the learned and by book-collectors. Many of them are the first editions (*editiones principes*) of Greek and Roman classics; others contain corrected texts of modern classic writers, as of Petrarch, Dante, Boccaccio, &c., carefully collated

with the MSS. All of them are distinguished for the remarkable correctness of the typography; the Greek works, however, being in this respect somewhat inferior to the Latin and Italian. The editions published by Aldus, the father, form an epoch in the annals of printing, as they contributed in no ordinary measure to the perfecting of types. No one had ever before used such beautiful Greek types, of which he got nine different kinds made, and of Latin as many as fourteen.

It is to him, or rather to the engraver, Francesco of Bologna, that we owe the types called by the Italians *Corsivi*, and known to us as Italics, which he used for the first time in the 8vo edition of ancient and modern classics, commencing with Virgil (1501). Manuzio's impressions on parchment are exceedingly beautiful; he was the first printer who introduced the custom of taking some impressions on better paper—that is, finer or stronger than the rest of the edition. The first example of this is afforded in the *Epistolæ Græcæ* (1499). It would be difficult to name another who has brought so much zeal, disinterestedness, taste, and knowledge to the furtherance of literature, especially classical literature. After his death, in 1515, his business was superintended by his father-in-law, Andreas Asulanus. Paul, the son of Aldus, possessed the same enthusiasm for Latin classics that his father had for Greek. He died in Rome in 1597. The printing establishment founded by Aldo continued in active operation for 100 years, and during this time printed 908 different works. The distinguishing mark is an anchor, entwined by a dolphin, generally with the motto, *Sudavit et alsit*. Under the direction of the grandson of the founder, it lost the superiority which it had formerly maintained over all other printing-presses in Italy. The demand which arose for editions from this office, and especially for the earlier ones, induced the printers of Lyon and Florence, about 1502, to begin the system of issuing counterfeit Aldines. The Aldo-mania has considerably diminished in later times. Among the A. works which have now become very rare may be mentioned the *Horæ Beatæ Mariæ Virginis* of 1497; the *Virgil* of 1501; and the *Rhetores Græci;* not to mention the editions from 1494 to 1497, which are now extremely rare. The most complete collections known are those of the former Grand Duke of Tuscany, and of Renouard, the bookseller of Paris. In 1834 appeared a third edition of the monograph published by Renouard, *Annales de l'Imprimerie des Aldes, ou Histoire des Trois Manuces, et de leur Editions: par A. Renouard* (Paris, 1834). Ebert has published a catalogue of all the authentic A. E. in the supplement to Vol. I. of his *Bibliographical Dictionary*.

ALDROVANDI, ULYSSES, one of the most distinguished naturalists of the 16th c., was born at Bologna, probably about the year 1522. He was descended of a noble family, and received an excellent education, partly in his native city and partly at Padua. Some of his religious opinions having been called in question, he traveled to Rome in 1550, to vindicate himself; and whilst there, studied Roman antiquities, and wrote a treatise on ancient statuary. At Rome, he formed the acquaintance of Rondelet. On his return home, he devoted himself to the study of botany, and having taken his degree in medicine at the University of Bologna in 1553, he was in the following year appointed to the chairs of Philosophy and Logic, and also to the lectureship on Botany. He practised medicine for some time in Bologna, and appears after a short time to have exchanged some of the chairs which he held in the University for that of Natural History, to the study of which science he applied himself with great devotedness. He established the Botanical Garden at Bologna in 1567. He was much employed, during many years, in forming a museum of natural history, collecting specimens with great assiduity, and employing draughtsmen to make figures of them for the great work on natural history which he contemplated. In the pursuit of his favorite science, he traveled into different countries, but no particular record of his travels remains. Inspiring others with a zeal similar to his own, he had the pleasure of seeing his museum rapidly increase. He finally bequeathed it to the Senate of Bologna, and it became the foundation of the splendid public museum of that city, where many of A.'s specimens remain to this day. He left behind him, also, at his death, a prodigious mass of valuable manuscripts, which still remain in the public library of Bologna, a store of which proper use has never yet been made, and in which there is probably much correspondence of eminent men, interesting as showing the first steps of progress of the science of natural history, after the long dormancy of the middle ages. All his studies and collections were made subservient to his work on Natural History, the first volume of which—on Birds—appeared in 1599. Six volumes appeared during A.'s life; other seven were published under the direction of his colleagues and pupils after his death, which took place in 1605. It has been stated in many notices of his life, and was long commonly believed, that, by his scientific pursuits, A. reduced himself to circumstances of great poverty, and that he died in a public hospital at Bologna; but the story, although Bayle has adopted it in his Dictionary, rests on no sufficient evidence, and there is reason to think that it is not true. It is difficult to procure a complete edition of the works of A., and the volume on Minerals is especially rare. A. has been censured for excessive copiousness in things of little importance, and at best merely serving to illustrate his subject and render it interesting. He shows, however, great anxiety to set forth all that is known on every subject of which he treats; he writes of natural history in a way which shows that he greatly loves the science, and at the same time with a devout and reverent spirit, always beholding in the work of creation the traces of the Creator's hand.

A'LDSTONE, or ALSTON, sometimes called ALSTON MOOR, a market-town of the county of Cumberland, England, 30 miles east-south-east from Carlisle. The parish of A. contains extensive and very productive lead mines, formerly belonging to the Earls of Derwentwater, and now to the Lords Commissioners of the Admiralty. The town has manufactures of worsted yarns and flannel. It is situated in a mountainous district, on the declivity of a steep hill, near the confluence of the Nent and South Tyne. Pop. about 2500. The produce of the lead mines has fallen off considerably during recent years. Pop. of parish (1871) 5680; (1881) 4621.

ALE would seem to have been the current name in England for malt liquor in general before the introduction of hops. This took place, according to Johnston (*Chemistry of Common Life*), as late as the reign of Henry VIII., about the year 1524. As the use of hops was derived from Germany, the German name of malt liquor (*bier*), *beer*, was used at first to distinguish the hopped liquor from *ale*, the unhopped. The word *ale* had in all likelihood been introduced by the Danes and other Scandinavian Settlers for *öl* (allied probably to *oil*) is still the name for malt liquor in the Scandinavian tongues—and must have driven out the *beor* of the Anglo-Saxons, which that people had in common with the other Teutonic nations. As now used, ale signifies a kind of beer (q. v. and FERMENTATION), distinguished chiefly by its strength and the quantity of sugar remaining undecomposed. Strong ale is made from the best pale malt; and the fermentation is allowed to proceed slowly, and the ferment to be exhausted and separated. This together with a large quantity of sugar still left undecomposed, enables the liquor to keep long without requiring a large amount of hops. The Scotch ales are distinguished for the smallness of the quantity of hops they contain, and for their vinous flavor. They are fermented at an unusually low temperature. The ales of Edinburgh and Prestonpans have a high reputation. Burton ale is the strongest made, containing as much as 8 per cent. of alcohol; while the best brown stout has about 6 per cent., and common beer only 1 per cent. India pale ale differs chiefly in having a larger quantity of hops.

A-LEE, expressed by the French *sous le vent*, 'under the wind,' is a maritime term applied to the position of the helm when so worked, as to bring the head of the ship to windward.

ALEMAN, MATEO, a famous Spanish novelist, was born about the middle of the 16th c., at Seville, and died in Mexico during the reign of Philip III. In 1604, he published a poetical biography of St. Antonius of Padua; and in 1608, while in the New World, an *Ortografia Castellana*, written during his voyage; but his great work is *Guzman de Alfarache*, a novel with a rogue for the hero, like some of the more recent English fictions. It was first published at Madrid in 1599, became immensely popular, and in half-a-dozen years had gone through twenty-six editions, consisting of not less than 50,000 copies, in Spain and other countries. Both as regards the delineation of manners and the purity of style, this masterly creation of A. ranks next to that most celebrated of all the Spanish novels of the same character—the *Lazarillo de Tormes* of Mendoza. It displays keen powers of observation; and is readily recognized as the work of a ripe and cultivated mind. Mendoza's hero has the advantage in originality, freshness, and vivacity; but Guzman exhibits a richer variety of gifts in the various characters he is compelled by circumstances to assume, such as stable-boy, beggar, thief, coxcomb, mercenary, valet, pander, merchant, &c. The manners of the author's own age are hit off with great skill and effect, a wide knowledge of human nature is manifested, and the whole narrative is interspersed with shrewd and solid reflections and moralizings. A. is considered to rank with Mendoza, Cervantes, &c., as one of the masters of the Castilian style.

ALEMANNI (that is, *all-men*), the name of a military confederacy of several German tribes which began to appear on the Lower and Middle Maine about the beginning of the 3d c. Caracalla fought with them first on the Maine in 211 A.D., but without conquering them; Alexander Severus was equally unsuccessful; but Maximinus at length succeeded against them, and drove them beyond the Rhine. After his death, they again invaded Gaul, but were defeated by Posthumius, who pursued them into Germany, and fortified with ramparts and ditches the boundary of the Roman territory, called the *Agri Decumates*. The mounds near Pförung on the Danube, the rampart extending through the principality of Hohenlohe to Jaxthausen, and the ditch with palisados on the north side of the Maine, are remains of these works. The A., however, did not desist from their incursions, although they

were repeatedly driven back. After 282, being pressed upon from the north-east by the Burgundians, they took up permanent settlements within the Roman boundary from Maintz to Lake Constance. At last, Julian came (357) to the relief of Gaul, which had been suffering from the incursions of the A., and soon compelled eight of their chiefs to sue for peace. Their united force, in their principal battle with Julian, amounted to 35,000 men. After the 5th c., the confederated nation is spoken of as A. and Suavi or Suevi. In the course of the 4th c., they had crossed the Rhine, and extended as far west as the Vosges, and south to the Helvetian Alps. At length, Clovis, king of the Franks, broke their power in 496, and made them subject to the Frankish dominion. The south part of their territory was formed into a duchy, called Alemannia. The name of Swabia came afterwards to be applied to the part of the duchy lying east of the Rhine. From the A., the French have given the name of *Allemands* and *Allemagne* to Germans and Germany in general, though the inhabitants of the north of Switzerland, with those of Alsace and part of Swabia, are the proper descendants of the Alemanni.

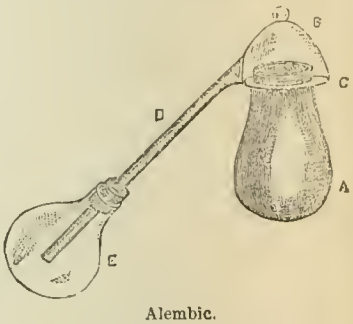
ALEMBERT, Jean le Rond d', one of the most distinguished mathematicians and writers of the 18th c., was born in Paris, November 16, 1717. He was the illegitimate son of Madame de Tencin, a lady of considerable notoriety in the time of the Regency, and of a M. Destouches. He was exposed by his mother on the steps of the church of St. Jean-le-Rond, and the policeman who found him committed the seemingly dying infant to the care of the wife of a poor glazier, thinking it too weak to be taken to the depôt. The father, without publicly avowing the child, secured to him an allowance of 1200 francs a year. At the age of twelve, he entered the College Mazarin, where he soon gave indication of that inclination, or rather passion for mathematical studies which distinguished him through life. On leaving college, he returned to the humble home of his kind foster-mother, where he continued to live and pursue his favorite studies for nearly forty years, sharing with her household his small revenue. Although the good woman loved him as a son, so little did she encourage his exclusive devotion to science, that when he spoke of his discoveries or writings, she replied with a sort of pity: 'You will never be anything but a philosopher; and what is a philosopher, but a fool who torments himself during his life, that people may talk about him when he is dead.' At first his friends urged him to qualify himself for some profitable career; but after trying for a time the study of law, and then of medicine, he gave up the attempt as hopeless, and abandoned himself without reserve to his passion for science. In 1741, at the age of 23, he was admitted a member of the Academy of Sciences, having already attracted attention by several physico-mathematical tracts. Two years later appeared his *Treatise on Dynamics*, founded on a new and fertile principle which makes an epoch in mechanical philosophy. 'This principle consists,' says Condorcet, 'in establishing the equality, at every instant between the changes which the motion of the body has undergone, and the forces which have been employed to produce them;' in other words, it reduces all the laws of motion to the consideration of Equilibrium. Among the more important of his other scientific works are: his *Theory of the Winds*, which gained the prize of the Academy of Berlin, 1746, and which contains the first conception and use of the Calculus of Partial Differences; a treatise on the *Precession of the Equinoxes*, 1749, giving for the first time an analytical solution of that phenomenon, as well as of the nutation of the earth's axis; *Essay on the Resistance of Fluids*, 1752; *Researches on some Important Points in the System of the Universe*, 1754 and 1756. His *Mathematical Opuscules* contain an immense number of memoirs, some on new subjects, some containing developments of his previous works.

But A. did not confine himself to physical science. Diderot (q. v.) having conceived the idea of the famous *Encyclopédie*, enlisted the services of A., who wrote the *Preliminary Discourse*, which is allowed by all to be a noble tribute to literature and philosophy—a model of lucid and eloquent exposition, and displaying an immense extent of knowledge combined with rare judgment. Besides numerous articles in the *Encyclopédie*, he published *Elements of Philosophy*, 1759; *Mélanges of Literature and Philosophy*; *The Destruction of the Jesuits*, &c. He also wrote a great many *éloges* of members of the Academy of Sciences, of which he was elected secretary in 1772. His literary works have been published in a collected form, new edition, by Bossange (Paris, 1821, 5 vols. 8vo). This edition contains the correspondence of A. with Voltaire and the king of Prussia. His scientific works have never been collected.

A. gave striking proof of how little he regarded riches and distinctions, or the flatteries of the great, and how genuine was his love of independence. Frederick II. of Prussia offered him the presidency of the Academy of Berlin, 1752, but he declined to leave France, and accepted only a subsequent offer of a pension of 1200 Francs. The king of France granted him a similar sum. In 1762, Catharine II. of Russia invited him, through her ambassador, to undertake the education of her son, with a salary of 100,000 francs; and when he declined, she wrote him a letter with her own hand, urging that to refuse to contribute to the education of a whole nation was inconsistent with his own principles; and inviting him, if he could not reconcile himself to the breaking-off of his pursuits and friendships, to bring all his friends with him, and she would provide both for them and for him everything they could desire. But A. remained steadfast. When the Grand Duke afterwards visited Paris, he good-humoredly reproached A. with his refusal; and to the excuse of the rigor of the climate and feeble health, the prince replied, with the compliment: 'In truth, monsieur, it is the only false calculation you have made in your life.' A was never married. He was tenderly attached for many years to a Mademoiselle Espinasse, although their intimacy, it is believed, never went beyond a warm friendship. The death of the lady was a severe blow to A. His own health began to give way; for he was suffering from the stone and would not consent to an operation. He died, October 29, 1783.

A. was truthful, frank, and extremely benevolent. He held it as a principle of morals that a man has no right to dispose at will of his own superfluous means while there are others in want of the necessaries of life. A stigma has attached to the name of A. from his intimate association with Voltaire and other assailants of Christianity; but A. never attacked religion in his published writings, which might be read without knowing what his opinions regarding revelation were. It is only from his private correspondence that it appears that he thought the probabilities were in favor of theism.

ALE'MBIC (formed by the Arabs from their article *al* and Gr. *ambix*, a goblet), is a form of still introduced into chemistry by the alchemists, and used by the more ancient experimenters in manipulative chemistry for the distillation and sublimation of substances, such as alcohol, or formic acid obtained by heating a decoction of red ants in water. The vessel consisted of a *body*, *cucurbit* or *matrass* (A), in which the material to be volatilized was placed; a *head* or *capital* (B) into which the vapors rose, were cooled, and then trickled down to the lower part (C), from whence by a *pipe* (D) the distilled product passed into the *receiver* (E). Where very volatile liquids were being distilled, it was customary to introduce the receiver (E) into a vessel with cold water, so as to increase the perfectness of the condensing part of the arrangement. The A. has now been entirely superseded by the retort and receiver, or by the flask attached to a Liebig's condenser. See Retort.



Alembic.

ALEMTE'JO, a province in the south of Portugal; area, 9388 square miles; population (1874), 375,996. It is partly washed by the Atlantic on the west, and stretches to the Spanish frontier on the east. It is traversed by a number of mountain-chains, and is watered by the Tagus, Guadiana, and Saado or Sado. In the south and west, the climate is hot and dry; the plains are covered with ground heath, unrelieved by a tree or a shrub, and only broken at intervals by marshy wastes, while the vegetation is extremely scanty. In the east, on the contrary, the valleys are fertile, and the mountains adorned with forests. The productions are singularly abundant. They consist of wheat, barley, rice, maize, the vine, and a variety of choice fruits—such as the citron, the lemon, the fig, the pomegranate. In the valley, the principal trees are the oak with edible fruits, the evergreen-oak, the cork-oak, the chestnut, and the pine; in the plains, we find lavender, rosemary, juniper, the myrtle. The pasturage, also, is extraordinarily fine. Great attention is paid to the rearing of swine, goats, and sheep, and in a less degree, of horned cattle, asses, and mules. As the population is sparse, more grain is produced than is consumed; but manufactures are in a backward condition. Even mining, which might be very profitably carried on, is neglected. The chief towns are Evora (the capital), Elvas, Portalegre, Beja, Estremoz, and Mertola.

ALE'NÇON, chief town of the department Orne, in France, is situated on the Sarthe, in lat. 48° 25′ N., and long. 0° 5½′ E. The town-church—a structure of the 16th c., containing the remains of the tombs of the A. family, which were almost completely destroyed at the Revolution—is built in the Gothic style. It has a fine porch and exquisitely painted windows. A. is a clean and handsome town, with good streets and a delightful public walk. The inhabitants produce excellent woollen and linen stuffs, embroidered fabrics, straw-hats, lace-work, artificial flowers, hosiery, &c. The manufacture of A. point-lace (*points d'A.*), although still important, is not carried on to the same extent as formerly. The cutting of the so-called A. diamonds (quartz-crystals), found

In the vicinity of the town, is a branch of industry which has also greatly declined. Pop. (1876) 15,433.

The old DUKES OF A. were a branch of the royal family of Valois, and were descended from Charles of Valois, who perished at the battle of Crecy in 1346. His grandson, John I., fell at Agincourt in 1415. His successor, John II., allying himself with the enemies of the court, was twice condemned to death, but pardoned both times. René, son of John II., also excited, not without cause, the suspicion of the French monarch, Louis XI., who confined him for three months in an iron cage at Chinon; but as the parliament had never condemned him, he was released at the death of Louis, and restored by Charles VIII. to his title and estate. René's son, who had married the sister of Francis I., was general of the advance-guard of the French army in the Netherlands. He commanded the left wing at the battle of Pavia, where, instead of supporting the king at a critical moment, he fled with his troops; and to him, therefore, has been attributed both the disastrous defeat sustained by the French, and his sovereign's falling into the hands of the enemy. With him expired the old House of A. The duchy was then given to the Duke of Anjou. Louis XIV. conferred it upon the Duke of Berri and Louis XVI. on the Count of Provence.

ALE'PPO, a town in the north of Syria, capital of a Turkish vilayet of the same name, between the Orontes and the Euphrates, on the banks of the little desert stream, Nahr-el-Haleb. It stands in a large hollow, surrounded by rocky hills of limestone. The fruitful gardens, celebrated for their excellent plantations of pistachios, are the sole contrast to the desolation which environs the city, whose numberless cupolas and minarets, clean, well-paved streets, and stately houses, make it even yet one of the most beautiful in the East. It is a telegraph station in connection with Damascus, and with Diarbekir, on the Indo-European line, and contains (*Alman. de Gotha*, 1879) 70,000 inhabitants. Formerly, it supplied a great part of the East with fabrics of silk, cotton and wooll, and gold and silver stuffs; but in 1822 an earthquake swallowed up two-thirds of the inhabitants, and transformed the citadel into a heap of ruins. The plague of 1827, the cholera of 1832 and the oppression of the Egyptian government, all but completed its destruction. During the sway of the last, however, a new citadel and some other edifices were erected; but scarcely half of the mosques and baths have been rebuilt. The aqueduct is the oldest monument of the town. A. is one of the principal emporiums of the inland commerce of Asia. Its port is Alexandretta or Iskanderoon (q. v.). A. has a large trade in cotton and silk goods, skins, tobacco, wine, oil, &c. The value of the imports of Alexandretta in 1874 was £1,345,000; of the exports, £880,000. It was once the center of Saracenic power, still retains much of the Arabic character, and its citizens are famed throughout the East for their elegant manners.

ALE'SIA, a town of ancient Gaul, the siege and capture of which form one of Cæsar's greatest exploits. The Gauls were making a last effort to shake off the Roman yoke; and Vercingetorix, their bravest leader, after several defeats, had shut himself up with 80,000 men in A., there to await the reinforcements which he expected from a general insurrection of the country. The town was situated on a lofty hill, and well calculated for defence. Cæsar, with his army of 60,000 men, completely surrounded the place, with the view of starving it into a surrender. He fortified his position by two lines of rampart of prodigious extent and strength; one towards the town, for defence against the sallies of the besieged; the other towards the plain, against the expected armies of relief. Before they could assemble, 250,000 strong, he was ready for them; and all their assaults, combined with the desperate efforts of the besieged, were of no avail. A. was obliged to surrender, and Vercingetorix was made prisoner. A. was afterwards a place of some note under the empire, but was destroyed by the Normans in 864. Near the site of the ancient A., W. of Dijon, stands the modern village of Alise or Sainte-Reine.

ALLESA'NDRIA, the principal fortress and town of the province of the same name in the north of Italy, is situated in a marshy country near the confluence of the Bormida and Tanaro. It was built in 1168 by the inhabitants of Cremona, Milan, and Placentia, as a bulwark against the emperor Frederick I. Its original name was Cæsarea, but it was afterwards called A. in honor of Pope Alexander III., who established a bishopric in it. Designed at first as a fortress to guard the passage of the Bormida and Tanaro, and being the central point of intercourse between Genoa, Milan, and Turin, the town has frequently been the object of sanguinary strife. It was taken and plundered in 1522 by Duke Sforza; besieged, but without success, by the French, under the Prince of Conti, in 1657; and again taken, in spite of an obstinate resistance, by Prince Eugene in 1707. After the prostration of Austria at the battle of Marengo in 1800, Bonaparte concluded an armistice at A. with his enemies, according to which, Upper Italy, as far as the Mincio, was ceded to the French, with twelve fortresses. It was the principal army of the Piedmontese during the insurrection of the Lombardo-Venetian states in 1848—9, when many new fortifications were added to it. At present, the citadel is one of the strongest fortresses in Europe; of enormous size, larger, it is said, than many a town, and in the event of a war in Italy, the whole surrounding country can be inundated by means of the sluices of the Tanaro. A. contains, exclusive of the garrison (1871) 29,102 inhabitants, who carry on a considerable trade in linens, woollens, silk fabrics, stockings, hats, &c. The culture of flowers is also much attended to. Two fairs are held in A. annually, which are largely frequented.

ALESSA'NDRIA DE'LLA RO'CCA, a town of Sicily, in the province of Girgenti, and 17 miles north-by-west from Girgenti, picturesquely situated in a mountainous district. Pop. of commune, 5214.

ALEU'TIAN ISLANDS, or the CATHERINE ARCHIPELAGO, is the name of a group of islands, numbering above 150, and consisting of several clusters, which now belong to the United States, and form an insular continuation of the N. American peninsula of Alaska (q.v.), in the shape of an arch or bridge between the former continent and Asia. They lie in 55° N. lat., separating the Sea of Kamtchatka from the Pacific, and naturally subdivide themselves into five groups; 1. the Komandorski Islands, sometimes not regarded as belonging to the A. I.; 2. the Sasignan, or 'Nearest' Islands; 3. the Rat Islands; 4. the Andreianowsky, which are very small and little frequented; 5. the Fox Islands, among which is Unimak, the largest in the archipelago. The islands are all craggy, and have a desolate appearance from the sea. They exhibit traces of violent internal commotion. Several volcanoes are still periodically active; and warm volcanic springs are numerous. The whole chain or group forms a connecting link between the volcanic range of the west coast of America and Kamtchatka. On account of the numerous rocks which lie off their shores, they are not very accessible to ships. Under a climate which exchanges only for a short time the monotonous rigor of winter for a cloudy spring and a hot summer, little can be expected of so niggardly a soil. There are plenty of low scrubby bushes, grasses, moss, and lichens, but no strong and stately growth of trees. An experiment tried at Unalaska of planting pines had very little success. Here and there, however, European kitchen-gardens have been attempted with better results; and the cultivation of the potato has likewise succeeded. The islands abound in springs, and are overrun with foxes, dogs, and reindeer, while the coasts swarm with fish, seals, and otters. The natives, reckoned now not to exceed 1500, though once numerous, are variously regarded as of Asiatic or American origin. Their occupation is hunting and fishing. Their trade is chiefly in furs and fish, of which the principal *entrepôt* is Alexandria, in the island of Rojak.

ALEWIFE (*Alosa tyrannus*), a fish of the same genus with the Shad (q. v.), which, in the end of spring and beginning of summer, appears in great numbers on the eastern coast of North America, and enters the mouths of rivers to spawn. It appears in Chesapeake Bay in March, on the coasts of New York and New England in April, and on those of the British provinces about the 1st of May. It abounds in the Bay of Fundy, but is more rare in the Gulf of St. Lawrence; and the Bay of Miramichi appears to be its northern limit. It ascends rivers only as far as the tide extends, and after spawning, returns to the sea in the middle of summer. It prefers a soft, muddy bottom. Its length is not more than 12 inches. The A. is called *Spring Herring* in some places, and *gasperau* by the French Canadians. It is inferior to the herring, yet it is a valuable fish. The fishery is prosecuted in the rivers, by small-meshed seine-nets, set across the stream. Large quantities are taken in the rivers of New England, New Brunswick and Nova Scotia. The harbor of St. John's, New Brunswick, alone produces from 12,000 to 20,000 barrels annually. This fish, in a salted state, forms a considerable article of export from the northern parts of America to the West Indies.

ALEXANDER THE GREAT, son of Philip of Macedon and Olympias, daughter of Neoptolemus of Epirus, was born at Pella, 356 B.C. Endowed by nature with a happy genius, he early announced his great character. Philip's triumphs saddened him. On one occasion he exclaimed: 'My father will leave nothing for me to do.' His education was committed first to Leonidas, a maternal relation, then to Lysimachus, and afterwards to Aristotle. This great philosopher withdrew him to a distance from the court, and instructed him in every branch of human learning, especially in what relates to the art of government, while at the same time he disciplined and invigorated his body by gymnastic exercises. As Macedon was surrounded by dangerous neighbors, Aristotle was anxious to inspire his pupil with military ardor, and with this view recommended him to study the *Iliad*, a revision of which he himself undertook for his use. A. was 16 years of age when his father marched against Byzantium, and left the government in his hands during his absence. Two years afterwards, he displayed singular courage at the battle of Chæronea (338 B.C.), where he

overthrew the Sacred Band of the Thebans. 'My son,' said Philip, as he embraced him after the conflict, 'seek for thyself another kingdom, for that which I leave is too small for thee.' The father and son quarreled, however, when the former repudiated Olympias. A. took part with his mother, and fled, to escape his father's vengeance, to Epirus; but receiving his pardon soon afterwards, he returned, and accompanied him in an expedition against the Triballi, when he saved his life on the field. Philip being appointed generalissimo of the Greeks, was preparing for a war with Persia, when he was assassinated (336 B.C., and A., not yet twenty years of age, ascended the throne. After punishing his father's murderers, he went into the Peloponnesus, and in a general assembly of the Greeks he caused himself to be appointed to the command of the forces against Persia. On his return to Macedon, he found the Illyrians and Triballi up in arms, whereupon he marched against them, forced his way through Thrace, and was everywhere victorious. But now the Thebans had been induced, by a report of his death, to take up arms, and the Athenians, stimulated by the eloquence of Demosthenes, were preparing to join them. To prevent this coalition, A. rapidly marched against Thebes, which, refusing to surrender, was conquered, and razed to the ground; 6000 of the inhabitants were slain, and 30,000 sold into slavery; the house and family of the poet Pindar alone being spared. This severity struck terror into all Greece. The Athenians were treated with more leniency, A. only requiring of them the banishment of Charidemus, who had been most bitter in his invectives against him.

A., having appointed Antipater his deputy in Europe, now prepared to prosecute the war with Persia. He crossed the Hellespont in the spring of 334 B.C., with 30,000 foot and 5000 horse, attacked the Persian satraps at the river Granicus, and gained a complete victory, overthrowing the son-in-law of Darius with his own lance. The only real resistance the Macedonians met with was from the Greek auxiliaries of the Persians, who were marshalled in phalanxes, under the command of Memnon of Rhodes, but finally they were all slain except 2000, who were taken prisoners. A. celebrated the obsequies of his fallen warriors in a splendid manner, and bestowed many privileges on their relations. Most of the cities of Asia Minor, Sardis not excepted, opened their gates to the conqueror, nor did Miletus or Halicarnassus offer longer resistance. A. restored democracy in all the Greek cities, cut the Gordian-knot (q. v.) with his sword as he passed through Gordium and proceeded to the conquest of Lycia, Ionia, Caria, Pamphylia, and Cappadocia. His career was checked for a time by a dangerous illness, brought on by bathing in the Cydnus. On this occasion he displayed his magnanimity in the following circumstances. He received a letter from Parmenio, insinuating that Philip, his physician, intended to poison him, having been bribed by Darius. A. handed the letter to Philip, and at the same time swallowed the draught which had been prepared for him. As soon as he recovered, he advanced towards the defiles of Cilicia, in which Darius had stationed himself, with an army of above 500,000 men. He arrived in November 333 B.C. in the neighborhood of Issus, where a battle took place, between the mountains and the sea. The disorderly masses of the Persians were thrown into confusion by the charge of the Macedonians, and fled in terror. On the left wing, 30,000 Greeks, in the pay of the Persian king, held out longer, but they, too, were at length compelled to yield. All the treasures as well as the family of Darius fell into the hands of the conqueror, who treated the latter with the greatest magnanimity. The king, who fled towards the Euphrates, twice made overtures of peace, which A. haughtily refused, saying that Darius must regard him as the ruler of Asia, and the lord of all his people. One of the conditions of the second overture was that A. should possess all Asia to the Euphrates. On hearing which his general, Parmenio, exclaimed: 'I would do it, if I were A.' 'So would I,' replied the monarch, 'if I were Parmenio.' The victory at Issus opened the whole country to the Macedonians. A. now turned towards Syria and Phœnicia, to cut off Darius's escape by sea. He occupied Damascus where he found princely treasures, and secured to himself all the cities along the shores of the Mediterranean. Tyre, confident in its strong position, resisted him, but was conquered and destroyed, after seven months of incredible exertion (332 B.C.). Thence he marched victoriously through Palestine, where all the cities submitted to him except Gaza, which shared the same fate as Tyre. Egypt, weary of the Persian yoke, welcomed him as a deliverer; and in order to strengthen his dominion here, he restored all the old customs and religious institutions of the country, and founded Alexandria in the beginning of 331 B.C., which became one of the finest cities of ancient times.

Thence he marched through the Libyan Desert, in order to consult the oracle of Jupiter Ammon, whose priest saluted him as a son of Jove; and at the return of spring went against Darius, who had assembled an army in Assyria. A battle ensued, in October, 331 B.C., on the plains of Arbela, or rather Guagamela, for Arbela, the point to which A. pursued the Persians, is 50 miles from the scene of the fight. See ARBELA. Notwithstanding the immense superiority of his adversary, who had collected a new army of 500,000 men, A. was not for a moment doubtful of victory. Heading the cavalry himself, he rushed on the Persians, and put them to flight; but as soon as he had entirely dispersed them, he hastened to the assistance of his left wing, which, in the meanwhile, had been sorely pressed. He was anxious to make a prisoner of the Persian king himself, but the latter escaped by flight on horseback, leaving his baggage and all his treasures a prey to the conqueror. Babylon and Susa, the storehouses of the treasures of the east, opened their gates to the conqueror, who next marched towards Persepolis, the capital of Persia, which he entered in triumph.

The marvelous successes of A. now began to dazzle his own judgment, and to inflame his passions. He became a slave to debauchery, and his caprices were as cruel as they were ungrateful. In a fit of drunkenness, and at the instigation of Thais, an Athenian courtezan, he set fire to Persepolis, the wonder of the world, and reduced it to a heap of ashes; then, ashamed of the deed, he set out with his cavalry to pursue Darius. Learning that Bessus, the satrap of Bactriana, held the king a prisoner, he hastened his march, in the hope of saving him, but he found him mortally wounded on the frontiers of that country (330 B.C.). He mourned over his unfortunate enemy, and caused his body to be buried with all the usual rites observed in Persia; but he pursued Bessus, who himself aspired to the throne, through Hyrcania, Iran, Bactriana, over the Oxus to Sogdiana (now Bokhara), whose satrap, Spitamenes, surrendered Bessus to him. Having discovered a conspiracy in which the son of Parmenio was implicated, he put both father and son to death, though Parmenio himself was innocent of all knowledge of the affair. This cruel injustice excited universal displeasure. In 329 he penetrated to the furthest known limits of Northern Asia, and overthrew the Scythians on the banks of the Jaxartes. In the following year, he subdued the whole of Sogdiana, and married Roxana, whom he had taken prisoner. She was the daughter of Oxyartes, one of the enemy's captains, and was said to be the handsomest of the virgins of Asia. A new conspiracy broke out against A., at the head of which were Hermolaus and Callisthenes, a pupil of Aristotle, which occasioned the death of many of the culprits; while Callisthenes himself was mutilated, and carried about in an iron cage through the army, till some one put an end to his sufferings by poison.

In the year 327 B.C., A. proceeded to the conquest of India, then known only by name. He crossed the Indus near to the modern Attock, and pursued his way under the guidance of a native prince to the Hydaspes (modern Jelum), where he was opposed by Porus, another native prince, whom he overthrew after a bloody contest. Thence he marched as lord of the country through that part of India which is now called the Punjab, establishing Greek colonies. He then wished to advance to the Ganges, but the general murmuring of his troops obliged him, at the Hyphasis (modern Sutledge), to commence his retreat, which was accomplished under circumstances of extreme danger. When he had again reached the Hydaspes, he built a fleet, and sent one division of his army in it down the river, while the other followed along the banks, fighting its way through successive Indian armies. At length, having reached the ocean, he ordered Nearchus, the commander of the fleet, to sail thence to the Persian Gulf, while he himself struck inland with one division of his army, in order to return home through Gedrosia (now Beloochistan). Here he had to traverse immense deserts, where a great part of his army perished for want of food and water, and were buried in the sand. The other division marched through Arachosia and Drangiana (Afghanistan) under Craterus, but they united again in Carmania. Of all the troops, however, which had set out with A., only about a fourth part arrived with him in Persia (325 B.C.) At Susa he married Stateira, the daughter of Darius, and he bestowed presents on those Macedonians (about 10,000 in number) who had married Persian women, his design being to unite the two nations as closely as possible. He also distributed liberal rewards among his soldiers. At Opis on the Tigris he declared it to be his intention to send home the invalids richly rewarded; and this he accomplished, but not till he had with some difficulty repressed the mutiny which broke out on the occasion. Soon afterwards he was deprived, by death, of his favorite Hephæstion, on which occasion his grief was unbounded, and he interred the deceased with kingly honors. As he was returning from Ecbatana to Babylon, it is said that the Magi foretold that the latter city would prove fatal to him; but A. despised their warnings, and, in spite of the advice of his friends, marched to Babylon, before reaching which, however, he was met by ambassadors from all parts of the world—Libya, Italy, Carthage, Greece, the Scythians, Celts, and Iberians. Here he again occupied himself with gigantic plans for the future, both of conquest and civilization, when he was suddenly taken ill after a banquet, and died eleven days afterwards, on the 11th or 13th of May or June, 323 B.C., in the 32d year of his age, having reigned twelve years and eight months. His body was deposited in a golden coffin at Alex-

andria, by Ptolemæus, and divine honors were paid to him, not only in Egypt, but in other countries. A. had appointed no heir to his immense dominions; but to the question of his friends: 'Who should inherit them?' he replied: 'The most worthy.' After many disturbances, his generals recognized as kings the weak-minded Aridæus—a son of Philip by Philinna, the dancer—and A.'s posthumous son by Roxane, while they shared the provinces among themselves, under the name of satraps. Perdiccas, to whom A. had, on his death-bed, delivered his ring, became guardian of the kings during their minority.

It is but right to observe that A. did something more than shed blood during his life. He diffused the language and civilization of Greece wherever victory led him, and planted Greek kingdoms in Asia, which continued to exist for some centuries. At the very time of his death he was engaged in devising plans for the drainage of the unhealthy marshes around Babylon, and a better irrigation of the extensive plains. It is even supposed that the fever which he caught there, rather than his famous drinking-bout, was the real cause of his death. To A., the ancient world owed a vast increase of its knowledge in geography, natural history, &c. He taught Europeans the road to India, and gave them the first glimpses of that magnificence and splendor which has dazzled and captivated their imagination for two thousand years.

ALEXANDER SEVERUS, a Roman emperor (222—235 A.D.), was the cousin, adopted son, and successor of Heliogabalus. The excellent education which he received from his mother, Julia Mammæa, rendered him one of the best princes in an age when virtue was reckoned more dangerous than vice in a monarch. He sought the society of the learned; Paulus and Ulpian were his counselors, Plato and Cicero were, next to Horace and Virgil, his favorite authors. Although a pagan, he reverenced the doctrines of Christianity, and often quoted that saying: 'Whatsoever ye would that men should do to you, do ye so also to them.' Beloved as he was by the citizens on account of his equity, he soon became an object of hatred to the unruly prætorian guards. His first expedition, against Artaxerxes, king of Persia, was happily terminated by a speedy overthrow of the enemy. But during one which he undertook against the Germans on the Rhine, to defend the frontiers of the empire from their incursions, an insurrection broke out among his troops, headed by Maximin, in which Alexander was murdered, along with his mother, not far from Mentz. The grateful people, however, placed him among the gods. After his death, military despotism obtained the ascendency, and the Roman power rapidly declined.

ALEXANDER NEWSKI, or NEVSKI, a Russian hero and saint, born at Vladimir in 1219 A.D., was the son of the Grand Duke Jaroslav, of Novgorod. In order to defend the empire, which was attacked on all sides, but especially by the Mongols, his father quitted Novgorod, leaving the cares of the government to his sons, Fedor and Alexander, the former of whom died soon afterwards. The latter vigorously resisted the enemy; yet Russia was forced to submit to the Mongol dominion in 1238 A.D. A. now fought to defend the western frontier against the Danes, the Swedes, and the Teutonic knights. He received the surname of Newski, on account of the splendid victory over the Swedes, which he achieved in 1240, on the Newa (Neva), in the province where St. Petersburg now stands. In 1243 A.D., on the ice of Lake Peipus, he defeated the Livonian Knights of the Sword, who had been stimulated by the pope to attack the Russian heretics. At the death of his father in 1247, he became Grand Duke of Vladimir. Pope Innocent IV. now made a diplomatic attempt to reunite the Greek and Roman churches, since his military scheme had failed, and with this view sent an embassy to A., which, however, proved as ineffectual as the former. To the end of his life, however, he remained a vassal of the Tartars or Mongols. Thrice had he to renew his oath of fealty to the Asiatic barbarians, making in each instance a journey to their camp. He died in 1263 A.D., at Kassimcow, on his return from the last of these journeys; and the gratitude of the nation perpetuated his memory in popular songs, and even canonized him. Peter the Great honored his memory by building a magnificent convent on the spot where A. had fought his great battle, and by founding the knightly order of A. N.

ALEXA'NDER VI. (Borgia), 1492—1503, the most celebrated of the eight popes (see Popes) of this name, but at the same time the most infamous one that ever lived, as well as the most vicious prince of his age. His most conspicuous qualities were a cunning and insidious cruelty, united with great fearlessness in danger, an unwearied perseverance and vigilance in all his undertakings, a soft and plausible manner towards his inferiors, a harsh and grasping spirit towards the rich. In spite of his talents and his love of art and science, he disdained, throughout his dissolute career, no means of gratifying his lust—not even perjury, murder, and poisoning. He was born at Valencia, in Spain, 1430. His own name was Rodrigo Lenzuoli, but he assumed the ancient and famous one of his mother's family, Borgia. He had five children by Rosa Vanozza, a woman celebrated for her beauty, two of whom equalled himself in criminality, Cæsar and Lucretia (see Borgia). A. was made a cardinal by his uncle Calixtus III., and on the death of Innocent VIII., was elevated to the papal chair, which he had previously secured by flagrant bribery. The long absence of the popes from Italy had weakened their authority and curtailed their revenues. To compensate for this loss, A. endeavored to break the power of the Italian princes, and to appropriate their possessions for the benefit of his own family. To gain this end, he employed the most execrable means. He died in 1503, from having partaken, by accident, as is commonly believed, of poisoned wine, intended for his guests. Under his pontificate, the censorship of books was introduced, and Savonarola, the earnest and eloquent Florentine priest, who had advocated his deposition, was condemned to be burned as a heretic. See Alexander VI. in Am. Supp.

ALEXANDER I., Paulowitsch, Emperor and Autocrat of All the Russias (1801—1825), was born December 23, 1777. His education, in which his father, Paul I., had no hand, was conducted by his grandmother, Catharine II., and Colonel Laharpe and other tutors. He always showed great affection for his mother, Maria, daughter of Eugene, Duke of Würtemberg. With a humane and benevolent disposition, the 'northern Telemaque' was imbued by Laharpe with the enlightened principles of the age. Professor Kraft instructed him in experimental physics, and Pallas in botany. It was thought better not to devote his attention to poetry and music, as it would have required too much time to make any great acquirements. In 1793 he married Elizabeth, daughter of Karl Ludwig, Crown Prince of Baden, and, on the assassination of his father Paul (q. v.), on the 24th of March 1801, succeeded him upon the throne. Although A. doubtless knew of the conspiracy to dethrone his father, there is no reason to believe that he contemplated the crime of murder. His accession was celebrated by Klopstock in an ode, *To Humanity*, indicative of the high expectations formed of him. The young ruler seemed deeply penetrated with a sense of his obligation to make his people happy and to promote their civilization and prosperity. He was the first to lay the foundation of the national culture and popular instruction on a regular plan, to introduce organization into the internal administration, unshackle the industry of the nation, raise the foreign commerce of Russia, and awaken in the people a feeling of unity, and a spirit of patriotism.

Of specific internal improvements effected by A., his exertions on behalf of the language, literature, and general culture of the Slavonic nations deserve special notice. Seven universities, at Dorpat, Kasan, Charkow, Moscow, Wilna, Warsaw, and St. Petersburg, were either instituted or remodeled by him; 204 gymnasiums and normal schools, and above 2000 district elementary schools, were erected; and fresh life and activity given to the higher scientific institutions in St. Petersburg and Moscow. He did more than any other sovereign in Europe for the spread of the Bible, by supporting the Bible Society (which was suppressed, however, in 1826); and in 1820, he had a bishop instituted for the evangelical Lutheran church, and a general consistory in St. Petersburg for the whole empire. He devoted large sums to the printing of important works, such as Krusenstern's *Travels* and Karamsin's *History of Russia*, and prized and rewarded scientific merit both at home and abroad. Several scientific collections were purchased by him, and in 1818 he invited two orientalists, Demange and Charmoy, from Paris to St. Petersburg, to promote the study of the Arabic, Armenian, Persian, and Turkish languages. Young men of talent were sent to travel at his expense. By the ukase of 1816 he prepared the way for the abolition of slavery in the Baltic provinces; he also declared that no more gifts of peasants would be made on the crown-lands. As early as 1801 he had abolished the secret tribunal which is said to have extorted confession from political offenders by means of hunger and thirst. The practice of slitting the nose and branding, which had been customary in connection with knouting, was also done away with. Laws were enacted to prevent the abuses of power by governors. The privilege of the nobles, that their inherited property could not be confiscated as a punishment, was raised by him to a common right for all subjects; and much was done in composing a code of civil law. He promoted the manufactures and trade of the empire by amending the laws regarding debt and mortgages; and by the institution of an imperial bank, the construction of roads and canals, making Odessa a free port, and, above all, by the ukase of 1818, permitting all peasants in the empire to carry on manufactures, which was before only allowed to nobles and to merchants of the first and second guilds.

A.'s far-sighted policy with regard to the foreign commerce of Russia is shown in various expeditions round the world sent out by him; in the embassy to Persia in 1817, in which was the Frenchman Gradanne, who was acquainted with all the plans of Napoleon respecting India and Persia; in the missions to Cochin China and to Khiva; in the treaties with the United States, Brazil, and Spain; in the naval and commercial treaties with the Porte; and in the settlement on the north-west coast of America.

A.'s foreign policy was characterized at the outset by a desire for peace; in 1801 he concluded a convention, putting an end to hostilities with England, and made peace with France and Spain. He next entered, along with France, into negotiations respecting the indemnification of the minor states in Germany and Italy, but soon discovered how little the French ruler intended any real compensation. As Bonaparte encroached more and more, took possession of Hanover, and annihilated Holland, A. broke with France, and joined the coalition of 1805. He was present at the battle of Austerlitz, when the allied armies of Austria and Russia were defeated, and retired with the remains of his forces into Russia, declining to enter into the treaty that followed. Next year, he came forward as the ally of Prussia; but after the disastrous battles of Eylau and Friedland, in 1807, he was obliged to conclude the peace of Tilsit, in which he managed to prevent the restoration of the kingdom of Poland, and to mitigate the hard fate of the king of Prussia. During the war with France, A. had also had to carry on hostilities with Persia and with Turkey.

Dazzled by the fortune and genius of Napoleon, A., in pursuance of the stipulations of Tilsit, acceded with his huge empire to the French continental system, thus altering entirely the foreign policy of Russia. He began by declaring war on England in 1808, and attacking her ally Sweden, wrested from that country, by the peace of Friedrichshamm (1809), the province of Finland. On the other hand, the Russian fleet sent to the aid of the French at Lisbon, fell into the hands of the British. In the autumn of 1808, the two great potentates held a meeting at Erfurt, attended with great splendor, at which A. represented, as it were, the empire of the east of Europe, while Napoleon assumed the dominion of the west. In the war of France against Austria in 1809, A. took only a lukewarm part, although at the peace of Vienna he received the circle of Tarnopol as his share of the spoil of Galicia. Against the Porte, which had not observed the armistice of Slobosta, he renewed the war, which was continued till the peace of Bucharest in 1812.

The alliance, however, of A. with the Corsican conqueror involved such an inconsistency, and was so contrary to the real interests of Russia, that a rupture and a complete change of the Russian policy were inevitable. The pressure of the continental system on the material resources of Russia, the despotic changes made by Napoleon, the augmentation of the duchy of Warsaw, the proffers of alliance by England and Sweden, awoke in A. first discontent and aversion, and soon the thought of a decisive contest against the subjugator of Europe and the disturber of the peace of the world. When this gigantic struggle at last began (1812), Russia brought into the field an army of nearly 900,000 men. During this war (see RUSSO-GERMAN WAR), A. repeatedly exposed himself to personal danger, in order to fire the courage and patriotism of his troops. His magnanimity towards France after the taking of Paris facilitated the negotiations for peace, and won for him great personal regard, amounting to a kind of enthusiasm. He was received with the same feeling in London, which he visited after the treaty of Paris in June 1814. When he returned to St. Petersburg, his first care was to provide for the wounded, and for the families of the soldiers that had fallen. The senate wished to give him the title of 'Blessed,' which, from Christian humility, he declined. After a short residence in his own capital, he repaired to the Congress of Vienna. Here he laid claim to Poland as essential to the interests of Russia, but promised to confer on it a constitution, and, on the whole, appeared to act for the good of humanity and the freedom of nations.

In the return of Napoleon, A. saw the confusion of Europe begun again, and therefore urged the fulfilment of the treaty of Chaumont and the outlawry of the common enemy. His appearance in the French capital after the battle of Waterloo raised less enthusiasm than previously; yet on this occasion, too, France owed much to his generosity. It was about this time that the tendency of A. to pietism, fostered by intercourse with Madame Krüdener (q. v.), was most strongly manifested, and exercised decided influence on his political views. It was under the influence of this religiosity that he founded the Holy Alliance (q. v.), the ostensible object of which was to make the principles of Christianity be recognized in the political arrangements of the world, but which became, in fact, a mere handle for political reaction.

In the end of October 1815, A. returned to his own dominions. His policy, and the march of events, had completely changed the internal condition of Russia and her foreign relations. Her weight in European politics had become powerful; the limits of the empire had extended in all directions; and notwithstanding the war, the earlier legislative reforms had begun to act favorably on the industry and well-being of the nation. After 1805, A. had remodeled the army after the fashion of the western powers, and raised it to a condition that menaced Europe. When peace was attained, he not only sought to heal the wounds inflicted by the war, but to carry forward the work of reform formerly begun. Numerous administrative abuses were done away with, and the condition of the peasants was more and more alleviated. In 1816, the Jesuits, who were causing a great deal of disturbance, were made to leave St. Petersburg and Moscow, and in 1820 were sent out of the empire. On the other hand, proselytism was rigidly prohibited, and the Duchoborzes, a sect of the Russo-Greek church, were allowed the free exercise of worship.

But however good A.'s intentions might be, his internal policy met with obstructions, partly arising from his personal views and character, partly from the nature of his position. Affected with a morbid religiosity, worn out and shaken perhaps in body and mind by the vast events in the vortex of which he had moved for the last ten years, the emperor became possessed by the dread of another European revolution; and the political struggles against reaction in Germany, and the outbreaks against despotism in Italy and Spain, appeared to him as the beginning of a new and terrible catastrophe. The attention now bestowed by A. on foreign relations threw internal improvements into the background; and the liberal reformer and pupil of Laharpe found himself involved in hopeless inconsistency, when he fully concurred in the policy of the Austrian cabinet, and, at the congresses of Troppau, Laybach, and Verona, helped to crush, along with the insurrections, the just requirements and political progress of the nations.

This complete reversal of policy could not fail to produce fruits, especially as Russia peculiarly abounded in fermentable materials. Poland saw itself completely disappointed in its national expectations, and required the actual carrying out of the promised constitution. The contact into which the Russians had come during the war with the civilization and institutions of the western nations, had excited in different classes of Russian society wishes and views by no means compatible with their condition at home. On the other hand, there had long existed in the most influential circles an Old-Russian party, who either found their interests hurt by the enlightened measures of the emperor, or saw in them the downfall of the national church, and of the nation itself. Besides, the army was kept up on the war-footing, and in 1821 numbered about 830,000 regular troops; and this pressed severely on the people, and produced discontent, along with exhaustion and disorder of the finances. To meet this evil, A. began the planting of military colonies, which, however, met with insuperable obstacles in the execution, and did not attain the end in view. But to exorcise the spirit of political discontent and the phantom of a Russian revolution, the emperor adopted the same measures that were very generally applied over the rest of Europe with similar views. The censorship of the press, and a rigid guard over the importation of books, were again introduced; restrictions were put on science, literature, and education; inquiries instituted into all democratic movements; mason-lodges and missionary societies suppressed; and gradually all plans for reform and progress given up. Over all the provinces of the empire, a net of police, open and secret, was spread, which interfered with the ordinary intercourse of society.

The experience that, in spite of this system of repression, public opinion could not be stifled, and that parties and individuals only expressed themselves more bitterly; the variance with his former self in which A. found himself involved; and the difficulties of governing the huge empire, which were now becoming more manifest and startling—all this tormented and embittered his morbid mind, and led him to complain of ingratitude and of a want of recognition of his good intentions. Sometimes he sought to forget his position in the dissipations of a splendid court, in which luxury and piety were strangely blended; at other times he plunged into the darkness of religious mysticism. The progress of the revolt in Greece brought the policy of the emperor into complete opposition to public opinion and the most sacred sympathies of the nation. The Russian people, restrained from all participation in political movements, were profoundly affected by the religious element of the Greek struggle; but the emperor condemned the rising as insurrection, disclaimed the favor he had formerly shown to the Greek cause, and confined himself to exhortations to the Porte to act with humanity. The death of his only and much-loved natural daughter, the terrible inundation suffered by St. Petersburg in 1824, in which he exposed himself to personal danger, and the alarm caused by a Russo-Polish conspiracy against all the members of the House of Romanow, contributed not a little to break the heart of the emperor, and completely destroy the composure of his mind. Sick in body, weary of life and possessed by thoughts of death, he commenced, in September 1825, a journey to the Crimea, with a view to benefit the health of the empress, who was ailing, and that he himself might enjoy retirement. Leaving the empress at Taganrog, he continued his journey, but was suddenly seized by a fever peculiar to the country, and obliged to return to Taganrog. Here, in spite of all care, he became worse, and died, December 1, 1825. The rumor that he had been poisoned is altogether groundless. He is said to have learned, shortly before his death, the details of the conspiracy which his brother and successor, Nicholas I. (q. v.), had to begin his reign by putting down.—See Choiseul-Gouffier's *Mémoires His-*

toriques sur l'Empereur Alexandre et la Cour de Russie (Par. 1829); and *Alexander I.; His Life and Times*, by C. Joyneville (London, 1875).

ALEXANDER II., Emperor of Russia, was born April 29, 1818. He was carefully educated by his father, Nicholas, who professed himself delighted with the manifestations of 'true Russian spirit' in his son. At sixteen, he was declared of age, made commandant of the Lancers of the Guard, Hetman of the Cossacks, first aide-de-camp of the emperor, and subjected daily to a life of manœuvring, reviewing, and military parade, which at last seriously injured his health. He then traveled through Germany to recruit his energies, and while there, concluded a marriage with the Princess Maria, daughter of the Grand Duke of Darmstadt, in 1841. He now vigorously applied himself to his duties as chancellor of the university of Finland. By his dexterous and subtle manners, he insinuated himself into the affections of the Finns, and weakened their love of independence.

On his accession to the throne, March 2, 1855, he found himself in a very critical position. He had two parties to conciliate—the old Muscovite party, zealous for war, and the more peaceable portion of the nation, with whom he sympathized. Throughout his reign, he had to hold the balance between Conservatives and extreme Radicals, but succeeded in guiding and promoting reform. The grand achievement of his reign, which was in great measure his own deed, was the emancipation of the serfs—23,000,000 souls—in 1861. Reforms of the tribunals, of civil and criminal procedure, and of municipal institutions followed. In 1865, A. established elective representative assemblies in the provinces. He resisted strenuously all foreign interference with Polish affairs in 1863. There was war in Central Asia repeatedly, and the Russian dominions were much extended in that region. The Czar shared the national sympathy with the Slavonic races under Turkish rule, and took the field with the army during the momentous war between Russia and Turkey in 1877—1878. Latterly he showed some tendency to reactionary measures, as in the reorganization of public education. He had been shot at by a Pole in Paris in 1867; but of late years, revolutionary discontent has been much on the increase in Russia, and persistent attempts were made to assassinate the Czar, especially by members of the Nihilist Society (see NIHILISM). In 1879, he was shot at in his capital; in the same year, the train in which he was supposed to be traveling was blown up by an elaborate mine beneath the railway; in 1880 a violent and destructive explosion was effected by dynamite below the imperial apartments in the palace at St. Petersburg; and on 13th March, 1881, he was so severely injured by a bomb thrown at him near his palace, that he died a few hours after. The Empress had predeceased him in 1880.—A. was succeeded by his son.

ALEXANDER III., who was born 10th March, 1845, and married the daughter of the king of Denmark in 1866. Through fear of assassination he practically became a prisoner in his palace at Gatschina. But his coronation, postponed till 1883, was celebrated with extraordinary magnificence, and with national festivities lasting several days. See ALEXANDER III. in AM. SUPP.

ALEXANDER I., king of Scotland, a younger son of Malcolm Ceammor, succeeded his brother, Edgar, in 1107, and amidst incessant disturbances, governed Scotland for seventeen years with great ability. Through his mother, Margaret of England, he had the advantage of mental cultivation. He quelled several formidable insurrections. His determined resistance to the pretensions of the English hierarchy secured the independence of the Scottish church, while his liberal patronage of the monasteries promoted her strength at home. In 1123 he founded the Abbey of Inchcolm. He died at Stirling in 1124.

ALEXANDER II. was born in 1198; succeeded his father, William the Lion, in 1214. He early displayed that wisdom and strength of character, in virtue of which he holds so high a place in history among Scottish kings. The first act of his reign was to enter into a league with the English barons who had combined to resist the tyranny of King John. This drew down upon him and his kingdom the papal excommunication; but two years subsequently (1218), the ban was removed, and the liberties of the Scottish church were even confirmed. On the accession of Henry III. to the English throne, A. brought the feuds of the two nations to a temporary close by a treaty of peace (1217), in accordance with which he married Henry's eldest sister, the Princess Joan (1221). The alliance thus established was broken after the death, without issue, of Queen Joan (1238), and the second marriage of A. with the daughter of a nobleman of France. In 1244, Henry marched against Scotland, to compel A.'s homage. In this emergency, the Scottish king received the steady support of the barons, whose ordinary policy was opposition to the crown, and is said, in a short time, to have found himself at the head of 100,000 foot, and 1000 horse. A peace was concluded without an appeal to arms. While engaged in one of those warlike expeditions which the turbulence of his subjects so frequently rendered necessary, A. died of fever at Kerrera, a small island opposite Oban, on the west coast of Argyleshire, in the thirty-fifth year of his reign.

ALEXANDER III, succeeded his father, A. II., on the Scottish throne at the age of eight, and, two years later, in 1251, he married the Princess Margaret, eldest daughter of Henry III. of England. The tender age of the sovereign enabled Henry to prosecute successfully for some time his schemes for obtaining entire control over the Scottish kingdom; but long before he reached manhood, A. displayed so much energy and wisdom as to give assurance that when the administration of affairs should come under his personal direction, it would be vain to think of reducing him to submission. Very shortly after he had come of age, his energies were summoned to the defence of his kingdom against the formidable invasion of Haco, king of Norway (1263), who claimed the sovereignty of the Western Isles. In attempting a landing at Largs, on the coast of Ayr, the Norwegian prince sustained a total defeat; and A., as the result of this important victory, secured the allegiance both of the Hebrides and of the Isle of Man. The alliance between Scotland and Norway was strengthened in 1282 by the marriage of A.'s only daughter, Margaret, to Eric, king of Norway. This princess died in the following year, leaving an infant daughter, Margaret, commonly designated the Maiden of Norway, whose untimely death, on her way to take possession of her throne, was the occasion of so many calamities to Scotland. During the concluding years of A.'s reign, the kingdom enjoyed a peace and prosperity which it did not taste again for many generations. The justice, liberality, and wisdom of the king, endeared his memory to his subjects, while the misfortunes that followed his death, heightened the national sense of his loss. His only son, A., who had married the daughter of Guy, Count of Flanders, died without issue in 1284. A. contracted a second marriage in 1285 with Joleta, daughter of the Count de Dreux. The hopes of the nation were soon after clouded by his untimely death. Riding on a dark night between Burntisland and Kinghorn, he fell with his horse over a precipice, and was killed on the spot.

ALEXANDER OF HALES (in Latin, Alexander Halensis), a famous theologian, known as the 'Irrefragable Doctor' (d. 1245). He was originally an ecclesiastic in Gloucestershire, but had attended the schools of Paris, got the degree of doctor, and had become a noted professor of philosophy and theology there, when (1222) he suddenly entered the order of the Minorite Friars. From that time he lived the life of a studious recluse. His chief and only authentic work is the *Summa Universa Theologiæ* (best ed., Venice, 1576, 4 vols.), written at the command of Pope Innocent IV., and enjoined by his successor, Alexander IV., to be used by all professors and students of theology in Christendom. A. gave the doctrines of the church a more rigorously syllogistic form than they had previously had, and may thus be considered as the author of the scholastic theology. Instead of appealing to tradition and authority, he deduces with great subtlety, from assumed premises, the most startling doctrines of Catholicism, especially in favor of the prerogatives of the papacy. He refuses any toleration to heretics, and would have them deprived of all property; he absolves subjects from all obligation to obey a prince that is not obedient to the church. The spiritual power which blesses and consecrates kings, is, by that very fact, above all temporal powers, to say nothing of the essential dignity of its nature. It has the right to appoint and to judge these powers, while the pope has no judge but God. In ecclesiastical affairs, also, he maintains the pope's authority to be full, absolute, and superior to all laws and customs. The points on which A. exercises his dialectics are sometimes simply ludicrous; as when he discusses the question, whether a mouse that should nibble a consecrated wafer would thereby eat the body of Christ. He arrives at the conclusion that it would.

ALEXANDERS (*Smyrnium olusatrum*), a biennial plant of the natural order *Umbelliferæ* (q. v.), found in waste ground, near ruins, &c., in Britain and the south of Europe. The stem is 3—4 feet high, very stout and furrowed; the leaves twice or thrice ternate, stalked, serrate, of a bright yellowish-green color; the leaflets very large. The flowers are yellowish-green, in very dense, numerous rounded umbels, destitute of involucres; the fruit almost black. The plant has an aromatic taste, strong and pungent, but becomes rather pleasant when blanched, and was formerly much cultivated and used in the same way as celery, although at present it is little regarded. The frequency of its occurrence near ruins in Britain, may probably be referred to its former cultivation. The fruit is carminative.—*S. perfoliatum*, a native of Italy, with the upper stem-leaves embracing the stem, is used in the same way.—The genus *Smyrnium* contains only a few known species, chiefly natives of the temperate parts of the N. hemisphere. It has compound umbels; the involucres variable; the calyx obsolete; the petals inflected at the point; the fruit consisting of 2 nearly globose carpels, each with 3 sharp dorsal ribs; the lateral ones obsolete; several vittæ in the interstices; the albumen involute.

ALEXANDRI, or ALEKSANDRI, VASILIO (Basil) a Rouman

poet and *littérateur*, was born at Jassy, the chief city of Moldavia, in 1821. His family was of Venetian origin. After spending several years at a French boarding-school at Jassy, he was sent, in his fourteenth year, with a tutor to Paris; and in due course he obtained from the University of Paris the degree of Bachelor of Letters. He is said to have thereafter made trial in succession of the study of medicine and the study of law, and to have found neither of them to his liking; he certainly followed up neither, but without qualifying himself for any profession, went back to Jassy in 1839. He found at Jassy a band of young men educated, as he himself had been, in France, whose minds had been formed upon the literature and the political ideas of France; who, besides being ambitious of literary distinction, were zealous for political equality and for Rouman nationality and independence. He naturally became the associate of these men; and soon after his return, made his *début* in literature by contributing a story, *The Flower-girl of Florence*, to a periodical conducted by them under the editorship of Cogalniceano. He became a frequent contributor to this periodical. Unfortunately, it was not destined to live long, being suppressed by order of Prince Stourdza. It was in 1842, after a long excursion among the mountains of his native province, that he first made his appearance as a poet, publishing several pieces, most of them strongly tinged with national feeling. At this time, too, it was that he began to write the songs and ballads upon which his chief claim to literary reputation at present rests. In 1844, he suddenly attained to an almost unbounded local popularity as a play-writer. Having become concerned in the management of two theaters at Jassy, the one French, the other Moldavian, he produced a series of pieces, some in French, others in Rouman, which, though mostly slight and hasty performances, had merit enough to excite the enthusiasm of his countrymen. *Georges de Sadagoura*, *Jassy en Carnival*, *La Pierre de la Maison*, *La Noce Villageoise*, are the titles of the most important of them. In 1844, he had also, in conjunction with Cogalniceano and Prince John Ghika, set on foot a new periodical, devoted to literature and science; but this, like the one already mentioned, was not suffered to live long—it was suppressed by the government, after a career of only nine months.

A. was engaged in the revolutionary movement which took place at Jassy in the year of revolutions, 1848, and on its failure, had to betake himself for a time to Paris. There, through the press, during the short period of his exile, he labored to arouse public opinion in favor of the independence of the Roumans; and his efforts, though they were unsuccessful at the time, helped, with those of others, to prepare the way for what took place several years after. It was to the Russian war that Moldavia and Walachia were destined to owe their virtual emancipation from the yoke of Turkey, and the chance of obtaining self-government and union. The union of the two principalities was carried by the resolution of their inhabitants, backed by the support of France, in spite of political obstacles that seemed almost unsurmountable; and A. did not a little to inspire the resolution of his countrymen. A song which he wrote at the critical moment in 1856, *The Hour of Union*, became exceedingly popular, and, by its stirring appeals to the feeling of Rouman nationality, helped to allay the jealousies which divided the two principalites, and to make them work together for the union. A. took a prominent part in all the political transactions which culminated in this result. It should be stated, that two years earlier, when the death of his father had put him into possession of the family estate, he had emancipated the serfs who lived upon it; and that this example found so many imitators that the government found itself almost immediately compelled to decree a general measure of enfranchisement.

A.'s *Popular Ballads of Roumania*, which he had begun to compose in 1842, appeared at Jassy in two parts in 1852 and 1853. One of the parts, translated into French by himself, was afterwards published at Paris under the title of *Ballades et Chantes Populaires de la Roumanie*. His collected dramatic works were published at Jassy in 1852. Another volume of poems appeared at Paris in 1853; and of this volume a French translation, with the title, *Les Doinas*, *Poesies Moldaves*, was soon afterwards produced by M. Vanesco. *Le Collier Littéraire*, a miscellaneous collection of pieces in prose and verse, many of which had previously appeared in periodicals, he published in 1857. A., as may be inferred from facts already stated, has written largely in periodicals, but mostly upon subjects of passing interest. All his works, besides their intrinsic merits, which are very considerable, are interesting from the connection they have with the growth of a national feeling among the Roumans.

ALEXA'NDRIA (called Skanderi'eh by the Turks and Arabs) was founded by Alexander the Great in the autumn of the year 332 B.C. It was situated originally on the low tract of land which separates the Lake Mareotis from the Mediterranean, about 14 miles west of the Canopic mouth of the Nile. Before the city, in the Mediterranean, lay the island of Pharos, upon the north-east point of which stood the famous light-house (Pharos), and which was connected with the mainland by a mole, called, from its length, the Heptastadium, or 'Seven Furlong' mole, thus forming the two harbors. The plan of A. was designed by the architect Dinocrates, and its original extent is said to have been about 4 miles in length, with a circumference of 15 miles. It was intersected by two straight main streets, crossing each other at right angles in the middle of the city. Colonnades adorned the whole length of these streets, which were in general very regularly built. The most magnificent quarter of the city was that called the Bruchéium, which was situated on the eastern harbor. This quarter of the city contained the palaces of the Ptolemies, with the Museum and the old library; the Soma or mausoleum of Alexander the Great and of the Ptolemies, the Poseidonum, and the great theater. Further west was the emporium or exchange. The Serapeion, or temple of Serapis, stood in the western division of the city, which formed the Egyptian quarter, and was called Rhacotis; a small town of that name had occupied the site before the foundation of A. To the west of the city lay the great Necropolis, and to the east the race-course, beyond which was the suburb of Nicopolis. The greater part of the space under the houses was occupied by vaulted subterranean cisterns, which were capable of containing a sufficient quantity of water to supply the whole population of the city for a year. From the time of its foundation, A. was the Greek capital of Egypt. Its population, in the time of its prosperity, is said by Diodorus to have amounted to about 300,000 free citizens, and if we take into account the slaves and strangers, that number must be more than doubled. This population consisted mostly of Greeks, Jews, and Egyptians, together with settlers from all nations of the known world. After the death of Alexander the Great, A. became the residence of the Ptolemies. They made it, next to Rome and Antioch, the most magnificent city of antiquity, as well as the chief seat of Grecian learning and literature, which spread hence over the greater part of the ancient world. The situation of the city, at the point of junction between the east and west, rendered it the center of the commerce of the world, and raised it to the highest degree of prosperity.

A. had reached its greatest splendor, when it came into the possession of the Romans, about 30 B.C. From this moment its prosperity began to decline—at first almost imperceptibly, but afterwards more rapidly, in consequence of the removal of the works of art to Rome, the massacres of Caracalla, the laying waste of the Bruchéium by Aurelian, the siege and pillage of the city by Diocletian, and, lastly, the rising prosperity of the rival city of Constantinople. All these causes combined to destroy A. so speedily, that, in the 4th c. no building of any importance was left in it except the temple of Serapis. The strife between Christianity and heathenism gave rise to bloody contests in A. The Serapeion, the last seat of heathen theology and learning, was stormed by the Christians in 389 A.D., and converted into a Christian church. This put an end to heathenism, and A. became henceforward a chief seat of Christian theology, and continued to be so till it was taken by the Arabs, under Amru, in June 638 A.D. This siege, and, still more, its conquest by the Turks in 868 A.D., completed the destruction of the city. It revived indeed, in some degree under the Egyptian califs, and continued during the middle ages to be the most important emporium of trade between the east and west; but the discovery of America, and of the passage to India by the Cape of Good Hope, very much diminished the trade of A.; and the dominion of the Mamelukes, and the conquest of the Osmanli, annihilated even the little which the Arabs had restored. The result was, that in 1778 A.D. A. contained no more than 6000 inhabitants. After the conquest of Egypt by the French in the end of the 18th c., A. once more began to revive; and under Mehemet Ali, who resided in it a part of every year, it prospered to such a degree, that it may now be reckoned one of the most important commercial places on the Mediterranean. The Suez Canal diverted part of its trade as the center of steam communication with India; but this was more than compensated by the general impetus given by the canal to Egyptian prosperity.

The present city is not situated exactly on the site of the old one, but is chiefly built on the mole called the Heptastadium, which has been increased by alluvial deposits till it has become a broad neck of land between the two harbors, of which the eastern is called the New Port, and the western the Old Port. A. is connected with Cairo by rail (continued to Suez) and by the canal of Mahmoudieh. Originally dirty and ill built, it has some handsome streets and buildings; but the best streets were ruined in 1882. The recent growth of A. has been extraordinary. 'Pop. (1825) 16,000; (1840) 60,000; (1870) 238,888—Arabians, Turks, Jews, Copts, Greeks, and Franks. Value of exports from A. in 1881, £13,684,630 (mostly cotton and cotton seed, two-thirds going to Great Britain); of imports, £7,110 168 (half from Britain). Of the few remaining objects of antiquity the most prominent is Pompey's Pillar (q. v.), as it is erroneously called. Of the so-called Cleopatra's Needles—two obelisks of the time of King Thothmes III., who lived in the 16th c. B.C.—one was brought to England and erected on the Thames Embankment, 1878; and the other,

presented by the Khedive to the United States, was set up at New York in 1881. Other antiquities of A. are some catacombs, and underground cisterns almost entirely filled up. In 1882 an English fleet bombarded the forts of A.; the town was thereafter sacked and plundered by the connivance of the native military usurper and his party, and great part of it destroyed by fire.

ALEXA'NDRIA, a town of Dumbartonshire, Scotland, on the west bank of the Leven, opposite to Bonhill, three miles from Dumbarton, on the Glasgow, Dumbarton, and Vale of Leven Railway. It is a town of recent growth, of a neat and pleasing appearance, in the midst of beautiful scenery. It has extensive cotton-printing works, and other public works. Pop. (1871) 4650; (1881) 6173.

ALEXANDRIA, a port of entry on the right or Virginian bank of the Potomac, U. S., about 7 miles below Washington, on the opposite side of the river. Though A. is fully 100 miles from the entrance of the Potomac into Chesapeake Bay, yet the stream in front of it, which forms its harbor, is still a mile wide. The place is accessible from the sea to the largest vessels, and has ample railway accommodation. The trade of the city is steadily increasing, while cotton manufactures also have been introduced on an extensive scale. The value of its import and export trade amounts to about 80,000 dollars. Pop. in 1870, 13,570; (1880) 13,658.

ALEXA'NDRIAN CODEX, an important manuscript of the sacred Scriptures in Greek, now in the British Museum. It is written on parchment, in finely formed uncial letters, and is without accents, marks of aspiration, or spaces between the words. Its probable date is the latter half of the 6th c. With the exception of a few gaps, it contains the whole Bible in Greek (the Old Testament being in the translation of the Septuagint) along with the epistles of Clemens Romanus. For purposes of biblical criticism, the text of the Epistles of the New Testament is the most valuable part; for with respect to the Gospels, it is clear that the original text which the copyist had before him must have been far inferior. This celebrated manuscript belonged, as early as 1098, to the library of the patriarch of Alexandria. In 1628 it was sent as a present to Charles I. of England by Cyrillus Lucaris, patriarch of Constantinople, who declared that he had got it from Egypt; and that it was written there appears from internal and external evidence. Grabe made this manuscript the foundation of his edition of the Septuagint (4 vols., Oxf. 1717—1720). Facsimiles have been published, of the New Testament, by Woide (Lond. 1786), and by Cowper (Lond. 1860); of the Old Testament, by Baber (Lond. 1816).

ALEXANDRIAN LIBRARY. This remarkable collection of books, the largest of the ancient world, was founded by Ptolemy Soter, in the city of Alexandria, in Egypt. Even in the time of its first manager, Demetrius Phalereus, a banished Athenian, the number of volumes or rolls already amounted to 50,000; and during its most flourishing period, under the direction of Zenodotus, Aristarchus of Byzantium, Apollonius Rhodius, and others, is said to have contained 400,000, or, according to another authority, 700,000. The greater part of this Library, which embraced the collected literature of Rome, Greece, India, and Egypt, was contained in the Museum, in the quarter of Alexandria called Bruchium.

During the siege of Alexandria by Julius Cæsar, this part of the Library was destroyed by fire; but it was afterwards replaced by the collection of Pergamos, which was presented to Queen Cleopatra by Mark Antony, to the great annoyance of the educated Romans. The other part of the Library was kept in the Serapeion, the temple of Jupiter Serapis, where it remained till the time of Theodosius the Great. When this emperor permitted all the heathen temples in the Roman empire to be destroyed, the magnificent temple of Jupiter Serapis was not spared. A mob of fanatic Christians, led on by the Archbishop Theophilus, stormed and destroyed the temple, together, it is most likely, with the greater part of its literary treasures, in 391 A.D. It was at this time that the destruction of the Library was begun, and not at the taking of Alexandria by the Arabians, under the Calif Omar. The story, at least, is ridiculously exaggerated which relates that the Arabs found a sufficient number of books remaining to heat the baths of the city for six months. The historian Orosius, who visited the place after the destruction of the temple by the Christians, relates that he then saw only the empty shelves of the Library. See Petit-Radel, *Recherches sur les Bibliothèques Anciennes et Modernes* (Paris, 1819); and Ritschl, *Die Alexandrinischen Bibliotheken* (Berlin, 1838).

ALEXA'NDRINE AGE. After liberty and intellectual cultivation had declined in Greece, Alexandria in Egypt became the home and center of science and literature. The time in which it held this position is s yled the A. A., and may be divided into two periods: the first including the reigns of the Ptolemies, from 323 to 30 B.C.; the second, from 30 B.C. to 640 A.D., or from the fall of the Ptolemæan dynasty to the irruption of the Arabs.

Ptolemæus Soter, the first ruler who introduced and patronized Greek science and literature in Alexandria, was followed by that yet more munificent patron, Ptolemæus Philadelphus, who regularly established the celebrated Alexandrian Library and Museum, which had been probably begun by his father. This Museum contained porticos, a lecture-room, and a large hall, in which the learned men—the professors and fellows, as they might be called—dined together. The A. school consisted of Egyptians, Greeks, Jews, and latterly, Romans. The grammarians and poets made the greatest figure. The grammarians were both philologists and *littérateurs*, who explained things as well as words, and were thus a kind of encyclopædists. Among these rank Zenodotus of Ephesus, Eratosthenes of Cyrene, Aristophanes of Byzantium, Aristarchus of Samothrace, Crates of Mallus, Dionysius the Thracian, Apollonius the Sophist, and Zoïlus. Their chief service consists in having collected the writings then existing, prepared corrected texts, and preserved them for future generations. The most noted of the poets of the A. school were Apollonius Rhodius, Lycophron, Aratus, Nicander, Euphorion, Callimachus, Theocritus, Dionysius, and the seven tragedians called the A. Pleiades.

The A. school has a spirit and character altogether different from the previous intellectual life of Greece. From the attention paid to the study of language, it was natural that correctness, purity, and elegance of expression should become especially cultivated; and in these respects many of the A. writers are distinguished. But what no study and no efforts could give—the spirit, namely, that animated the earlier Greek poetry, was, in most of these works, wanting. In place of it, there was displayed greater art in composition; what had formerly been done by genius, was now to be done by the rules furnished by criticism. Only a few display real genius; the works of the rest, faultless according to rule, are destitute of life and soul. In a school, where imitation and rule thus took the place of inspiration, each generation of disciples became more artificial and lifeless than their masters. Criticism degenerated into frivolous fault-finding, and both prose and poetry became labored affectation.

The ALEXANDRINE PHILOSOPHY is characterized by a blending of the philosophies of the East and the West, and by a general tendency to *eclecticism*, as it is called, or an endeavor to reconcile conflicting systems of speculation, by bringing together what seemed true in each. Not that the A. philosophers were without their sects; the most famous of which were the Neo-Platonists (q. v.). Uniting the religious notions of the East with Greek dialectics, they represent the struggle of ancient civilization with Christianity; and thus their system was not without influence on the form that Christian dogmas took in Egypt. The amalgamation of eastern ideas with Christian, gave rise to the system of the Gnostics (q. v.), which was elaborated chiefly in Alexandria.—The A. school was no less distinguished for the culture of the mathematical and physical sciences, which here reached a greater height than anywhere else in ancient times. As early as the 3d c. B.C., Euclid had here written his great work on geometry. The astronomers of the A. school were distinguished from all their predecessors by their setting aside all metaphysical speculation, and devoting themselves to strict observation. Among the distinguished physicists and mathematicians of the A. school, were Archimedes, Eratosthenes, Aristarchus of Samos, Ptolemæus, &c. For about four centuries, the A. school was the center of learning and science in the ancient world. Counting from its origin to its complete extinction, it lasted 1000 years.

ALEXA'NDRINES are rhyming verses consisting each of twelve syllables or six measures. The name is most probably derived from an old French poem on Alexander the Great, belonging to the 12th or 13th c., in which this measure was first used; according to others, it was so called from the name of one of the authors of that poem being Alexander. The Alexandrine has become the regular epic or heroic verse of the French, among whom each line is divided in the middle into two hemistichs, the sixth syllable always ending a word. In English, this rule is not always observed, as in the following verse from Spenser:

> That all the woods shall answer, and their echo ring

The only considerable English poem wholly written in A. is Drayton's *Polyolbion;* but the Spenserian stanza regularly ends in an Alexandrine, and the measure occurs occasionally in our common heroic verse, as the last line of a couplet:

> When both are full, they feed our blest abode,
> Like those that watered once the paradise of God.—*Dryden.*

ALEXANDROVSK, a town in the south of Russia, capital of the district of the same name, situated on the left bank of the Dnieper, below the cataracts. It is 48 m. S. of Ekaterinoslav, is fortified, and has considerable trade. Inland productions are shipped here for the Black Sea. Pop. (1880) 14,300.—There are various other towns and districts of the same name in Russia; the most important of which is that in the government of Vladimir, in the center of the empire. It was a favorite summer residence of the Czar Ivan Vasiliewitch, who introduced there the first

printing-press known in Russia. It has also a magnificent imperial *stud*, commenced by the Empress Elizabeth in 1761, and completed about twenty years after. Pop. (1867) 5810.

ALEXE'I MICHA'ILOWITCH, the second Russian czar of the House of Romanow (b. March 10, 1629—d. January 29, 1676), succeeded his father, Michael Fedorowitch, in 1645. The young Czar A. yielding himself to the control of his chancellor, Plessow, and his tutor, Morosow, the avarice of these bad advisers caused an insurrection in 1648, in which Plessow lost his life. Popular discontent favored the plans of two pretenders to the throne—Demetrius III. (q. v.) and Ankudinow. The latter, professing to be a son of the Czar Wasili Shuiskoi, was executed at Moscow in 1653. A. possessed good qualities, which appeared when he came to riper years. In his two campaigns against the Poles (1654—1656, and 1660—1667), he took Smolensko, conquered and devastated almost the whole of Lithuania, and even secured for himself the possession of several provinces. He also gained a part of the Ukraine; and though his war with Sweden (1656—1658) was unfortunate, he lost nothing by the following peace. A. conferred great benefits on his countrymen, by the introduction of various important reforms into the Russian laws; he ordered translations of numerous scientific works, chiefly of a military nature, into Russian; and even ventured on some ecclesiastical changes. In his private character, he was amiable, temperate, and pious. His second wife, the beautiful Natalia Narischkin, was the mother of Peter the Great.

ALEXEI, PETRO'WITCH. The eldest son of Peter the Great of Russia, was born at Moscow, February 18, 1690. Having shown himself opposed to the reforms and innovations made by the emperor, he was excluded by Peter from the line of succession to the throne. With this decision, he appeared to be satisfied, and declared his intention of spending the remainder of his days in a monastery. But when Peter the Great undertook his second tour in Northern Europe, A., under the pretence of following the czar, escaped in 1717 to Vienna, and thence went to Naples. He was induced to return to Russia, where, by the ukase of February 2, 1718, he was disinherited, and an investigation was ordered to detect all parties concerned in his recent flight from Russia. His mother, Eudoxia, with Marie Alexiewna, step-sister to the czar, and several other eminent persons, were made prisoners, and either executed or otherwise punished. A. was condemned to death, but soon afterwards received a pardon. However, the terror and agitation of the trial so affected his health, that he died June 26, 1718. The czar, to avoid scandal, ordered the trial to be published. Other accounts assert that A. was beheaded in prison. By his wife, Charlotte Christine Sophie, Princess of Brunswick-Wolfenbüttel, A. left a son, who, as Peter II., was elevated to the throne.

ALE'XIUS COMNE'NUS, one of the ablest rulers of the Byzantine empire, was born at Constantinople in 1048. He was the third son of Johannes Comnenus, the brother of the emperor, Isaac Comnenus. The family came originally from Italy, and settled in Asia Minor. His father having refused the purple on the abdication of Isaac, it was given to one Ducas, the son of a distinguished general. A. in his youth gave brilliant promise of the vigorous military genius which he afterwards manifested; and at length, after a series of anarchic reigns of brief duration, his soldiers succeeded in elevating him to the throne, while the old and feeble Nicephorus Botaniates, his predecessor, was obliged to retire to a monastery. Gibbon graphically paints the position and achievements of A. in the 48th chapter of his *Decline and Fall of the Roman Empire*. Everywhere he was encompassed with foes. The Scythians and Turks were pouring down from the north and north-east; the fierce Normans, who had violently effected a lodgment in Sicily and Italy, were menacing his western provinces; and, finally, the myriad warriors of the first crusade had burst into his empire on their way to Palestine, and had encamped around the gates of his capital. Yet he contrived to avoid all perils and disgraces by the wisdom of his policy, the mingled patience and promptitude of his character, his discipline in the camp, and his humanity on the throne. He reigned for 37 years; and if it had been possible to preserve the weak and corrupt Byzantine empire in its integrity, a ruler like A. might have done it. He could only delay its inevitable destruction. Undoubtedly, the great interest which attaches to A. arises from his relation to the crusaders. Historians differ as to the purity and sincerity of his conduct towards them. His daughter Anna, who wrote his life, defends his 'policy' with filial piety; but it seems clear that he entertained a profound dread and suspicion of the half-civilized Franks, and, knowing the weakness of his own empire, was compelled to dissimulate. He certainly promised them help, and persuaded them to go off into Asia; it is equally certain that he did not fulfil his promises, and that he simply used them as instruments to reconquer from the Turks the islands and coasts of Asia Minor. Perhaps, however, little apology is needed for a monarch who 'subdued the envy of his equals, restored the laws of public and private order, caused the arts of wealth and science to be cultivated, and transmitted his sceptre to his children of the third and fourth generation.' He died in 1118.

ALFIERI, VITTORIO, COUNT, a modern Italian dramatic poet, was born at Asti, in Piedmont, on the 17th January, 1749. He received a very defective education in his father's house, and was then sent to the academy of Turin, which he quitted, as ignorant and uninformed as he had entered it, to join a provincial regiment. After a hurried tour through the greater part of Europe, he returned to Turin in 1772. He then left the military service, and renouncing idleness and unworthy amours, devoted himself to literary occupation. The applause which his first attempts received, encouraged him in his determination to win fame as a dramatic author. But as he clearly saw the deficiencies of his education, he began at a mature age to learn Latin, and also to study the Tuscan dialect, for which purpose he went to Tuscany. On his journey thither, A. made the acquaintance of the Countess of Albany (q. v.), to whom he became deeply attached. To render himself worthy of her esteem, he strove with unremitting earnestness after poetic excellence; and in order to be perfectly free and independent of all other cares, he transferred his whole property to his sister, in exchange for an annuity. A. now lived alternately in Florence and in Rome. Afterwards, when his friend the Countess was released from other ties by the death of her husband, they lived together in the closest intimacy in Alsace or in Paris, where A. was incessantly occupied in writing, revising, and publishing his works. There appears to have been a marriage, although it was never made public. On the first outburst of the French Revolution, A. went to England, but soon returned to Paris. In 1792 he was again forced to flee from France, and he then settled with his inseparable companion in Florence. Here he died, on the 8th October, 1803. The ashes of A. and those of his friend repose in the church of Santa Croce, in Florence, under a beautiful monument by Canova, between the tombs of Michael Angelo and Macchiavelli. As a dramatic author, A. has attempted three different departments of his art. He published 21 tragedies, 6 comedies, and 1 'tramelogedia,' a name invented by himself. His dramatic works show a want of fresh imaginative vigor, and betray the laborious perseverance with which he did violence both to himself and to art. A. was inspired more by politics than by poetry. He wished to breathe a spirit of freedom into the dormant minds of his countrymen, and considered the theater as a school in which the people might learn to be 'free, strong, and noble.' In order to preserve the purity of his muse, A. had resolved to read no other poet. He wished to produce an effect by the very simplest means, and, renouncing the aid of ornament, to please by manly strength and earnestness alone. His works are on this account cold and stiff, his plots simple even to poverty, his verse hard and unpleasing, and his language destitute of that magic splendor of coloring which stirs the inmost soul. Notwithstanding this, A. did good service to Italian tragedy. He corrected the effeminate taste which had before prevailed, as well as the pedantry of an affected imitation of Attic models. Succeeding writers endeavored to imitate his strength and simplicity. A. was more unsuccessful in his comedies than in his tragedies. They manifest the same serious political tendency; the invention is poor, the development of the plot uninteresting, and the characters are only general sketches, without individuality. The most successful of his dramatic works is *Abel*, a mixture of tragedy and opera, invented by himself, which he designated by the singular name of 'tramelogedia.' Besides the dramatic works of A., we possess an epic poem, in four cantos, written by him, also many lyrical poems, 16 satires, and poetical translations of Terence, Virgil, and portions of Æschylus, Sophocles, Euripides, and Aristophanes. After his death, appeared his *Misogallo*, a memorial of his hatred to the French. The Countess of Albany had a collected edition of his works published (35 vols. 4to, Pisa, 1805—1815) containing his autobiography; Centofanti published *Tragedie e Vita d' Alfieri* (Florence, 1842).

ALFONSI'NÉ, a town of Italy, in the province of Ravenna, nearly four miles north-west from Ravenna, in a level, irrigated, and fertile district. Pop. of commune, 6741.

ALFONSO I., earliest king of Portugal, was the son of Henry of Burgundy, conqueror and count of Portugal. He was born in 1110 A.D., and being only two years of age at his father's death, the management of affairs fell into the hands of his ambitious and dissolute mother, Theresa of Castile, from whom he was compelled forcibly to seize it, on attaining his majority. He then entered on a war with Castile, whose supremacy he did not recognize, and leaguing himself with Navarre, made several conquests in Galicia, after which he proceeded to attack the Moors, whose invasions he had already begun to check by building the fortress of Leiria. A battle was fought in the plains of Ourique, July 25, 1139, when victory declared for the Portuguese, after a bloody struggle, in which, it is said, not less than 200,000 Moors perished. From that day, A. assumed the title of king, which the pope confirmed. On

the 25th October 1147, he took Lisbon, by the help of the English fleet of crusaders; and in 1158, after a siege of two months, made himself master of Alcazarde-Sal and Evora. In 1171, he took by assault the fortress of Santarem from the Saracens, and annihilated the garrison; and at the same place he defeated the Almohadian ruler, Jusuf-ben-Jakub, in 1184. He invited to his land the Knights-Templars and Knights of St. John, and established the orders of Avis, and of St. Michael. The Portuguese style him *El Conquistador* (the Conqueror). But he was also a legislator, establishing the Cortes of Lamego, and promulgating a code of laws relating to the order of succession, the privileges of the nobility, the administration of justice, &c. He died at Coimbra, December 6, 1185.

ALFONSO VI., king of Portugal, second son of John IV., was at first destined for the church, but the death of his elder brother in 1656 altogether changed his circumstances. Being then a minor, the government of the kingdom was intrusted to his mother, Louisa de Guzman, a woman of great wisdom and prudence, who felt it her duty to retain the power in her own hands, even after A. had reached his majority; for the sickly and dissolute prince displayed little aptitude for business. But the court minions, who had their own reasons for wishing him to rule, urged him to remove his mother from her office. This was accomplished in 1662. The minister, Count Castel-Melhor, a mere trifler, possessed supreme authority. Nevertheless, Portugal was victorious in the war which she undertook against Spain, although for this she had to thank her English and French allies. In 1666, A. married Maria-Francisca-Elizabeth of Savoy, who, however, soon conspired with his brother Pedro against him. The plot succeeded. A. was seized and imprisoned at Cintra, where he died on the 12th of September 1683. Pedro then obtained the throne, and married the widow of his deceased brother.

ALFONSO III, surnamed THE GREAT, king of Leon, Asturias, and Galicia, born 848 A.D. He succeeded his father, Ordoño I., in 866, but had to maintain his rights by force of arms against Count Froila, who had usurped the throne. Having caused the latter to be murdered, he proceeded sternly to reduce to obedience the powerful nobility of the kingdom, who looked with a jealous eye on the monarchy remaining in one family; and then, carrying his arms against other enemies, he fought through more than 30 campaigns, and gained numerous victories over the Moors. He crossed the Douro, broke down the walls of Coimbra, penetrated to the Tagus and Estremadura, enlarged his territories by a portion of Portugal and Old Castile, and re-peopled the conquered and desolated Burgos. But these wars entailed great expense and misery on the nation. In 888 A. had to endure the pain of beholding, at the head of a rebel army, his own son Garcias, who wished to seize the crown, although pretending a simple desire for the prosperity of the commonwealth. A. collected his forces, conquered his son, and threw him into prison. But Garcias' mother, by the help of several of the grandees, excited a new conspiracy, which resulted in the abdication of the monarch in favor of his imprisoned son. In order, however, to be still useful to his country, A. became commander of Garcias' forces in an expedition against the Moors. After returning in triumph, he died at Zamora, 910.

ALFONSO V., king of Aragon, Naples, and Sicily (1416—1458 A.D.), received the surname of 'the Magnanimous,' because on his accession to the throne he destroyed a document containing the names of all the grandees who were hostile to him. His historical importance arises from his having brought Southern Italy under the dominion of Aragon. In 1420, he attacked Corsica, but speedily hastened to Naples, at the request of Queen Joanna II., who besought his assistance against Louis of Anjou. For some time he enjoyed the highest favor; but, in 1423, having thrown into prison her minion Caraccioli, who was his enemy, the queen declared for his rival, Louis. At her death, in 1435, A. resolved to claim the kingdom, but René of Anjou, whom Joanna had appointed her successor after the death of Louis, opposed him. Rome and Genoa sided with René, and the Genoese fleet attacked and defeated that of A., the monarch himself being taken prisoner. He was sent to Duke Philip of Milan, who, charmed by his manner and talent, set him at liberty, and even formed an alliance with him. After several battles, and a long mountain-war in the Abruzzi, A. overthrew his adversary, and entered Naples in triumph. Having once firmly established his power, he proceeded to suppress the disorders which had sprung up during the worthless reign of Joanna, and honorably distinguished himself by his patronage of letters. He died at Naples while his troops were besieging Genoa, June 27, 1458.

ALFONSO X., surnamed 'the Astronomer,' 'the Philosopher,' or 'the Wise' (*El Sabio*), king of Leon and Castile, born 1221, succeeded his father, Ferdinand III., in 1252. As early as the storming of Seville in 1248, he had given indications of his courageous spirit. But, instead of wisely attempting to expel the Moors, and subdue the nobility, he lavished the resources of his kingdom in fruitless efforts to secure his election to the imperial throne of Germany. Rudolf of Hapsburg was chosen in opposition to him. Nor would Pope Gregory X. recognize his claims even to the Duchy of Swabia. Soon after, his throne was threatened by the turbulence of the nobility, and his wars with the Moors. The latter, however, he defeated in 1263, in a bloody battle, and took from them Xeres, Medina-Sidonia, San-Lucar, and a part of Algarve, uniting at the same time Murcia with Castile. In 1271, an insurrection broke out in his dominions, at the head of which was his son Philip. Three years elapsed before it was finally quelled. In the mildness with which he treated the rebels, men saw only indications of his weakness. But afterwards determining to employ more stringent measures, his son Sancho also rebelled, and in 1282 deprived him of his throne. He now sought the help of the Moors; but after fruitless efforts to recover his power, he died at Seville, April 4, 1284. He was the most learned prince of his time, and has acquired lasting fame through the completion of the code of laws commenced (though this is disputed) by his father, and called *leyes de las Partidas*, which in 1501 became the universal law of the land. There are still extant several long poems of his, besides a work on chemistry, and another on philosophy. He is also credited with a history of the church and of the crusades, and is said to have ordered a translation of the Bible into Spanish. He labored much to revive knowledge, increasing both the privileges and professorships of the university of Salamanca. He sought to improve the Ptolemaic planetary tables, whose anomalies had struck observers even at that early time. For this purpose, in 1240, he assembled at Toledo upwards of fifty of the most celebrated astronomers of that age. His improved tables, still known under the name of the Alfonsine Tables, were completed in 1252 at the cost of 40,000 ducats—an unprecedented sum to be expended on such a work in those days. The results obtained by means of the Alfonsine Tables were no more accurate than those of the older ones, for both were based on the same erroneous hypothesis of Epicycles (q. v.). The *Opusculos Legales* of A. were published by the Royal Historical Society of Madrid in 1836.

ALFORD, REV. HENRY, D.D., a biblical critic of the highest reputation, and also a poet of considerable genius, was born in London in 1810, but was educated first at Ilminster grammar-school in Somersetshire, and finally at Trinity College, Cambridge, where he took his degree, and entered the church. His first volume, published at Cambridge in 1831, was entitled *Poems and Poetical Fragments*. Three years afterwards, the young author was elected a Fellow of Trinity, and in the following year (1835), appeared his most popular work, *The School of the Heart, and other Poems*, which has been frequently re-issued, especially in America. About the same time, A. was appointed vicar of Wymeswold, Leicestershire, where he remained till 1853, gradually enlarging the circle of his studies, and obtaining fresh honors. In 1841, he published *Chapters on the Greek Poets*, which exhibit both purity of taste and breadth of scholarship. In 1844 appeared the first volume of his *magnum opus*, the Greek Testament with notes and various readings; the second was not published till 1852. In 1853, he was removed to Quebec Street Chapel, London, where he continued to maintain his high reputation as a sound and eloquent preacher, until, in 1857, he was appointed Dean of Canterbury by Lord Palmerston. A.'s poetry is characterized, not so much by depth or originality, as by freedom from affectation, obscurity, or bombast. His Greek Testament, which was completed in 1861, occupies the first rank among English editions. Among his latest writings was *A Plea for the Queen's English*, which excited considerable discussion. He also published several volumes of sermons. He died January 12, 1871. See *Life, Letters*, &c. (1873).

ALFRED, surnamed THE GREAT, was born at Wantage, in Berkshire, in 849. His father was Ethelwolf, son of Egbert, king of the West Saxons; and though the youngest of four sons, he succeeded to the crown, on the death of his brother Ethelred, at the age of 23. He had already given decisive proofs of high ability as a general in repelling the incessant incursions of the Danes, at that time the most terrible warriors in Europe. After he succeeded to the throne, he redoubled his exertions to restore the independence of his country. At first he strove without success, whilst the Danes continued to pour fresh bands upon the coast, and the Anglo-Saxons either bent to the yoke or forsook their homes. In 878, the invaders had completely overrun the whole kingdom of the West Saxons. A., no longer able to collect an effective army, was obliged to seek security in the hills and forests, and for some time found refuge in a cowherd's hut. He still, however, kept up some communication with his friends; and as soon as the people began once more to arm against the Danes, he built a stronghold on an elevation or island (still known as Athelney, i.e., the 'island of nobles,' or the 'royal island') amid the marshes of Somersetshire, to which he summoned his faithful followers. From this fortress he made frequent successful sallies against the enemy,

and after a comparatively short time, he found himself at the head of a considerable army, with which he totally routed them (878) near Edington, in Wiltshire. After holding out for some time in a stronghold to which they had retreated, the invaders capitulated. A. accepted hostages, and their solemn oath to quit his territory of Wessex, and receive baptism. Their king, Godrun or Guthrum, was baptized, with thirty of his followers, and ever after proved faithful in his allegiance to A.

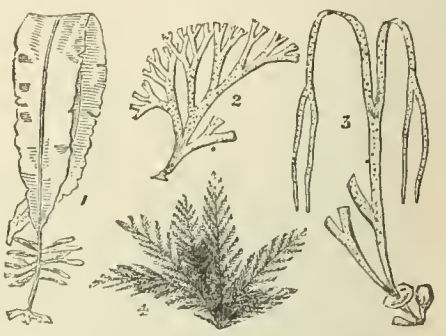
After this decisive victory, the power of A. steadily increased, both by land and sea—for already he had built England's first fleet—he beat the Danes in numerous battles, and gradually their possessions were confined to the northern and eastern coasts. In 886, A., without any formal installation, became recognized as the sovereign of all England, a title to which he had proved his right by the most indisputable of arguments. During the ensuing years of peace, he rebuilt the cities that had suffered most during the war, particularly London; erected new fortresses, and trained the people to the use of arms; while at the same time he encouraged husbandry and other useful arts, and founded those wise laws and institutions which contributed so much to the future greatness and welfare of England. The grateful reverence of posterity has, as is usual with mankind, become prodigal in its awards, ascribing to A. the entire credit of having established many beneficial institutions, some of which had already existed among the Anglo-Saxons, but were by him revived, remodelled and improved. Of his political institutions, little is known beyond the fact that he compiled a code of laws, divided England into counties, hundreds, and tithings, and thoroughly reformed the administration of justice by making these tithings, hundreds, &c., so far as was practically possible, responsible for the offences committed within their jurisdiction. William of Malmesbury, with enthusiastic exaggeration, declared that 'a purse of money, or a pair of golden bracelets,' might in A.'s day be exposed for weeks in complete safety on the common highways. A is also said—though erroneously, as is now believed—to have been the author of 'trial by jury.'

In an age of ignorance and barbarism, A. was an accomplished scholar and a zealous patron of learning. No prince of his age did so much for the diffusion of knowledge, and few monarchs of any time have shown an equal zeal for the instruction of their people. He caused many manuscripts to be translated into Anglo-Saxon from Latin, and himself translated several works, such as Boëthius on the *Consolation of Philosophy*, the *History* of Orosius, Bede's *Ecclesiastical History*, and *Selections from the Soliloquies of St. Augustine*. Among his original works in the Anglo-Saxon language, are *Laws of the West Saxons*, *Institutes*, *Chronicles*, *Meditations*, &c. All his works strikingly indicate the serious, elevated, and yet practical character of the man. In his translations, A. is frequently more than a translator. He adds his own reflections to those of his author; and expands the geographical outline of Orosius, by a chart of Germany, an account of the Baltic, and the icy regions towards the north pole, which are pretty accurate, considering the means which then existed for acquiring the knowledge of these places. Several works attributed to A. are believed not to be genuine.—The peaceful labors of A. were in 893, interrupted by a fresh invasion of Northmen under Hæsten or Hastings, more formidable than any that had yet been attempted in his reign. The defection of the East Anglians and Northumbrians added to the difficulties with which he had to contend. A. however was fully prepared, and though, during their protracted stay in his dominions, the invaders overran a large extent of country, and committed considerable depredations, they were beaten in almost every encounter with the English, and finally quelled. A. died on the 27th of October, 901, aged 52, leaving his country in the enjoyment of comparative peace and prosperity, the fruit of that wise and energetic rule which has made his memory dear to all generations of Englishmen, as that of their best and greatest king. We cannot perhaps realize the resolute patience of A., in his political and military capacity, for we have but a very imperfect knowledge of the obstacles which stood in his way; but it must excite both our highest wonder and reverence to behold a man pursuing solitarily, in the midst of ferocity, barbarism, and ignorance, and in spite of the perpetual pains with which his body was racked, so many various and noble schemes for the civilization and true glory of his country.—The most authentic and interesting of the original sources of information on the history of A., is the life by Asser, bishop of Sherborne, a book distinguished by extreme simplicity and affection. The best edition is that of Wise (Oxford, 1782). Of the recent lives, the most complete and careful are that of Professor Reinhold Pauli, edited by T. Wright, and that by Mr. T. Hughes (1869).

A'LFRETON, a market-town of Derbyshire, England, 12 miles north-north-east from Derby, and a station on the Erewash branch of the Midland Railway. It has manufactures of hats, stockings, and brown earthenware. There are collieries and iron-works in the vicinity. The town is irregularly built, and contains many very old houses, but has of late rapidly increased. It is said to derive its name from Alfred the Great. Pop. (1871) 3680; (1881) 4492.

ALGA MARI'NA. See GRASS WRACK.

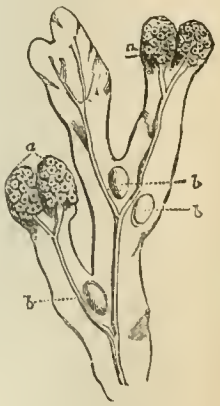
A'LGÆ, a natural order of plants, belonging to the class *Cryptogamia* of Linnæus, and to the *Acotyledones* of the natural system. It contains a great number of species, about 2000 being known and described, and among these there is a great variety of forms. They grow for the most part in water, some in fresh, and some in salt water, but some also on moist rocks or ground; whilst others are frequently found covering the glass and pots of hothouses. Some species occur even upon diseased animal tissue, as *Achlya prolifera* upon the gills of fish, whilst *Sarcinula ventriculi* (q. v.) appears to be formed in the human stomach. They are most numerous in still or stagnant water and in warm climates. Their structure is very various; they are found of all grades, from



Algæ.
1. Alaria esculenta.
2. Dictyota dichotoma.
3. Himanthalia lorea.
4. Rytiphlœa thuyoides.

the little microscopic vesicle, to great sea-weeds, which ramify like trees. The diversity in size is as great as in form; some species being visible only through the microscope, and resembling mould or rust; some a few inches, others several feet in length; whilst the *Laminariæ*, which float in the South American seas, measure more than 100 feet; and *Macrocystis pyrifera* of the Pacific Ocean reaches the length of 1500 feet. Yet they are seldom to be found as thick as the finger, or as broad as the hand, although some far exceed these dimensions, the trunk of *Lessonia fuscescens* attaining the thickness of a man's thigh. Some species are firmly fixed at the bottom of the water, some adhere to rocks and stones left dry by the retiring tide; some frequently break loose, and float about upon and beneath the surface. They have in no case proper roots, but merely processes for their attachment to the surfaces on which they are fixed; they seem to derive their nourishment by all parts of their surface from the water or moist air in which they grow. The Gulfweed (*Sargassum*) floats in long pieces in the Atlantic Ocean and all the great seas; a large portion of the sea between the West Indies and the Canary Islands, is specially called the *Mer de Sargasse*. The weed is carried in such quantities by the current into the Gulf of Mexico, that it covers the sea in tracts of many miles in breadth, and gives it the appearance of a meadow. Many fabulous stories were related of this Gulfweed by the mariners of the 15th c. Ships were said to have been stopped in their course, and the crews obliged to cut their way through with hatchets. The discoveries of Columbus put an end to these exaggerated reports.

A. are entirely cellular in their structure, however elongated may be their fronds, having no proper vessels, but consisting of an irregular tissue of utricular cells. The fronds of many are articulated. Some of the simplest or lowest organizations are propagated by spontaneous separation; in others, the reproductive organs consist of spores (see ACOTYLEDONOUS PLANTS) enclosed in *perispores*, and variously disposed in receptacles of different kinds; sometimes in the interior of the cells. *Antheridia* (q. v.) also occur in some; and *zoospores*, or spores with moving *cilia*, which exhibit phenomena of motion resembling those of animal life. The *Diatomaceæ*, in which the ordinary mode of reproduction is by spontaneous separation, have by some been referred to the animal kingdom. They are entirely microscopic, resemble the animalcules called *Infusoria*, and are generally found in still waters and moist places, but occur in prodigious numbers in some parts of the Antarctic Ocean, where they give a color to the water.



Fucus vesiculosus: showing the receptacles of the fructification *a*, *a*, at the ends of the branching frond: *b*, *b*, *b*, large air-cells which help to float the plant.

A. differ from Fungi (q. v.) in deriving their nourishment exclusively, as it would seem from the medium by which they are

surrounded, and not from he substance upon which they grow. The substance of which they are composed is also very different. Yet it has been felt not a little difficult to determine to which order some of the lowest forms of vegetable life should be referred.

As to their substance, A. consist chiefly of vegetable gelatine, which dissolves in water when they are boiled in it. The harder parts of their fronds are sometimes coriaceous, or horny, or cartilaginous, but never really ligneous. Their color is not always green, but mostly brown or yellow, sometimes purple or violet, or rose-color; and many of them present a very beautiful appearance when examined through a microscope. Many contain an abundance of iodine. Different species of WRACK (*Fucus*) (q. v.), which are cast on shore in vast confused masses by the waves, are gathered and burned in the Orkney Islands, in Normandy, and other parts of the world, the ashes forming an article of commerce under the name of KELP (q. v.), and containing much of the iodide of sodium. Sea-weeds of all kinds are an excellent manure. None of the species are poisonous, and some of them are used for food, as CARRAGEEN (q. v.) or Irish-moss, DULSE (q. v.), LAVER (q. v.), &c. The edible swallows' nests of the Indian Archipelago are composed of a species of sea-weed. Several kinds are eaten as articles of luxury by the Chinese. *Plocaria tenax*, one of the species so used, furnishes them also with an admirable glue, of which great quantities are prepared and brought to the market. *Plocaria helminthocorton*, Corsican moss, a native of the Mediterranean, and found principally around the shores of Corsica, is used as a vermifuge. See PLOCARIA.

This natural order is divided into five sub-orders, regarded by some as distinct orders—namely, CHARACEÆ (q. v.), FUCACEÆ (q. v.) CERAMIACEÆ (q. v.) CONFERVACEÆ (see CONFERVA), and DIATOMACEÆ (q. v.). The Characeæ are sometimes separated as a distinct order of higher organization, whilst the rest are united under the name Algæ. See Kützing's *Phycologia Generalis* (Leip. 1843), and his *Species Algarum* (Leip. 1849); Greville's *A. Britannicæ* (Lond. 1830); *British Sea-weeds*, nature-printed (London: Bradbury and Agnew).

ALGA'RDI, ALESSANDRO, an Italian sculptor (b. at Bologna 1602—d. 1654), ranked next to Lor. Bernini among Italian sculptors of the 17th c., and especially excelled in the representation of nude figures. His works, however, suffered from the faults prevalent in his time, especially from a striving after pathos and picturesque effects, opposed to the true character of sculpture. His most important work is a colossal relievo of Attila in St. Peters, Rome. His statue of the God of Sleep in the Villa Borghese has frequently been mistaken for an antique.

ALGARO'BA. See CAROB.

ALGARO'TTI, FRANCESCO, COUNT, an Italian author, was born at Venice in 1712, studied in Rome and Bologna, and when 21 years old, published in Paris (1733) a work, entitled *Newtonianismo per le Dame* (The Newtonian Philosophy adapted to the Ladies), which was the basis of his subsequent reputation. Until 1739, he lived in France. On his return from a journey to Russia, A. became acquainted with Frederick II. of Prussia, who elevated him to the rank of count, and made him, in 1747, lord chamberlain. He was also patronized by Augustus III. of Poland, and lived alternately in Berlin and Dresden until 1754, when he returned to Italy. He died March 3, 1764, at Pisa, where, in the Campo Santo, Frederick the Great raised a monument to his memory. In his own time he was recognized as a good judge of painting and architecture, and his reputation is confirmed by his work *Saggi Sopra le Belle Arti* (Essays on the Fine Arts), and by the paintings he selected for the Dresden Gallery. His poetry displays no great genius; but his other works show that he was an accomplished man; and his letters rank with the best in the Italian language.

ALGA'RVÉ, the smallest and most southerly of the provinces of Portugal, lies between Andalucia and the Atlantic Ocean. In ancient times, it was much more extensive. It received its name from the Arabs, in whose language A. signifies 'a land lying to the west.' It was a Moorish province till 1253, when Alphonso III. united it to the crown of Portugal as a separate kingdom. Its area is estimated at 2020 square miles, and its pop. is (1878) 205,-901. The northern part of the province is occupied by a range of mountains of an average height of 4000 feet, which form the continuation of the Sierra Morena of Spain, and terminate in Cape St. Vincent, the south-western extremity of Europe. The highest ridges are entirely destitute of vegetation; and the mountainous tract in general admits of but little cultivation. From the main ridge, the country slopes southward in jagged terraces and low hills, leaving a level tract of a few miles along the coast. The soil of this plain is but indifferently suited for the production of grain, or even of pasturage; but it produces abundance of the finest fruits of the south, even plantains and dates. The wine is also of excellent quality. The African heat of the climate is mitigated by the cool sea-breeze. The only river of importance is the Guadiana, on the frontiers of Spain. The inhabitants employ themselves chiefly in fishing, in manufacturing salt, and in cultivating fruit. They are considered the best sailors and the truest friends in Portugal. The chief town is Faro (pop. 8600).

A'LGEBRA is a branch of pure mathematics. The name is derived from the Arabs, who call the science *Al gebr wal mokâbala* —i. e., supplementing and equalizing—in reference to the transposition and reduction of the terms of an equation. Among the Italians in early times it was called *Arte Maggiore*, as having to do with the higher kinds of calculation, and still oftener *Regola de la Cosa*, because the unknown quantity was denominated *cosa*, the 'thing;' hence the name of *Cossike Art*, given to it by early English writers.

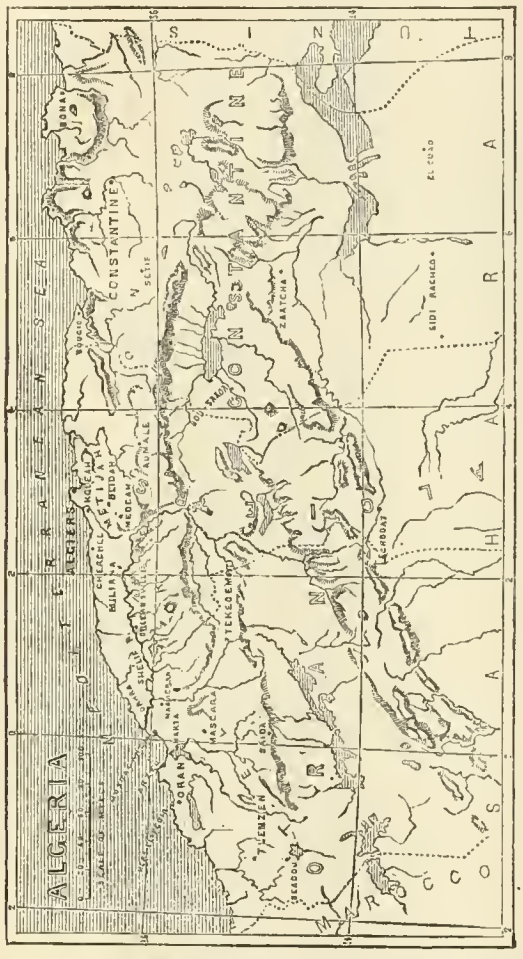
The term Algebraical is generally used somewhat vaguely, to denote any expression or calculation in which signs are used to denote the operations, and letters or other symbols are put instead of numbers. But it is perhaps better to restrict the name A. to the doctrine of Equations (q. v.). Literal arithmetic, then, or multiplying, dividing, &c., with letters instead of Arabic ciphers, is properly only a preparation for A.; while Analysis (q. v.), in the widest sense, would embrace A. as its first part. A. itself is divided into two chief branches. The first treats of equations involving unknown quantities having a determinate value; in the other, called the Diophantine or Indeterminate Analysis, the unknown quantities have no exactly fixed values, but depend in some degree upon assumption.

The oldest work in the West on A. is that of Diophantus of Alexandria, in the 4th c. after Christ. It consisted originally of 13 books, and contained arithmetical problems; only six books are now extant. They are written in Greek, and evince no little acuteness. The modern Europeans got their first acquaintance with A., not directly from the Greeks, but, like most other knowledge, through the Arabs, who derived it, again, from the Hindus. The chief European source was the work of Mohammed Ben Musa, who lived in the time of Calif Al Mamun (813—833); it has been translated into English by Dr. Rosen (Lond. 1831). An Italian merchant, Leonardo Bonaccio, of Pisa, traveling in the east about 1200, acquired a knowledge of the science, and introduced it among his countrymen on his return; he has left a work on A., not yet printed. The first work on A. after the revival of learning is that of the Minorite friar Paciolo or Luca Borgo (Ven. 1494). Scipio Ferreo in Bologna, discovered, in 1505, the solution of one case of cubic equations. Tartaglia of Brescia (died 1557) carried cubic equations still further, and imparted his discoveries to Cardan of Milan, as a secret. Cardan extended the discovery himself, and published, in 1545, the solution known as 'Cardan's Rule.' Ludovico Ferrari and Bombelli (1579) gave the solution of biquadratic equations. A. was first cultivated in Germany by Christian Rudolf, in a work printed in 1524; Stifel followed with his *Arithmetica Integra* (Nürnb. 1544). Robert Recorde, in England, and Pelletier, in France, wrote about 1550. Vieta, a Frenchman (died 1603), first made the grand step of using letters to denote the known quantities as well as the unknown. Harriot, in England (1631), and Girard, in Holland (1633), still further improved on the advances made by Vieta. The *Géométrie* (1637) of Descartes makes an epoch in A.; it is rich in new investigations. Descartes applied A. to Geometry, and was the first to represent the nature of curves by means of equations. Fermat also contributed much to the science; and so did the *Arithmetica Universalis* of Newton. To these names may be added Maclaurin, Moivre, Taylor, and Fontaine. Among the chief promoters of A., in more recent times, are Euler, Lagrange, Gauss, Abel, Fourier, Peacock, De Morgan, &c.

ALGECIRAS, or ALGEZIRAS, a town in Spain, in the province of Cadiz, on the Gulf of Gibraltar. Its harbor is bad, but it possesses a good dock, and the inhabitants are supplied with fine aqueducts. The citadel is in a very dilapidated condition, and the trade in corn and brandy is no longer important. The place, however, which is pleasantly situated, has a picturesque appearance. It was the first town in Spain taken by the Moors (713), in whose possession it remained for 7 centuries; but in 1344, after a siege of 20 months, it was retaken by the brave Alfonso XI., king of Castile. It is said that crusaders from all parts of Europe were present at this siege, which was *the* siege of the age, and is spoken of as such. Edward III. of England purposed coming in person to the assistance of the Spanish monarch, whom he greatly admired. Alfonso destroyed the old Moorish town; the modern one was built by Charles III. in 1760. On the 6th of June 1801, between Algeciras and Tarifa, the English admiral Saumarez attacked the combined French and Spanish fleets under Rear-admiral Linois. He was defeated, but renewed the engagement a few days after, and gained a complete victory. A. is 5 miles from Gibraltar, across the bay or gulf, and 10 round by land. Pop. 12,465.

ALGE'RIA (in French ALGÉRIE), a country on the north coast of Africa, which was a subordinate part of the Turkish Empire till 1830, and is now a French colony. It lies between 2° 8′ W. long. and 8° 32′ E. long. It is bounded on the north by the Mediterranean, on the east by Tunis, on the south by Sahara, and

on the west by Marocco. The French have extended their dominions more than 200 miles into the interior, but those of the deys—the former rulers of A.—comprehended territories lying nearly twice as far south. The area of A. is now calculated to be about 150,000 square miles; and the pop. (1877) 2,867,626, including about 300,000 Europeans. The chief towns are Algiers, Bona, Constantine, and Tlemzen. Upwards of 7,000,000 acres are under cultivation. Physically, A. forms a part of the northern border of the great plateau of North Africa, which here rises from the sea in three terraces. The Atlas Mountains run parallel to the coast-line. Behind these, a vast tract of heathy plains, called the *Sebkhas*, interspersed with salt-lakes, stretches southwards, until



bounded by a second chain of mountains of various heights; beyond which, again, lies the great desert of Sahara, extending to the banks of the Niger. The plains and valleys which open out towards the sea in the north of A., such as those round Bona, Algiers, Oran, &c., are extremely fertile, abound in wood and water, consist mostly of a calcareous soil, and are well adapted for agriculture.

They form the *Tell*, which was once one of the granaries of Italy. In strong contrast to these are the *Sebkhas* or lesser deserts, covered with herbs and brushwood, but almost destitute of fresh water, except where here and there they are interrupted by an oasis. The most southern part of the country beyond the Atlas partakes of the nature of the Sahara, but contains oases covered with palm-trees, and well peopled. This is a part of the 'date-country,' or 'Blad-el-Djerid.' There are no rivers of any importance in the entire colony, nothing beyond mere coast-streams, which rise in the neighboring Atlas. The largest is the Shelif, about 230 miles in length. With respect to the climate, the heat in the *Tell* is sometimes very great. On the coast it is mitigated by the sea-breeze; and among the high mountains of the interior, the winters are even cold. The average temperature of Algiers is about 63° F. A. is not unfrequently visited by the *simoom*, or hot wind, called by the Italians *sirocco*, and by the Spaniards *solano*. Its mineral wealth is considerable; iron, lead, copper, and manganese are found. The marble of Numidia was in requisition in ancient times. Extensive forests of oaks, cedars, pines, and pistachionut trees cover large portions of the country, and furnish an abundant supply of timber and resin. The cereals and the olive are cultivated in the Tell; and the oases of Sahara are famed for their dates. The domestic animals of A are the ox, the sheep, the goat, and the camel; but the once noble race of Numidian horses is degenerated. The population is composed of various elements. Besides Europeans, there are Kabyles and Arabs, who compose the bulk of the people; also Moors, Negroes, and Jews.

Language.—Four languages are spoken in A. The Berber, the Arabic, the Turkish, and the Negro dialects. The Berber, which is the most ancient of all, has a variety of dialects, and is spoken by all the Kabyle tribes. It possesses no literature written in its own alphabet, Arabic characters alone being used. The Arabic is of course an importation from the East, and has borrowed expressions and idioms from the various native languages with which it came into contact; but its differences are comparatively slight. The Koran is the great bond of union. The Turkish, since the French conquest, has become almost extinct. The Negro dialects are of little consequence.

History.—In the most ancient times we find the Numidians settled in the eastern part of the regency, and the Moors (or Mauri) in the west. Under the Romans, the former was included in the province of Africa, while the latter was called Mauritania Cæsariensis. Like the rest of North Africa, it had then reached its highest prosperity. It had numerous cities, which were principally Roman colonies. But its conquest by the Vandals, under the famous Genseric about 440, threw it back into a state of barbarism, from which it only partially recovered after the Mohammedan immigrants had established their dominion. About the year 935, the city, Al-Jezira, i. e., the island, and later Al-Gazie, i. e., the warlike, now called Algiers, was built by an Arabian prince, Zeiri, whose successors ruled the land till 1148, after which it was governed by the Almohades (q. v.) till 1269. It was then split up into many small territories. In 1492, the Moors and Jews who had been driven out of Spain, settled in A., and began to revenge themselves on their persecutors by piracy. Ferdinand, the Spanish monarch, attacked them on this account, took the city of Algiers in 1509, and erected fortifications on the island which forms its harbor. One of the Algerine princes, the Emir of Metidja, whose territories were threatened by the Spaniards, now invited to his assistance the Greek renegade, Horuk or Harude Barbarossa, who had made himself famous as a Turkish pirate chief. This laid the foundation of the Turkish dominion; for when Barbarossa arrived in 1516, he treacherously turned his corsair bands against the emir, whom he murdered, and then made himself Sultan of Algiers. His subsequent successes alarmed the Spaniards, who marched an army against him from Oran. Barbarossa was defeated in many encounters, and at last, being taken prisoner, was beheaded in 1518. His brother was then chosen Sultan. He put himself under the protection of the Ottoman court, by the help of a Turkish army drove the Spaniards out of the country, and established that system of military despotism and piracy which lasted till 1830, and which sunk A. into a state of ruinous degradation. In 1541, the Emperor Charles V. made a bold attempt to crush this nation of corsairs. He landed in A. with a fleet of 370 ships, and 30,000 men; but a fearful storm, accompanied by earthquakes and water-spouts, destroyed the greater portion of the former, and rendered the latter destitute of victuals, &c.; so that the expedition proved a failure, and Charles was glad to re-embark, which he managed to do with extreme difficulty.

The history of A., under the Moslems, offers few episodes worthy of notice. The Algerines continued to carry on their piratical warfare against the powers of reprisals. Emboldened by success, the Algerines pushed their piratical expeditions even beyond the Straits of Gibraltar. In the year 1600, the Turkish janissaries of Algiers obtained from the Constantinopolitan court the right to choose a dey from among themselves, who should share the power with the pacha appointed by the Sultan, and be their commander-in-chief. The result of this divided authority was internal strife and confusion. Nevertheless, the insolence of the Algerines at sea increased. They attacked even the coasts of Provence, compelling Louis XIV. to chastise them thrice; which he did, however, with very little effect. An incident occurred during the first bombardment of Algiers by the French fleet in 1682, which illustrates the reckless ferocity of these corsairs. By way of answer to the cannonading of his enemies, the dey caused the French consul, Vacher, to be shot off from the mouth of a mortar! After the third bombardment in 1687, the dey scornfully inquired of the French how much money the burning of Algiers had cost their master, and on being told, coolly replied that 'he would have done it himself for half the sum, and spared their king the trouble.' No more decisive result followed the attack of Admiral Blake in 1655, nor of the English and Dutch fleets in 1669 and 1670; yet the English were the first to form treaties with the Algerines. In 1708, the dey, Ibrahim, made himself master of Oran; and his successor, Baba-Ali, succeeded in effecting the virtual emancipation of the country from the dominion of the Porte. He banished the Turkish pacha; craftily persuaded the Sultan of Turkey to leave the power solely in his hands; carried on war,

and concluded peace at his own pleasure, and paid no more tribute.

A. was now ruled by a military oligarchy, at the head of which stood the dey, and after him the powerful Turkish militia, recruited from Constantinople and Smyrna, because their children by native mothers could not enjoy the same privileges as themselves. Besides these, there was a divan, or Christendom, venturing even to land on the Italian and Spanish coasts. Inland, too, they were constantly fighting to extend their territories. Before the end of the 16th c., they had subdued the whole country to the verge of Marocco, with the exception of Oran, which belonged to Spain.

The Spaniards were invariably unsuccessful in their attempts at council of state, chosen from the sixty principal civil functionaries. The internal history of the country henceforth presents nothing but a bloody series of seraglio revolutions, caused by the lawless janissaries, who permitted few of the deys to die a natural death. In the year 1775, Spain undertook her last great expedition against A., with 44 ships of war, 340 transports, and 25,000 soldiers. This, however, was as singularly unfortunate as all her previous ones. Everything went wrong, and the Spaniards had to re-embark as speedily as possible, leaving behind them 1800 wounded, and all their artillery. Thus A. continued to defy the greater Christian powers, and to enforce tribute from the lesser. During the French Revolution, and the time of the Empire, its piracies were much diminished in consequence of the presence of powerful fleets in the Mediterranean Sea; but at the close of the war, they were recommenced as vigorously as ever. This brought down upon 'the nation of corsairs' the vengeance of the Christian powers. The Americans took the lead, attacked the Algerine fleet off Carthagena, on the 20th June 1815; defeated it, and compelled the dey to acknowledge the inviolability of the American flag. About the same time, the English admiral, Lord Exmouth, extorted from the other states of Barbary the recognition of an international law respecting the treatment of prisoners. A. alone refused to consent to it; and after a delay of six weeks, the English and Dutch fleets, under the command of Lord Exmouth, fiercely bombarded the capital. The batteries of the pirates were soon silenced; and in a few hours the half of the city lay in ruins; its naval force and its magazines being all destroyed. The dey, an ignorant and obstinate barbarian, still wished to protract the fight, but his soldiery forced him to yield, and a treaty was concluded (1816), by which all Christian slaves were released without ransom (the number was 1211), and a promise was given that both piracy and Christian slavery should cease for ever. But nothing could keep these wretches from piracy. As early as 1817, they ventured as far as the North Sea, and seized all the ships in their course not belonging to any of the powers who sent them tribute or presents, as was done by Sweden, Denmark, Portugal, Spain, Naples, Tuscany, and Sardinia. Nor did even treaties avail to protect European vessels at all times. The Spanish, the Papal, and, in particular, the German shipping, suffered severely, while the dey mocked by his insolent replies the remonstrances addressed to him.

Meanwhile, the internal condition of A. continued to present the spectacle of a cruel prætorian despotism. In the year 1817, the power of the janissaries was greatly weakened by the skillful tactics of the dey, Ali. Upon his death, which was occasioned by the plague in the following year, Hussein was chosen in his stead, under whom the Moslem dominion was terminated by a conflict with France. The causes of this conflict were various. A French trading-brig was plundered in Bona in 1818; the dwelling of the French consul was attacked in 1823; Roman ships sailing under the protection of the French flag were seized; and even French ships were detained and plundered. But the chief cause of the quarrel was a dispute about the payment of a debt incurred by the French government to two Jewish merchants of Algiers at the time of the expedition to Egypt. This debt was fixed at seven millions of francs; four and a half millions were immediately paid; the rest was reserved until the counter-claims of certain French creditors should be decided in the French law-courts. For three years the lawsuit dragged its slow length along, till the dey became impatient—being himself a principal creditor of the Jewish-Algerine house—and angrily demanded payment from the king of France. To this letter no answer was returned. The feast of Beiram occurring soon after, when it was customary for the dey to receive all the consuls publicly, he asked the French consul why his master had remained silent. The latter haughtily replied, that 'a king of France could not condescend to correspond with a dey of Algiers.' Upon this, the dey struck him on the face, and fiercely abused his sovereign. In consequence of this insult, a French squadron was sent to Algiers, which received the consul on board, and blockaded the city (12th June, 1827). Six days after, the dey caused the French coral-fisheries at Bona to be destroyed. For three years the blockade was listlessly carried on; but in April 1830, during the ministry of Polignac, a warlike manifesto appeared; and a month later, a fleet sailed for the African coast, consisting of 100 ships of war, and 357 transports, having on board an army of 37,000 infantry, 4000 cavalry, and a proportionate number of artillery, under the command of Lieutenant-general Bourmont. The landing was effected under trifling opposition. A perpetual skirmishing then took place previous to the bombardment of Algiers, which commenced on the 4th July. Next day a capitulation was agreed to. The Turkish soldiers marched out —for such were the conditions—with their families and private possessions, and the French took possession of the place. Fifteen hundred guns, 17 ships of war, and 50,000,000 francs fell into their hands as spoil. The dey retired to Port Mahon, with his private property and a train of 118 persons, while the greater number of the Turkish janissaries were conveyed to Asia Minor. The conduct of the French soldiery, however, it must be confessed, tarnished the glory of their conquest. They went about plundering remorselessly the beautiful villas and gardens in the neighborhood of Algiers, as well as the ancient valuables and works of art; thus exciting a universal spirit of hostility in the natives, who kept up an incessant guerilla warfare outside the capital.

After the revolution of July, Marshal Bourmont resigned, and General Clausel was appointed his successor. The latter, who was a prompt and vigorous man, set about subduing the country, and giving it a regular government. His predecessor had committed a great mistake in driving out the Turks, who might have been usefully employed in subordinate functions of authority. After their banishment, the Kabyles and Bedouins, believing themselves emancipated from all subjection, and stimulated by intense fanaticism against the new conquerors, rose in rebellion, or rather commenced a series of petty struggles, which obstructed the colonization of A. for many years, and which cannot be said to have altogether ceased even yet. The imposition of French laws and institutions was made not in the wisest spirit, most of the old Turkish regulations being summarily abrogated. Besides this, the natives were wounded in their most susceptible point. Their mosques and burying-grounds were frequently desecrated and destroyed; and Clausel, whose vigor was more remarkable than his justice or prudence, confiscated—in direct contradiction to the very words of the capitulation—all the immovable property of the deys, and other exiled Turks, and of the townships, besides various religious institutions. The effect of these political crimes was instant. The entire provinces determined obstinately to resist; some even of the provincial rulers who had previously submitted, now appeared in arms again. Clausel was compelled to undertake a military expedition against the refractory beys; but his uncertain successes only inflamed the hatred and patriotism of the Kabyles and Arabs, who opposed him energetically. A young emir at last appeared on the scene, Abd-el-Kader (q. v.), who soon became the rallying point of the *Jad* ('holy war'), which the Marabouts had begun to preach. Under these circumstances, it became impossible for Clausel to carry out his scheme of colonization, and only a reckless speculation in land took place, which was in every way injurious. To strengthen his position, the French general, whose army was now greatly reduced, made a treaty with the Bey of Tunis; but the home-government disapproving of it, he was recalled in consequence. His successor, General Berthezène, having achieved nothing but defeat and disgrace in spite of his cruelties, was also speedily recalled, and Lieutenant-general the Duke of Rovigo appointed to the command. He arrived in Algiers on the 25th of December 1831, and established a most severe and relentless system. He scrupled not to perpetrate the most arbitrary acts, cruelties, and treacheries. His two most remarkable actions were, first, the complete annihilation of the whole Arab tribe El-Uffia, when even old men, women, and children were massacred during the night, on account of a robbery committed by some of the members of the tribe; second, the execution of two Arab chiefs who were hostile to him, and whom he had treacherously allured into the city by the written promise of a safe-conduct. Such monstrous proceedings fired the entire nation.

The most peaceful tribes flew to arms, and the French were attacked on all sides. The Emperor of Marocco, who secretly fomented the strife, and even meditated the conquest of Oran, assisted the fierce and impetuous Abd-el-Kader in his designs. The health of the duke now declined. He returned to France in March 1833, and the administration of affairs was provisionally intrusted to General Avizard, who gained some credit by establishing the *Bureau Arabe*. After the death of the duke, General Voirol, a man exactly the reverse of his predecessor, was made interim commander-in-chief. His efforts were more directed to promote the material interests of the colony, than to extend the power of France. He met with little opposition in the province of Algiers, and in the eastern districts; but, on the other hand, the war raged fiercely in the west, where Abd-el-Kader had either gained over or subdued all the tribes between Mascara and the sea. At length a treaty was effected with him, in which he pledged himself to make peace, and to deliver up all his prisoners. In return he received a monopoly of the corn-trade, and the right to buy arms and ammunition in the French ports. Towards the end of 1834, the French government, having resolved to retain permanent possession of the colony, organized its administration anew, placing the supreme power, both civil and military, in the

hands of a governor-general, who received his orders from the minister of war. General Drouet d'Erlon was the first appointed to this high dignity. Under him there were a commander of the troops, a commander of the naval force, a military intendant, a civil intendant, and a director of finance. The administration of justice was also regulated by the erection of many tribunals. Frenchmen and foreigners were to be subject to French laws, but the natives to their own. Moreover, the old Algerine courts of justice were still to be kept up. D'Erlon apparently desired, at first, to occupy himself with the internal administration of the regency, and, in truth, deserved much credit for the introduction of French municipal institutions, and the French system of education and police arrangements; but a disgraceful defeat suffered by the French army at Makta, on an expedition against Abd-el-Kader, who had secretly broken the treaty, caused the recall both of the officer in command and of D'Erlon himself. Clausel was now sent back to A. with the title of marshal. He arrived on the 10th of August 1835, his first anxiety being to wipe away the disgrace of the defeat at Makta.

About three months after, he marched out at the head of 11,000 men, to attack Mascara, the center of Abd-el-Kader's power: he had to fight many petty battles on his way, but was always successful. On reaching Mascara, he resolved to set it on fire, which he did on the 8th December, and then commenced his retreat, in which his army suffered severely from bad weather, and from perpetual harassments by the enemy. Abd-el-Kader was soon more powerful than ever, and General Bugeaud had to be sent out from France with reinforcements; but nothing came of this save a few fruitless victories over Abd-el-Kader, which did the latter no real harm. Bugeaud was at length compelled to make peace on the 30th May, 1837. Abd-el-Kader recognized the sovereignty of France over the regency; he received, in return, the government of the provinces of Oran, Titeri, and Algiers, with the exception of the cities of Oran, Arzeu, Masagran, Mostaganem, Algiers, Blidah and Koleah, Sahel (or the 'sea-coast'), and the plain of Metidja. In exchange for the city of Tlemzen, he delivered to the French army 60,000 sacks of corn, and 5000 oxen; he was likewise permitted to buy arms and ammunition in France. In February, 1837, Marshal Clausel was recalled, and Lieutenant-general Damrémont succeeded him. The condition of the colony was at this moment desperate, for the disgraces which followed the rash and even reckless measures of Clausel had everywhere lowered the *prestige* of the French army. The duty of the new governor-general was clear, but difficult: he had to wipe out the stain which attached to the honor of his soldiery, and to re-create the conviction of their superiority. He at first attacked the Kabyles of the province of Algiers, and chastised them with considerable severity, and then commenced his great work of taking Constantine, from which his predecessor had been compelled ignominiously to retire. In the month of May, with an army of 12,000 disciplined troops, besides *Zuavi* (originally light infantry raised among the natives), *Bataillons d'Afrique* (convict-battalions at first), the *Tirailleurs d'Afrique*, and the *Chasseurs d'Afrique*, as well as the Spahis (a cavalry corps composed of native soldiers commanded by French officers), Damrémont marched to the attack of Constantine, and in spite of fearful weather, succeeded in storming the city on the 13th. This victory laid the foundation for the entire subjugation of the province of Constantine, which was completed in the course of the two following years without any great effort.

On December 1, 1837, General Valée was appointed governor-general in the stead of Damrémont, who had fallen at the storming of Constantine. He, like the others, misunderstood the character of Abd-el-Kader when he considered it possible for him to remain quiet. New treaties were made, which only delayed hostilities. Meanwhile, the work of colonization went on in spite of numerous obstacles. The province of Constantine was much improved by the building of towns and the making of roads; but suddenly, in October 1839, Abd-el-Kader, whose power had now become formidable to an unprecedented extent, violated the treaty on an insignificant pretext, and fell upon the unprepared French with an overwhelming force. The European settlements in the open plain were attacked and laid waste, bodies of French troops were surprised on their march and cut to pieces, small outposts and encampments were taken in a moment, and by the 24th of November, the dominion of the French was confined to the fortified cities and camps. Even the settlements in the plain of Metidja were lost. Forty thousand Arabs swept over it, and threatened Algiers itself. This state of things demanded energetic measures. The spring campaign was vigorously opened on both sides: everywhere the French gained splendid successes; while the heroic defence of the fort of Masagran, near Mostaganem (garrisoned by only 123 men), against from 12,000 to 15,000 Arabs, who stormed it incessantly, and with the utmost fury, for three days, raised the *prestige* of the invaders higher than ever. Still, however, nothing was really accomplished. After repeated bloody defeats, the native tribes again rushed to arms, swept the plains, and rendered life insecure at the very gates of Algiers. The only thing of any practical importance which took place during the whole year, was the beginning of the circumvallation by which the fertile plain of Metidja was to be secured against the hostile incursions of the Arabs. Marshal Valée was now recalled, and Lieutenant-general Bugeaud appointed his successor. The latter arrived at Algiers on February 22, 1841, and adopted a new system, which was completely successful. A brave, inexorable, and unscrupulous man, he resolved to employ any and every means for the attainment of his purpose. He wearied out the enemy by incessant *razzias* (predatory excursions) against individual tribes, corrupted them (not a difficult thing to do) by all the arts of bribery, and on special occasions undertook great expeditions to annihilate the regular power of Abd-el-Kader, whose strong defensive positions he destroyed, and whose authority he spared no pains to undermine. The French army was raised to 80,000 or 100,000 men. Its operations were carried on from three principal points. Victory followed Bugeaud wherever he went. He relieved and victualed hard-pressed garrisons; intimidated the surrounding country; penetrated to Tekedempt—the very stronghold of Abd-el-Kader himself—which he laid in ashes; marched thence to Mascara, which was also taken; and on all sides received the submission of the terrified Arabs. Even the hottest period of the summer was made use of. Bugeaud bribed and seduced from their allegiance those Arabs who were under the sway of Abd-el-Kader. The autumn campaign was for the time decisive. Saida, the last fortress belonging to the gallant emir, was utterly destroyed, and now almost the entire country was subdued. Abd-el-Kader retired into Marocco, where he raised a new army, for his old one had been completely annihilated. He was, however, defeated by General Bedeau, and again compelled to retreat into Marocco, from which, however, he issued a second time, in the summer of 1842, and contrived to maintain a fierce but desultory warfare, for two or three years, aided by the Sultan of Marocco. At last, however, deserted by most of his followers, pursued by his late ally, and, in fact, hemmed in on all sides, he was forced to surrender to General Lamoricière, at the close of December 1847. See ABD-EL-KADER.

The revolution of February 1848, somewhat disturbed the progress of conquest and subjugation in A. That superb race of mountaineers, the Kabyles, descendants of the ancient Numidians and possessed of the same fiery and dauntless spirit, broke out into a new insurrection, which, however, was speedily quelled. The National Assembly now offered to the European population of A. to incorporate the country with the republic of France, and to grant it all the accompanying political privileges of a French province; but intelligent men of all parties acknowledged the uselessness and danger of this step. It was therefore simply declared to be a permanent possession of the republic. Four deputies from the colony were permitted to take a part in all discussions in the National Assembly on Algerian affairs. Meanwhile, the work of conquest, colonization, and, in some respects, civilization went on. The French troops penetrated into the far south, almost to the borders of Sahara, sternly reducing to obedience the desert tribes, who manifested a not unnatural antipathy to these inroads, and in some cases fiercely resisted the invaders. Various tribes of the Kabyles, too, opposed every attempt at organized taxation, and the imposition of civilized discipline; the result of which patriotic obstinacy was, a new campaign against them by the French general, Bugia. Fortune again declared for the invaders; but the most alarming insurrection was that excited by the Cherif Bouzian, who fled for freedom to Zaatcha in the oases. The French pursued him thither; but were beaten, and had to retreat. Some months after, they returned, largely reinforced, and in spite of the broad belt of palm-trees which hindered their operations, and the wild and strenuous heroism of the besieged, the place was stormed and destroyed. The defenders all perished.

In 1853—1854, and again in 1856—1857, expeditions were organized against the Kabyles; though not altogether with the will of the colonists, who could not but recognize the great intelligence and industry displayed by that highland race. The struggle was sanguinary and barbarous on both sides, but the French at last subdued their enemies. For two years (1858—1860) the military government of A. was superseded by the institution of a special ministerial department for A. and the colonies, which was first of all intrusted to Prince Napoleon. In December 1860, however, a military government was re-instituted, and Marshal Pélissier made Governor-general, with a Vice-governor under him, a Director-general for Civil Affairs, and a Council of thirty members. In 1863, the Emperor Napoleon announced that he was willing to give the colony a new constitution, with a Chamber of Representatives for provincial affairs: he also addressed a letter to the governor-general, in which he explained that A. was no colony in the strict sense of the word, but an Arabian kingdom; and that the natives had the same right to protection as the colonists. In 1864, however, strife again arose between the colonists and the Arabs; and it was only after several engagements, during the months of April and May, that peace was restored by the sub-

mission of the conquered tribes. Pélissier having died in May 1864, Marshal MacMahon was appointed to succeed him.

In the following year the emperor himself made a journey to A., and, on March 5, issued a proclamation, in which, although explaining to the Arabs that A. must continue to be united to France, he promised to maintain their nationality; and at the same time gave them assurance that they should always remain in undisturbed possession of their territories. Yet these and other measures for conciliating the Arabs were all in vain; for, shortly after the emperor's return to France, insurrections broke out in the province of Oran and elsewhere. Si-Hamed, a native chief, with 12,000 horsemen at his command, began to harrass those tribes which remained in submission, until he was routed by Colonel Colomb of Geryville, and forced to escape into Sahara: after which, in the beginning of 1867, two expeditions, led by Colomb and Sonis, succeeded in reducing to submission the other tribes which had revolted. In 1867 and 1868, a severe and general famine checked the military enterprises of the Arabs; and there was peace till 1870, when the Franco-Prussian war having begun, the emperor found it necessary to withdraw to Europe the greater part of the forces in Africa. MacMahon's place was then taken by General Durieu, as interim governor-general; and the natives began to entertain hopes of freeing themselves from the yoke of France. Movements were begun in the provinces of Constantine and Oran, which it required all General Durieu's vigilance and activity to hold in check. After this, again, some disorder arose among the colonists themselves, who strongly desired the abolition of the military government—a change which the new republican government at Paris soon gratified them by effecting. To Durieu's place was appointed a civil governor, and under him prefects for each of the three provinces. A council was formed—composed of the prefects, archbishop, commander of the army, and other members appointed by the French government—with which, in all important cases, the governor has to take counsel. The territory of the Sahara and adjoining districts remain under exclusively military rule.

The French troops still stationed in A. consist of one 'corps d'armée,' and numbering 60,000. It is said that the possession of A. has cost France the lives of 150,000 men, besides £120,000,000 in money. The revenue of A. is derived chiefly from indirect taxes, licenses, and customs duties. In 1879–83, it was about 31 million francs a year, and the expenditure about 35 million. The cost of maintaining the army, however, the outlay for public works, and other large sums disbursed—estimated in 1877 at 25,-111,472 francs—are not included in the expenditure, being provided out of the French budget.

Since the subjugation of A., the French have conferred various benefits on the colonists and native tribes, not the least important of which has been the digging of Artesian wells (q. v.). In May 1856, a 'boring' was commenced in an oasis of the Sahara or desert of the province of Constantine. A civil engineer, a sergeant of Spahis, and a detachment of soldiers of the Foreign Legion succeeded in bringing to light a splendid fountain or river, yielding not less than 4010 quarts of water per minute. The work was considered a miracle. From all quarters the Arabs flocked to behold and enjoy it. The native priests blessed it, naming it the 'Fountain of Peace.' Another well was termed the 'Fountain of Benediction.' In the oasis of Sidi-Rached, unproductive for want of water, a well was dug, and at a depth of 54 mètres, yielded 4300 quarts per minute. It is known as the 'Fountain of Gratitude,' and the enthusiasm excited at its opening was boundless. The idea of providing such wells has rightly been considered 'a stroke of strong political wisdom.'

In spite of frequently recurring troubles, such as the native rebellion in 1881, the government have largely helped the colonists in establishing banks and the like. In 1881 there were 720 miles of railway, including the line into Tunis; the principal lines are those from Algiers to Oran, and from Constantine to Setif. A telegraph cable was laid in 1870 between Bona and Marseille; there are 5850 miles of inland telegraphs.

It would be too much to affirm that the colonization of A. has advanced rapidly. About 7,000,000 acres of land are under cultivation, 900,000 being in the hands of European colonists. Of the total population of 2,867,626 (in the three civil departments and the three corresponding military divisions), the French residents were 198,092; Jews, 33,500; Mohammedan natives, 2,477,641; Spaniards, 94,038; Italians, 25,322; English, 14,313; besides smaller numbers of other European nationalities. (The non-French Europeans are 160,000.) The total exports of A. amounted in 1880 to £6,752,000; the imports, £12,136,000. In the same year, £742,000 represented the value of exports from A. to Great Britain, and £292,000 the imports thence. Barley, iron ore, and zinc are among the exports; but alfa fibre or esparto grass, for making paper, is the staple product; of it, a value of £433,500 was sent to Britain in 1881. Mohammedan schools for instruction in French and Arabic have been established, and are regularly attended by pupils of both sexes. Thus, although progress is slower than might have been anticipated, it is real, and its pace accelerating. When fierce memories have been softened by time, and such atrocities as those of Dahra (q. v.) have been forgotten in the substantial blessings which an enlightened civilization cannot fail to bestow, the presence of the French in A. will cease to be deplored by the natives.

ALGHE'RO, or ALGHERI, a seaport on the west coast of the island of Sardinia, 15 miles S. W. from Sassari. It is well defended towards the sea, being built on a rocky point, and surrounded by thick walls, but is commanded by some hills which overhang the town. A. has a cathedral, several convents, a college, and public schools. It exports wine, tobacco, anchovies, skins, coral, bones, &c. It was a favorite residence of Charles V., in whose time it belonged to Spain. Pop., 8000.

ALGIE'RS (Arabic Al-jezira, the island), the capital of Algeria, was built about 935 A.D. by an Arab chief. It rises from the seashore up the sides of a precipitous hill in the form of an equilateral triangle. The apex is formed by the Casbah, the ancient fortress of the deys, which is 500 feet above the sea-level, and commands the whole town. The base is a mile in length. The present city may be regarded as divided into two parts; the old, or high town; and the new, or low town. With the exception of some mosques, the latter consists of wharfs, warehouses, government houses, squares, and streets, principally built and inhabited by the French; while the former is almost wholly Moorish both in its edifices and inhabitants. The great center of bustle and activity in A. is the Place Royale—a large oblong space in the center of the town, planted with orange and lime trees, and surrounded by houses in the European style. Here may be found as motley a crowd as anywhere in the world, denizens of all nations—Arabs, Moors, Jews, French, Spaniards, Maltese, Germans, Italians, &c.

The city is intersected by two large parallel streets, Bab-el-Ouad and Bab-azoun, running north and south for more than half a mile. They are flanked by colonnades, but are very narrow, and therefore inconvenient for traffic; as promenades, however, nothing could be more agreeable. In 1833, A. had upwards of 100 mosques and marabouts. The mosques are divided into two classes—the djamas, or principal mosques, and the mesjids, or inferior mosques. The marabouts are the tombs and sanctuaries of saints. Everywhere A. wears the aspect of a rising colonial city. Other towns in the province still retain their oriental character, with the exception of a few military buildings; but the new town of A. might deceive the traveler into the belief that he is still in Europe, were it not for the throng of swarthy faces he meets. The streets are regular, spacious, and elegant; some of them as handsome as the Parisian Boulevards, and adorned with arcades. The shops, too, are occasionally very good. The houses are in some instances five stories high, which, though it gives a massive and imposing appearance to the city, is yet a very perilous innovation in a place which has suffered dreadfully from earthquakes.

But perhaps greater interest attaches to the old Moorish town, which is connected with the new by a steep, narrow, jagged-looking street called the Casbah, leading down from the fortress of the deys. The houses are square, substantial, flat-roofed; rise irregularly one over the other; and have no windows, but only peepholes, which are intended to exclude impertinent eyes, and are therefore fortified with iron gratings instead of glass, so that the houses have a very prison-like appearance. Although the streets at first contrast unfavorably with those of Europe, on account of their narrowness, the coolness which this secures soon reconciles the traveler to other inconveniences. The inhabitants have recourse to their flat roofs or terraces in the evening, to enjoy the delicious sea-breeze. The French have introduced many useful reforms. There are conduits in every part of the city, public baths, coffee-houses, hotels, omnibuses, &c. The markets are held in the Squares de Chartres, Mahon, and d'Isly. Horse-racing is the great amusement. The Arabs are passionately fond of it. The French have also improved, at great expense and labor, the port, which was in a precarious condition. The town has supreme courts of justice, a chamber and tribunal of commerce, a college and schools, a Catholic cathedral and several churches, a French Protestant church, a synagogue, a bazaar for the exhibition of native industry, theaters, and banks.

A., which had been wretchedly misgoverned by a long succession of Turkish deys, fell into the hands of the French in 1830 (see ALGERIA), who swept away every trace of the ferocious despotism that had prevailed. The Turks withdrew in great numbers. Of the 42,000 inhabitants in 1877, only 16,000 are French; while 18,000 are of other European nations, 11,000 are natives, and 7000 are Jews.

ALGO'A BAY, an extensive inlet at the east extremity of the south coast of Africa, being intersected by the parallel of Cape Town, from which it is distant about 8 degrees of longitude. Its anchorage is sheltered, excepting on the south-east, the holding-ground being excellent. It receives two rivers, the Sunday and the Baasher. At the mouth of the latter is Port Elizabeth. A. B. is the harbor of the eastern province, by far the most flourishing

section of the colony; and it will ever be locally memorable as the landing-place of about 4000 souls in 1820, the first British emigration to this once Dutch possession. Since then, the trade of the bay has steadily and rapidly increased. See further, CAPE OF GOOD HOPE.

ALGO'NQUINS. The A. formed the most prominent of the three aboriginal races that the French found in the great basin of the St. Lawrence. They were then the lords not merely of the best part of Canada, but of much adjacent territory to the north and west. At the present day, the A., as well as the Hurons and the Iroquois, exist, at least within the pale of settlement, only as the shadow of a mighty name, being chiefly confined to several miserable villages, with hardly anything of civilization but its individual helplessness. This deplorable result from whatever causes it may have arisen, is certainly not to be imputed either to oppression or to indifference on the part of the French, who, politically religiously, and socially, have always treated the red man with consideration and humanity. On this interesting subject, see further under the general head of AMERICA.

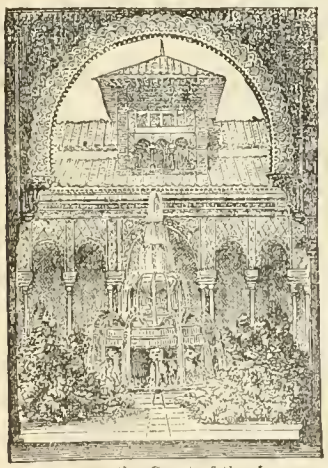
A'LGUACIL, or ALGUAZIL (derived from the Arabic *Wasil*, i. e., the 'power' derived from the king), is the general name in Spain of the officers intrusted with the execution of justice. There are 'Alguaciles mayores,' who either inherit the office of executing justice in a town as a hereditary right belonging to their families, or are chosen to the office by the municipality; formerly, the name was also given to the officers that executed the sentences or orders of tribunals, such as the tribunal of the Inquisition, and of the various orders of knights. But usually, under the name of A., is understood the 'Alguaciles menores,' or 'ordinarios,' that is to say, the attendants or officers of the courts of justice, gens d'armes, bailiffs—in short, all the inferior officers of justice and police.

ALHA'GI. See MANNA.

ALHA'MA (Arab. *The Bath;* the Roman *Astigia Juliensis*), a town of Andalusia, Spain, in the province of Granada, 25 miles south-west from Granada. Its situation is extremely picturesque on the edge of a projecting rock, overhanging a deep chasm of limestone hills, through which the river Marchan foams, and with mountains in the background rising to the height of 8,000 feet. Vineyards and gardens mingled with the houses on the steep slopes add to the interest of the scene. A. is a decayed town, although its warm sulphureous baths are still frequented by visitors in the beginning and end of summer. The Moors derived a large revenue from its baths. It was a famous fortress of the Moors; and its capture, in 1482, prepared the way for that of Granada. There are still remains of the Moorish castle and town wall. There are ruins also of a Roman aqueduct: the principal bath still in use is a Moorish edifice; and a smaller one is supposed to be Roman. Pop. 7758.

ALHAMA, a town of Murcia, Spain, 17 miles south-west from Murcia. It is celebrated for its warm mineral waters, and is resorted to for bathing. It has a ruined castle. Pop. 6300.

ALHA'MBRA is the name given to the fortress which forms a sort of acropolis or citadel to the city of Granada, and in which stood the palace of the ancient Moorish kings of Granada. The name is a corruption of the Arabic *Kal-'at al hamra*, 'the red castle.' It is surrounded by a strong wall, more than a mile in circuit, and studded with towers. The towers on the north wall, which is defended by nature, were used as residences connected with the palace. One of them contains the famous *Hall of the Ambassadors*. The remains of the Moorish palace are called by the Spaniards the Casa Real. It was begun by Ibnu-l-ahmar, and continued by his successors (1248–1348). The portions still standing are ranged round two oblong courts, one called the *Court of the Fish-pond*, the other the *Court of the Lions*. They consist of porticos, pillared halls, cool chambers, small gardens, fountains, mosaic pavements, &c. The lightness and elegance of the columns and arches, and the richness of the ornamentation, are unsurpassed. The coloring is but little altered by time. The most characteristic parts of the Casa Real have been reproduced in the 'Alhambra Court' of the Crystal Palace at Sydenham. A great part of the ancient palace was removed to make way for the palace begun by Charles V., but never finished. It is long since any part of the Moorish palace was inhabited; but it is kept in a state of preservation as a work of art, and as a memorial of the tragic legend of the Abencerrages (q. v.).



Entrance to the Court of the Lions—Alhambra.

ALHAURI'N EL GRA'NDÉ, a town of Granada, Spain, in the province of Malaga, and 19 miles west from Malaga, on the north side of the Sierra de Mijas, and near the Faala, an affluent of the Guadalherce. It is a well-built town, with a number of squares, wide well-paved streets, and many fountains. There are remains of a Roman aqueduct and of an Arab fortification. Many of the inhabitants are employed in working the marble, freestone, and granite quarries of the vicinity, and its lead and antimony mines. Pop. 7514.

ALI PASHA, one of the most ferocious and unscrupulous men that even the east has produced, was descended from an Albanian pasha, who perished at the siege of Corfu in 1716. He was born at Tepelen, a small place at the foot of the Klissoura Mountains, in Albania, in 1741. His mother was a vindictive and merciless woman, who never hesitated to employ the most revolting means of accomplishing her purposes. Having lost his father, a comparatively quiet and enlightened man, his education necessarily devolved upon her; and she did not fail to inspire him with the same remorseless sentiments that animated herself. His youth was passed in extreme peril and hardship, for the neighboring pashas combining, had robbed his father of nearly all his possessions, in the effort to recover which, young Ali was repeatedly defeated, and at last had to betake himself to the mountains, and even to pledge his sword to save himself from dying of hunger. These calamities were not calculated to soften the native ferocity of his disposition; they only nurtured a mingled boldness and cunning, which afterwards developed itself in a variety of qualities, such as subtlety, dissimulation, foresight, treachery, vigor, and diabolical cruelty. It is said that the change in his fortune arose from his having accidentally discovered a chest of gold, with which he raised an army of 2000 men, gained his first victory, and entered Tepelen in triumph. On the very day of his return, he murdered his brother, and then imprisoned his mother in the harem on the charge of poisoning him, where she soon after died. He next reconciled himself to the Porte by helping to subdue the rebellious Vizier of Scutari; and thus acquired not only the lands that had been wrested from his father, but likewise several Greek cities. He also attacked and slew (with the permission of the sultan) Selim, Pasha of Delvino, and, as a reward, was appointed lieutenant to the new Pasha of Derwend; but instead of attending to the security of the high roads (which was his office), he rendered them more insecure than ever, by participating in the plunder which the *klephtis* (robbers) were allowed to make. The result was, his deposition by the Porte; but he speedily purchased back its favor, for he was a master-hand at bribery. Shortly after this, he acquired a high reputation as a soldier, and did such good service to the Turks in their Austro-Russian war of 1787, that he was named Pasha of Trikala in Thessaly; at the same time he seized Janina or Joannina, of which he got himself appointed pasha by the instrumentality of terror, a forged firman, and bribery. It must be admitted that, as a ruler, he now displayed many excellent qualities. He swept his old friends, the robbers, from the mountain-roads, incorporated them into military troops, quelled the wretched factions that prevailed, and everywhere introduced order in the place of anarchy, by the vigor and vigilance of his administration.

A short time after this, he entered into an alliance with Napoleon Bonaparte, who sent him engineers. When Bonaparte was defeated in Egypt, Ali, in 1798, took the places in Albania possessed by the French. After a three years' war, he subdued the Suliotes, for which the Porte promoted him to be governor of Romania. About this time, he revenged upon the inhabitants of Gardiki an injury done to his mother forty years before, by the murder of 739 male descendants of the original offenders, who themselves were all dead.

In the interior of his dominions, Ali maintained the strictest order and justice. Security and peace reigned, high roads were constructed, and industry flourished, so that the European travelers, with whom he willingly held intercourse, considered him an active and intelligent governor. From the year 1807, when he once more entered into an alliance with Napoleon, the dependence of Ali on the Porte was merely nominal. Having failed, however, in his principal object, which was to obtain, at the peace of Tilsit, through the influence of Napoleon, Parga, on the coast of Albania, and the Ionian Islands, he now entered into an alliance with the English, to whom he made many concessions. In return for these, they granted Parga, nominally to the sultan, but really to Ali. As he now considered his power to be securely established, he caused the commanders of the Greek Armatoles (or Greek militia), who had hitherto given him assistance, to be privately assassinated one by one, while at the same time he put to death the assassins, to save himself from the suspicion of having been their instigator. The Porte at length determined to put an end to the power of this

daring rebel; and in 1820, Sultan Mahmoud sentenced him to be deposed. Ali resisted for a time several pashas that were sent against him; but at last surrendered, on the security of an oath that his life and property would be granted him. Regardless of this, he was put to death, February 5, 1822. Ali possessed, indisputably, great natural gifts; but along with them, a character of the worst description. He never scrupled to use any means, provided it speedily secured his end. Yet we can hardly help admiring the singular talent which he invariably displayed. Like many other half-civilized monarchs and chiefs who have lived within the sphere of European influence, he was keenly alive to whatever transpired among the powers of Christendom. Though utterly illiterate himself, he had all the foreign journals translated and read to him. He watched every political change, as if conscious that the interests of his little region depended for their future prosperity on the west, and not on the east; and made friendly advances to both the French and the English, recognizing, with a sagacity remarkable in a barbarian, that the practical dominion of the world had passed from the Crescent to the Cross.

A'LIA, a town of Sicily, in the province of Palermo, 30 miles south-east from Palermo, picturesquely situated on the crest of a hill, in a mountainous and craggy district, near a torrent called the Fiume Torto. Pop. 5425.

ALIBAUD, Louis, notorious for his attempt to murder King Louis-Philippe, was, at the Revolution of July, quarter-master in the 15th regiment of the line. Having been degraded subsequently for an accidental brawl in the streets of Strasbourg, he demanded his discharge in 1834, and went to live at Perpignan, and then at Barcelona, where, having become a fanatical republican, he returned to Paris, with the determination to murder the king. A weariness of life had also seized him, so great, that he thought of suicide. It was on the 25th of June 1836, at the moment that the king, when driving through the gate of the Tuileries, bowed to the national guard as they presented arms, that A. fired the well-aimed ball, which passed close to the king's head. Being immediately seized, he regretted nothing but the failure of his attempt. After a short trial, he was sentenced to death, and was guillotined on the 11th of July.

ALI-BEN-ABI-TALEB, the first convert to Mohammedanism, and fourth calif, was the bravest and most faithful follower of the Prophet, whose daughter, Fatima, he married. Being made calif in the place of the murdered Othman, he was victorious over the rebels in ninety engagements. He took prisoner Aysha, the young widow of Mohammed, and his greatest enemy, in the battle of the Camel—so called because Aysha appeared in the field riding on a camel. Ali was murdered by a fanatic in the year 660. He was buried near Kufa, where a monument was afterwards erected to him, to which his votaries still go on pilgrimage, and which caused the building of the city Medjed Ali. The religious sect formed by the followers of Ali, called Shiites (q. v.), has spread extensively under that name in Persia and Tartary. The descendants of Ali and Fatima, called the Fatimites (q. v.), although much persecuted by the Ommiades, have nevertheless ruled on the banks of the Nile and of the Tagus, in West Africa and in Syria. The best edition of the Proverbs or Maxims ascribed to Ali has been published by Fleischer (Ali's *Hundred Proverbs, Arabian and Persian*, Leip. 1837); Ali's *Divan*, the most complete collection of his lyrical poems, mostly on religious subjects, appeared in 1840 at Bulak, near Cairo.

A'LIBI, Lat., signifying 'elsewhere'. This is a defence resorted to in criminal prosecutions, when the party accused, in order to prove that he could not have committed the crime with which he is charged, tenders evidence to the effect that he was in a different place at the time the offence was committed. When true, there can be no better proof of innocence; but as offering the readiest and most obvious opportunity for false evidence, it is always regarded with suspicion. In the case of crimes the place of committing which is immaterial—as, for example, the act of fabricating the plates, or of throwing off the spurious notes, in a case of forgery—a proof of *A.* is of no avail.

ALICA'NTE, chief town of a province of the same name in Spain. The province, formed of parts of the old kingdoms of Valencia and Murcia, contains (1877) 408,154 inhabitants. The town, one of the most considerable seaports of Spain, is strongly fortified, has 35,000 inhabitants, and is the staple place for the products of Valencia, especially soda, cotton and linen fabrics, ropes, corn, oil, silk, and the wine of the neighboring district, known as A. or *vino tinto*, on account of its dark color. A good deal of this rough, and at the same time sweet, wine is used to doctor thin clarets for the British markets. In 1331 the town was besieged by the Moors; and again by the French under Asfeld in 1709. In 1873 it was unsuccessfully bombarded by the Cartagenan insurgents.

ALICA'TA, or LICATA, a town of Sicily, in the province of Girgenti, and 26 miles south-east from Girgenti. It is most beautifully situated on the sea-coast, at the mouth of the Salsa (anc. *Himera Meridionalis*), one of the largest rivers, if not the largest, in Sicily; its buildings stretch along the shore, and occupy the steep slope of the hill, which is crested by the great old fortress, now indeed of little strength, but of imposing appearance. On the brow of a hill to the west of the town, is the dismantled castle of St. Angelo, said to occupy the site of that in which the tyrant Phalaris kept the brazen bull, his celebrated instrument of torture. A. itself is generally believed to stand on the spot where the ancient *Phintias* was built (280 B.C.) by Phintias, tyrant of Agrigentum, after he had destroyed Gela, the inhabitants of which he transferred hither. The place and immediate neighborhood were the scene of some memorable battles in the wars between the Carthaginians and Sicilians, and between the Carthaginians and Romans. In the middle ages, A. suffered severely from the depredations of Barbary corsairs. It has a very bad port, the sea being so shallow that only vessels of small size can approach the town; larger vessels are compelled to anchor about a mile from the town, and are loaded and unloaded by the aid of small craft. Yet A. has a considerable trade, exporting corn, macaroni, fruit, almonds, pistachio-nuts, sulphur, soda, and wines. Pop. 14,338.

A'LIEN (Lat, *alienus*, belonging to another, foreign). The citizen of one state, when resident in another, unless naturalized (see Naturalization), is an alien. The condition of an alien does not necessarily result from foreign birth, for the son of a natural-born or naturalized Englishman is not an alien, wherever he may be born (4 Geo. II. c. 21 s. 1). This privilege even extends to the second generation on the father's side; and thus a man whose paternal grandfather was an Englishman, is an Englishman himself, unless either his father or grandfather be liable to the penalties of felony, have been attainted of treason, or be serving in the army of a prince at war with England at the period of his birth (13 Geo. III. c. 21, s. 1). Neither is this privilege affected by the fact that the mothers of such persons were foreigners. The children of aliens born in England, except in the case of a hostile invasion, are natural-born subjects; but the children of English women by aliens are aliens, unless born within the British dominions.

By 7 and 8 Vict. c. 66, s. 16, alien women married to natural-born subjects are naturalized. The allegiance due by an alien or stranger to the prince in whose dominions he resides, is usually called *local* or *temporary allegiance*. It differs from natural allegiance chiefly in this, that whereas natural allegiance is perpetual, and unaffected by change of residence, local allegiance ceases when the stranger transfers himself to another kingdom. See Allegiance. In 1792 and 1793, in consequence of the influx of foreigners caused by the French Revolution, several acts of parliament were passed, which are known by the name of the Alien Acts. The object of these acts was expressly to confer on the crown the power of banishing aliens from the realm; a power which there is reason to think was included in the general prerogative which the crown possesses of declaring war against the whole or any portion of the inhabitants of a foreign state. They were superseded by the Peace Alien Act (6 Will. IV. c. 11, 1836).

Changes extending the power of aliens to hold property, were introduced by 7 and 8 Vic. c. 66, and 10 and 11 Vic. c. 83; and the whole legislation regarding aliens was revised and placed on its present footing by the Naturalization Act of 12th May 1870 (33 Vict. c. 14). By this act both real and personal property of every description may now be acquired, held, and disposed of, by an alien, in the same manner, in all respects, as by a natural-born British subject; and a title to real and personal property of every description may be derived from an alien, in the same manner, in all respects, as from a British subject. An alien is not qualified for any office or municipal, parliamentary, or other franchise, unless naturalized in accordance with the provisions of the act. The act does not affect any interest arising in pursuance of any disposition made before the passing of the act, or in pursuance of any devolution by law on the death of any person dying before the passing of the act. Where a convention has been entered into with a foreign state to the effect that the subjects, or citizens, of that state, who have been naturalized as British subjects, may divest themselves of such status, any person, originally a citizen of the state with which the convention exists, may make a declaration of alienage, and on so doing he shall be regarded as an alien and subject of the state to which he originally belonged. Even a British-born subject may now cease to be such, provided that, at the time of his birth, he was, and still continues to be, the subject of another state, by making a declaration of alienage. The privilege of aliens of being tried by a jury *de medietate linguæ* is abolished, and it is provided that henceforth they shall be tried in the same manner as natural-born subjects. On the subject of expatriation, it is enacted, that any British subject who has at any time before, or may at any time after the passing of this act, when in a foreign state and not under any disability, voluntarily become naturalized in such state, shall thenceforth cease to be a British subject. In the case of a British subject who, before the passing of the act, has been naturalized in a foreign state, desiring to re-

tain his British nationality, he may do so by making a declaration and taking the oath of allegiance. Whilst resident within the limits of the foreign state, however, he shall not be deemed a British subject unless he has ceased to be a subject of that state. On naturalization and the resumption of British nationality, see NATURALIZATION.

By the above provisions it will be seen, that in so far as Great Britain is concerned, the injustice has been obviated of a man who had been naturalized in one state being still held to his citizenship in another, and thus exposed, in the event of war, to the guilt of treason if he took part on either side. The right of merchants to reside in England, and to possess goods, money, and other personal effects, is recognized by Magna Charta (Art. 48). See CONSPIRACY BILL. See also ALIEN in AM. SUPP.

ALI'GNMENT, a term used in military tactics, equivalent to 'in line.' Thus, the A. of a battalion is effected when the men are drawn up in line; the A. of a camp is a rectilinear arrangement of the tents, according to some prearranged plan.

A'LIMENT (Lat. *alimentum*), that which feeds or nourishes. A. is not known as a technical term in the law of England. In the law of France and in that of Scotland, it has retained the meaning which it possessed in the Roman law (*Dig.* 34, 1, 6), and signifies the food, dwelling, clothing, and other things necessary to the support of life, or such money as may be judicially demanded in lieu of them. In this sense, it is applied in Scotland to the allowance granted to a wife deserted by her husband, or whilst an action of divorce is in dependence, whether it be at his instance or at hers, to a pauper by his parish, to a prisoner for debt by his creditors, and the like. Alimentary allowances, being generally barely sufficient for the support of the recipient, and made to him in consequence of his being in want of such support, are not attachable by Arrestment (q. v.).

ALIME'NTARY CANA'L, in Mammalia, is that portion of the digestive apparatus through which the food passes after mastication. It is lined by a mucous membrane, which extends from the lips to the anus, being modified in each region. See MUCOUS MEMBRANE. The A. C. really begins at the back of the mouth, in the lower part of the bag called the pharynx, which communicates with the nostrils above, and the gullet or œsophagus below, and also with the mouth and the larynx. The pharynx is surrounded by three muscles, the constrictors, which grasp the food, and force it into the next portion of the A. C., the œsophagus. This is a tube composed of an outer layer of longtitudinal muscular fibres, and an inner of circular, which extend down to, and spread out upon the stomach. These fibres, by a series of peristaltic contractions, carry the morsel of food along into the stomach. In vomiting, there is a reversal of these actions, which ruminating animals can accomplish at will. The œsophagus passes through an opening in the diaphragm, and joins the stomach, which is a pouch curved with the concavity upwards, expanded into a *cul de sac* on the left side (the cardiac extremity), and gradually narrowed to the right or pyloric end. It consists of muscular fibres continuous with those of the œsophagus, which become thicker towards the pylorus. Its external surfaces are covered by peritoneum, and it is lined by a thick soft mucous membrane, which, when the stomach is empty, lies in folds. Between the muscular and mucous layers is a fibrous layer in which the blood-vessels lie before they pass into the mucous layer. See STOMACH. At its pyloric or left extremity the stomach communicates with the small intestine, which is about 20 feet in length, becoming gradually narrower towards its lower end, and arranged in numerous convolutions, which occupy the middle of the abdominal cavity, and are kept in position by the peritoneum, which attaches them to the back of the abdomen.

The small intestine is subdivided into three parts. The first 10 inches from the stomach is the duodenum, into which open the duct of the pancreas and the common bile duct; of the remainder, the *jejunum* includes about two-fifths, and the *ileum*, three-fifths. The differences between these last two are not visible externally, but consist in modifications of their internal structure. The tube consists of peritoneum, longitudinal and circular muscular fibres, a fibrous layer, and the mucous membrane. See INTESTINES, SMALL.

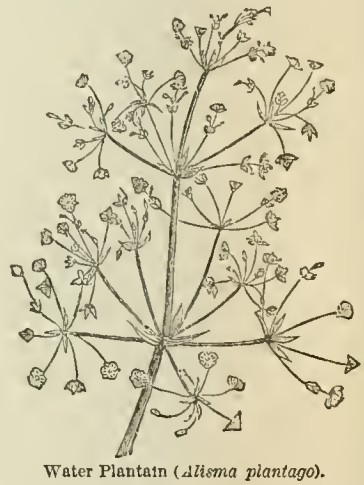
The ileum ends at the right iliac region in the large intestine, which is from 5 to 6 feet in length. It begins at the pouch called he blind gut (caput cæcum coli) or cul de sac (see CÆCUM) which has a small worm-like appendage (appendix vermiformis); a double valve guards the opening of the small into the large intestine. The colon passes upwards on the right side to below the liver (ascending colon), then crosses from the right hypochondrium across the upper umbilical region to the left hypochondrium (transverse colon), then descends to the left iliac fossa (descending colon), when it bends twice like an S (sigmoid flexure), and then joins the *rectum* at the left margin of the true pelvis. The colon is distinguished by its pouched or sacculated appearance, the sacs being separated by three flat bands of longitudinal muscular fibres. The peritoneum only covers it in parts. See COLON. The rectum is not sacculated, but its muscular coat becomes thicker; at its lower end the longitudinal fibres stop, but the muscular become more numerous, forming the internal sphincter muscle. The rectum is not straight, but takes a curved course.

The *A. C.* thus consists of a continuous passage lined by mucous membrane, which rests on a fibrous and muscular basement. Its length is generally about five or six times the length of the body, or in other words, about thirty feet. It begins below the base of the skull, and passes through the thorax, abdomen, and pelvis, and consists shortly of the mouth, pharynx, œsophagus, stomach, small intestine, and large intestine. The above is the description of the A. C. in human anatomy; its parts are variously modified in different animals, as will be found in the articles on its several subdivisions.

A'LIMONY signifies, in English law, the allowance which a married woman is entitled to receive out of her husband's estate, on separation or divorce *a mensâ et thoro*. It is generally proportioned to the rank and quality of the parties. Where the wife elopes and lives with an adulterer, the law allows her no A. By Scotch legal writers, the term is sometimes used as synonymous with *Aliment* (q. v.). See also ALIMONY in AM. SUPP.

A'LIQUOT PART. One quantity or number is said to be an A. P. of another, when it is contained in this other an exact number of times without remainder. Thus 2, 2¼, 4, and 5 are A. parts of 20, being contained in it 10, 8, 5, and 4 times. The consideration of A. parts occurs chiefly in the rule of *Practice*. Suppose we have to find the price of a number of articles at 6¼*d.*: since ¼*d.* is the 8th part of 6*d.*, to the price at 6*d.* (which is found at once in shillings, by taking half the number of articles), add ⅛ of that price.

ALISMA'CEÆ, a natural order of monocotyledonous plants, consisting of herbaceous plants either floating in water or growing in swamps. The leaves have parallel veins, even if expanded into a broad blade. The flowers are in umbels, racemes, or panicles; the sepals 3, the petals 3, the number of stamens definite or indefinite. The ovaries are several, superior, one-celled, distinct or united; the styles and stigmas equal to them in number. The fruit is dry, with one or two seeds in each carpel; the seeds exalbuminous.—There are about fifty known species, excluding the natural order JUNCAGINEÆ, which is very nearly allied, and is included in this by some botanists. The species of both orders are chiefly natives of the northern parts of the world. WATER PLANTAIN (*Alisma Plantago*) is a very common plant in stagnant waters in Britain, and is not destitute of beauty. Its leaves, which have long footstalks, shoot up above the water and amongst them, but far above them rises the erect scape or leafless stem, dividing into slender whorled branches and branchlets, among which the little flowers appear to lie thinly scattered. The fleshy rhizome, or root-stock, is eaten by the Calmucks, after it has been deprived of its acridity by drying. The corms of the ARROWHEAD (*Sagittaria*) possess somewhat similar properties. See ARROWHEAD.



Water Plantain (*Alisma plantago*).

A'LISON, REV. ARCHIBALD, was born in Edinburgh in 1757. He studied at the university of Glasgow, and afterwards at Oxford. He took orders in the church of England in 1784, and subsequently held several preferments, among others, a prebendal stall in Salisbury, and the perpetual curacy of Kenley, in Shropshire. From 1800, Mr. A. ceased to reside in England, and officiated in a chapel in his native city, where he died in 1839. A. is principally known by his *Essays on the Nature and Principles of Taste*, first published in 1790. The second edition, in 1811, gave occasion to an article by Jeffrey, in the *Edinburgh Review*, which brought the book more before the public. It has since gone through several editions, and been translated into German and French. The *Essays* advocate what is called the 'association' theory of the sublime and beautiful, and are distinguished for their pleasing and elegant style, and the fine feeling that pervades them. See ÆSTHETICS.

ALISON, SIR ARCHIBALD, Bart., born at Kenley, Shropshire, in 1792, was the younger son of the Rev. Archibald A., author of the *Essays on the Nature and Principles of Taste*. His mother was Dorothea Gregory, daughter of Dr. John Gregory of Edinburgh. In 1800, his father removed to the Scottish metropolis, where he

had accepted the senior charge in the Episcopal chapel in the Cowgate, and thus A. had the advantage of studying in a city then, as now, distinguished for its politeness and learning. At Edinburgh University he obtained the highest honors in Greek and mathematics. After he had finished his curriculum, he became a member of the Scottish bar in 1814, but spent a considerable number of years on the continent, before devoting himself to legal avocations. In 1822, he was named advocate-depute, which office he held till 1830. He now began to appear as a writer on law, politics, and literature. His *Principles of the Criminal Law of Scotland*, published at Edinburgh in 1832, is considered a standard authority on the subject. In the following year he published a sequel to the work, entitled *The Practice of the Criminal Law*. In 1834, he was appointed sheriff of Lanarkshire, by Sir Robert Peel; in 1845, the students of Aberdeen elected him 'Lord Rector' of Marischal College; in 1851, he received the same honor from Glasgow University, and subsequently, the title of D.C.L. from the university of Oxford. He received a baronetcy in 1852. His great work is undoubtedly *The History of Europe during the French Revolution* (10 vols. 8vo, 1839–42), which narrates the events from 1789 to 1815; a continuation, under the title of *The History of Europe from the fall of Napoleon to the Accession of Louis Napoleon* (9 vols.), was finished in 1859. He also published a *Life of the Duke of Marlborough*, *The Principles of Population*, &c., *Free Trade and Protection*, *England in* 1815 *and* 1845, besides contributing for many years to *Blackwood's Magazine* a series of tedious articles on Tory politics. It is very difficult to characterize Sir Archibald's *magnum opus*, *The History of Europe*. Although a work of immense industry, of very respectable accuracy, written with great animation and tolerable candor, it has failed to impress critics with a high idea of Sir Archibald A.'s abilities. The style is at times excessively wordy, and even when animated, it is never picturesque. Neither has he much insight into events or characters. Nevertheless, as his work supplied a felt want, and is sufficiently entertaining for a large class of readers, it met with an excessive popularity. It has gone through numerous editions, and has been translated into German, French, Arabic, and other languages. A. died May, 1867. See his autobiography, 2 vols. 1882.

ALISON, William Pulteney, M.D., political economist, physician, and professor of the practice of medicine, in the university of Edinburgh, from which last office, however, he retired in 1855, was an elder brother of the historian. He was extremely popular with all classes of the community, from the amiable and humane disposition which he invariably showed in his efforts to alleviate the sufferings of the poor. A pamphlet published by Dr. A. in 1840, to show how the inadequate provision for the poor in Scotland led to desolating epidemics, was the principal means of bringing about an improved poor-law for that country. His other writings are—*Outlines of Phisiology*, and *Outlines of Pathology and Practice of Medicine*. In a work published at Edinburgh in 1850, entitled a *Dissertation on the Reclamation of Waste Lands*, he fully examines the subject, and recommends the colonization of these by paupers and criminals. He died September 1859.

ALIWA'L, a village near the southern bank of the Sutlej, and not far from the town of Loodiana, in lat. 30° 57′ N., long. 75° 36′ E. It was the scene of a fierce conflict between the British and Sikh forces on the 28th of January 1846. The latter having crossed the river for the purpose of foraging, or otherwise obtaining supplies, had threatened Loodiana, when they were attacked by Sir Harry Smith, defeated, and driven back with great slaughter. The victory of A. was 'without a fault.'

ALI'ZARINE. See Madder.

A'LKAHEST, or ALCAHEST, the universal solvent of the alchemists. See Alchemy.

A'LKALIES. The word *alkali* is of Arabic origin, *kali* being the name of the plant from the ashes of which an alkaline substance was first procured. The name now denotes a class of substances having similar properties. The alkalies proper are four in number—potash, soda, lithia, and ammonia. The first three are oxides of metals; the last is a compound of nitrogen, hydrogen, and oxygen, and, being in the form of a gas, is called the volatile alkali. Potash, being largely present in the ashes of plants, is called the vegetable alkali; and soda, predominating in the mineral kingdom, is designated the mineral alkali. The *alkaline earths*, as they are called—lime, magnesia, baryta, and strontia—are distinguished from the former by their carbonates not being soluble in water. The distinguishing property of alkalies is that of turning vegetable blues green, and vegetable yellows reddish brown. Blues reddened by an acid are restored by an alkali. The alkalies have great affinity for acids, and combine with them, forming salts, in which the peculiar qualities of both alkali and acid are generally destroyed; hence they are said to neutralize one another. In a pure state, alkalies are extremely caustic, and act as corrosive poisons. Combined with carbonic acid, especially as bicarbonates, they are used to correct acidity in the stomach; but the injudicious and continued use of them is attended with great evil.

ALKALI'METER. Commercial potash and soda always contain greater or less quantities of foreign substances, such as sulphate of potash, common salt, silicates, oxide of iron, water, &c., which diminish the percentage of real alkali in a given weight. It is important, then, for the manufacturer to have some simple and ready means of determining the proportion of pure carbonate of potash or soda contained in any sample, that he may be able to judge of its value. Ordinary chemical analysis takes too much time. The A. serves this purpose. It consists of a graduated glass tube, filled with diluted sulphuric acid, and containing as much absolute sulphuric acid as would neutralize a given weight, say 100 grains, of carbonate of potash. 100 grains of the article to be judged of is then dissolved in water, and as much acid is gradually added to it from the tube as to neutralize the solution, that is, take up all the alkali. The application of colored tests determines when the neutralization is complete. The purer the article, the more of the acid will be required; and if the tube, which is divided into 100 degrees, has been emptied to the 80°, the impure article contains 80 per cent. of pure carbonate of potash.

This method of determining the strength of alkalies is called the *alkalimetry process;* but the instrument is not confined in its use to the estimation of the strength of alkaline substances. It is likewise employed in the determination of the strength of acids, such as sulphuric acid, hydrochloric acid, nitric acid, and acetic acid (vinegar). For this end, the graduated instrument is charged with a solution of an alkali of known strength, such as a given weight of crystallized carbonate of soda (washing soda), dissolved in water, and according to the number of divisions of the liquid poured from the A., the strength of the acid into which the alkaline liquid has been decanted, is calculated. The latter application of this instrument is called *acidimetry*. Again, the same graduated glass tube has been recently employed in many other ways, such as the determination of the strength of a solution of silver, by charging the instrument with a known or standard solution of common salt; and for this purpose it is used largely by assayers to the Royal Mint, and other metallurgic chemists. This mode of analysis is every day becoming of more and more importance, and, in fact, has given rise to a new department of analytical chemistry, which has been designated *volumetric analysis*.

A'LKALOIDS form an important class of substances discovered by modern chemistry. They are divided into two classes—namely, *natural* and *artificial*. The natural A. are found in plants and animals, and are often designated *organic bases*. Those obtained from plants are likewise called *vegeto-alkalies*. They are composed essentially of carbon, hydrogen, and nitrogen; besides which, the greater number contain oxygen. The A. have generally an energetic action on the animal system, and hence are every day employed in small doses as medicine; whilst in comparatively large doses they are powerful poisons. They have, although in a low degree, the characteristic alkaline properties on vegetable colors, &c.; have generally a bitter, acrid taste; and form the active principles of the plants in which they are found. Such are morphia, codeine, and narcotine, found in opium; quinine and cinchonine, in cinchona bark; strychnine, in nux-vomica; hyoscyamine, in henbane; nicotine, in tobacco; piperine, in black pepper; caffeine or theine, in coffee and tea, &c.

The animal A. are few in number, the more important being urea, found in the urine of the mammalia; and kreatine and kreatinine, two of the constituents of the juice of flesh. The artificial A. are those organic bases which are not found in any known plant or animal, but of which the later researches of chemists have contrived to form a large number. As the artificial A. do not differ essentially from the natural A. in composition, structure, or properties, it is confidently believed that the day is not far distant when all of the A. will be prepared artificially; indeed, recently several of the natural A. have been manufactured on the small scale without the intervention of the living plant or animal. For instance, urea can be formed from the simplest form of dead organic nitrogenous matter.

A'LKANET (*Anchusa*), a genus of plants belonging to the natural order *Boragineæ*, and having a 5-partite calyx, a funnel-shaped or salver-shaped corolla, with five scales closing its mouth, five stamens, an obtuse stigma, and ovate achænia, which are surrounded at the base by a plaited tumid ring. The species are herbaceous plants, rough with stiff hairs, and having lanceolate or elongatoovate leaves, and spike-like, bracteated, lateral and terminal racemes of flowers, which very much resemble those of the species of *Myosotis*, or Forget-me-not.—The Common A. (*A. officinalis*) grows in dry and sandy places, and by waysides, in the middle and north of Europe. It is rare and a very doubtful native in Britain. The flowers are of a deep purple color. The roots,

leaves, and flowers were formerly used in medicine as an emollient, cooling, and soothing application.—The EVERGREEN A. (*A. sempervirens*) is also a native of Europe, and a doubtful native of Britain, although not uncommon in situations to which it may have escaped from gardens, being often cultivated for the sake of its beautiful blue flowers, which appear early in the season, and for its leaves, which retain a pleasing verdure all winter. It is a plant of humble growth, rising only a few inches above the ground.—A number of other species are occasionally seen in our flower-borders.—*A. tinctoria*, to which the name A. or ALKANNA (Arab. *Al-chenneh*) more strictly belongs, is a native of the Levant and of the south of Europe, extending as far north as Hungary. The root is sold under the name of A. or Alkannaroot; it is sometimes cultivated in England; but the greater part is imported from the Levant or the south of France. It appears in commerce in pieces of the thickness of a quill or of the finger, the rind blackish externally, but internally of a beautiful dark-red color, and adhering rather loosely to the whitish heart. It contains chiefly a resinous coloring-matter, called *Alkanna Red*, *Anchusic Acid*, or *Anchusine*. The color which it yields is very beautiful, although not very durable. It is readily soluble in oils, and is therefore in very general use amongst perfumers for coloring oils, soaps, pomades, lip-salves, &c. It is extensively used for coloring spurious port-wine. It also enters into compositions for rubbing and giving color to furniture. Its solutions in oils and alcohol have almost a carmine red color, although to water it gives only a brownish hue. It combines with alkalies, forming blue solutions; with chloride of tin, it becomes of a carmine red; with acetate of lead, blue; with sulphate of iron, dark violet; with alum, purple; and with acetate of alumina, violet.—VIRGINIAN A. (*A. Virginica*) yields a similar coloring-matter, and is used in the same way.

Alkanet (*Anchusa officinalis*).

ALKA'NNA (*Al-henna*) is also a name given to a coloring-matter prepared from the leaves of *Lawsonia inermis*, and used by oriental ladies to give a red color to their nails. See HENNA.

ALKMAA'R, an old town in the province of North Holland, in the Netherlands, situated on the Helder Canal, 20 miles N.N.W. of Amsterdam, in lat. 52° 38′ N., long. 4° 43′ E. Pop. (1876) 12,245. It is well built, has very clean streets, and is intersected by broad canals. It possesses a town-house, ornamented with curious Gothic carving. The inhabitants support themselves by important manufactures of sail-cloth, sea-salt, &c., as well as by trade in grain, butter, and cheese. A. is said to export more of the last-mentioned commodity than any other town in the world; 9,000,000 lbs. annually is the quantity specified. It is the birthplace of Henry of A. See REINEKE FUCHS. Here, on October 18, 1799, the Duke of York signed a not very honorable capitulation, after his Russo-British army had been twice defeated by the French general Brune.

A'LLA BREVE. In old music, the breve ‖O‖, as the longest note, was equivalent to our semibreve, *O*, the longest note commonly used in modern music. Consequently, the minims anciently used were equivalent to our crochets. Music written with four minims in a bar is signed *Alla Breve*, which implies that the four minims must be sung as four crotchets. The difference between the two styles of writing is merely formal. Other signs for A. B. time are—$\frac{2}{2}$, 2, or C, or *Alla Capella*.

A'LLAH (compounded of the article, *al* and *ilâh*—i.e., 'the worthy to be adored') is the Arabic name of the one God, to whose worship Mohammed pledged his followers; and the word has passed into all languages wherever the name of Islam has been heard. The notions of the character of this God given by Mohammed in the Koran bear manifest traces of Jewish and Christian influence, and are much superior to the national superstitions and impassioned fancies of the orientals in general. Above all other things, Mohammed inculcated the unity of God in the strictest sense, in opposition not only to idolatry, but also in some points to the belief of the Jews and Christians, as is seen in the following formula or creed: 'There is no God but *the* God (Allah). This only true, great, and highest God has his existence of himself, is eternal, *not begotten, and begets not*, suffices for himself, fills the universe with his infinity, is the center in whom all things unite, manifest and concealed, Lord of the corporeal and spiritual worlds, creator and ruler, almighty, all-wise, all-good, merciful, and his decrees are irrevocable.' Mohammed has ventured on very bold illustrations of these attributes for popular representation, as in the passage of the Koran where he says: 'If all the trees on earth were pens, and if there were seven oceans full of ink, they would not suffice to describe the wonders of the Almighty.' The different attributes of God, divided under his ninety-nine names, and connected together in a certain order in a litany, form the rosary of the Mohammedans, which concludes with the name A., as the hundredth, including in itself all the former epithets.

A'LLAHABA'D, a British district in the Northwest Provinces of India, between lat. 24° 49′, 25° 44′; long. 81° 14′, 82° 26′. It is 85 miles in length by 50 in breadth—area, 2765 square miles. The surface of the country is in general level, with a slope towards the S.E. The principal rivers are the Ganges (flowing partly within it, and partly dividing it from Oude and Mirzapore), and its great affluent the Jumna, which joins it at the city of A. The district is well watered, and vegetation is luxuriant. The native agriculture at the end of the last century was singularly rude and deficient, but the efforts of British residents have done much for its improvement. The principal products of the district are cotton and salt; and there is a brisk transit-trade by the Jumna in cotton, indigo, and sugar. The population, in 1871, was 1,394,245, chiefly agricultural, about 100,000 being Mohammedans and others not Hindus. The four principal towns are Allahabad, Shahzadpore, Bhugeisur, and Adampore.—The Province or 'Division' of A. comprehends the districts of Cawnpore, Futtehpur, Humeerpore, and Calpee, Banda, and A. It is bounded N. by Oude and Agra, E. by Behar, S. by Gundwana, and W. by Malwa. Its length is about 270 miles; breadth, 120; area, 13,574 square miles; population, 5,466,116. It comprises one of the most populous and productive territories in India.

ALLAHABAD ('city of God'), the seat of the government of the N.W. Provinces of British India, occupies the fork of the Ganges and Jumna, lat. 25° 26′ N., long. 81° 85′ E., thus forming the lowest extremity of the extensive region, which, as lying between those natural boundaries, is distinguished as the *Doab*, or the country of *Two Rivers*—an analogous term to the *Punjab*, or the country of *Five Rivers*. The situation of A., at the confluence of the holy streams of India, besides giving the city its sacred appellation, has rendered it a much-frequented place of pilgrimage for the purposes of ablution, some of the devotees sinking themselves with weights to rise no more. In point of appearance, A. was scarcely worthy of its character and renown. With the exception of a few ancient monuments of costly, elaborate, and tasteful workmanship, the native part of the city consists of mean houses and narrow streets. As in the towns generally of India, the European quarter, on the whole, is vastly superior. Its nucleus appears to have been the native fort, which, on the east and south, rises directly from the banks of both rivers, while towards the land its artificial defences, of great strength in themselves, are not commanded from the neighborhood by any higher ground. This citadel, described by Heber as having been at one time 'a very noble castle,' has lost much of its romance by having had its lofty towers pruned down to bastions and cavaliers. The Europeans of the garrison occupy well-constructed barracks. Beyond the fort are the cantonments for the native troops. In connection with these are numerous villas and bungalows, few other spots in India boasting such handsome buildings of this kind; and these showy retreats are rendered still more attractive and agreeable by avenues of trees, which wind between them, and connect them with the fort, the city, and several of the circumjacent localities.

The summer of 1857 brought disaster to A. On the 6th of June of that year, the insurrection, which had begun at Meerut on 10th May, extended itself to A. Though the Europeans continued to hold the fort, yet the mutineers were, for some days, undisputed masters of all beyond; and between the ravages of the marauders and the fire of the garrison, the city soon became little better than a heap of blackened ruins. In the history of this fearful outbreak, A. must be 'a magic word' to every English ear, as the spot where the fiery Neill entered on his brief career of glory. It was here also that Lord Canning, after the close of the mutiny, distributed three millions sterling in presents to the chiefs who had remained loyal. But although situated thus in the heart of the outbreak, and feeling its disastrous effects, the city possesses natural advantages that have allowed it to recover. Its position at the confluence of the holy rivers, which has so long made it a center of superstitious reverence and worship, now renders it naturally a center of commerce and civilization, and has been fully appreciated by government. It commands the navigation both of the Ganges and of the Jumna. It is on the direct water-route between Calcutta and the Upper Provinces; and is a main station, not only on the Grand Trunk Road, but also on the East India Railway. New buildings, many of them possessing great architectural merits have accordingly sprung up with rapidity since 1857; the most noteworthy building being still, however, the Great Mosque and the Sultaun Khossor's Caravanserai—a fine cloistered quadrangle. The Fort is of red stone, and is approached by a very handsome gate: it contains the palace or Residency, and the Gada pillar or Club of Bhin Sen, in the Chalee Satoom Temple, which is said to

communicate with Benares by a subterranean passage, through which flows a third holy river, the Sereswati, visible only to the eye of faith. A. possesses a college, an hospital, theaters, bazaars, &c. Pop. (1872) 143,693; (1881) 150,378. So many poor pilgrims throng the city, especially at the time of the Great Fair, which is held once every twelve years, that instead of Allahabad, the natives call it 'Fakirabad,' or the City of Beggars. The cotton, sugar, and indigo produce of the fertile district of A. is brought in large quantities into the city, to be transported thence to Calcutta and elsewhere. Steamers sail to Calcutta, and barges to Delhi. A. is distant from Calcutta, by land, 496 miles; by water, 808 miles in the rainy season; by water, 985 miles in the dry season. From Delhi it is distant 386 miles; and from Bombay, by the Jubbulpore branch of the East Indian Railway, 840 miles.

ALLAMA'NDA, a genus of plants of the natural order *Apocynaceæ* (q. v.), distinguished by a 5-parted calyx without glands, a funnel-shaped corolla with its limb campanulate, and the fruit a prickly capsule. *A. cathartica*, a native of the West Indies, is a shrub with whorled or opposite oblong leaves, and large yellow flowers on many-flowered footstalks. It has violently emetic and purgative properties; but in small doses, and infusion of the leaves is esteemed a valuable cathartic medicine, especially in the cure of painter's colic. All the species are natives of the tropical parts of America.

A'LLAN, Bridge of, a beautiful village, consisting chiefly of lodging-houses, lying within the shelter of a spur of the Ochils, on the road from Sterling to Perth, from the former of which towns it is only three miles distant. It is situated on the banks of the Allan, which, like the heights behind the place, are richly wooded. It owes its prosperity partly to its mineral (saline) wells, and partly to its sheltered situation and mild climate, which render it a favorite resort of invalids, especially in spring and autumn. There are excellent hotels, and abundance of good lodgings. Pop. (1881) 3005.

ALLAN, David, a distinguished Scottish painter of domestic subjects, in which he was the forerunner of Wilkie, was born at Alloa in 1744. In 1755 he entered the academy for drawing, painting, and engraving, established in Glasgow by the celebrated printer Foulis, where he studied for seven years. The liberality of friends enabled him, in 1764, to go to Rome, where he resided for sixteen years. In 1773, he gained the gold medal given by the Academy of St. Luke for the best historical composition. The subject was the 'Origin of Painting,' the old legend of the Corinthian maid who drew her lover's profile from the shadow. This picture, the highest effort of Allan's powers, was engraved by Cunego. Of his other pictures executed at Rome, the best known are four humorous pieces illustrating the Carnival, which were engraved by Paul Sandby. In 1777, A. came to London, where he painted portraits; after a year or two, he removed to Edinburgh; and in 1786, succeeded Runciman at the head of the art academy established there by the Board of Manufactures. His works subsequent to this date were chiefly of a humorous description, and illustrative of Scottish domestic life. His illustrations of Allan Ramsay's *Gentle Shepherd* became very popular, but are of no great merit. A. died at Edinburgh in 1796. 'His merits,' says Allan Cunningham, 'are of a limited nature; he neither excelled in fine drawing nor in harmonious coloring; and grace and grandeur were beyond his reach. His genius lay in expression, especially in grave humor and open drollery.'

ALLAN, Sir William, a distinguished Scottish historical painter, was born at Edinburgh in 1782. He was educated at the High School; and having early displayed a taste for drawing, was entered as a pupil in the School of Design connected with the Royal Institution, with the intention of becoming a coach painter. Among his fellow-students and friends were David Wilkie, John Burnet, and others who afterwards rose to eminence. He subsequently studied for some time at the Royal Academy of London. Finding difficulties in the way of professional advancement in the metropolis, he determined to go abroad; and in 1805, set out for St. Petersburg, where the friendly interest of his countryman, Sir Alexander Crichton, the imperial family physician, soon procured him employment. In the Russian capital, he spent several years, diligently pursuing his professional labors, and making occasional tours to the south of Russia, the Crimea, Turkey, and Circassia, where he made numerous sketches, some of which supplied the materials of his best known works. In 1814, he returned to Edinburgh, and soon after exhibited his 'Circassian Captives,' a large picture, distinguished by the picturesqueness of the subject and the elaborate fidelity and spirit of its treatment. He had exhibited several pictures before this, but not till now was his reputation as an artist fairly established. The remuneration of his labors, however, was not so ready as the public acknowledgment of their worth. The purchase of two of his pictures by the Grand Duke Nicholas, afterwards emperor, when on a visit to Edinburgh, contributed in no small degree to promote the sale of his works. A severe attack of ophthalmia obliged him for a time to suspend his exertions. He employed his leisure in visiting Italy, Turkey, Greece, and Asia Minor. On returning home he resumed his brush, and for many years labored with great assiduity. In 1826, he was elected an Associate of the London Academy, in 1835, an Academician. In 1838, on the death of Mr. George Watson, the Royal Scottish Academy elected him as its president, and on the death of Sir David Wilkie in 1841, he was appointed Limner to Her Majesty for Scotland. He was at the same time knighted.

At intervals, he made excursions into the continent, visiting Spain and Morocco in 1834, St. Petersburg in 1841, and Germany and Belgium in 1847. At St. Petersburg, he received a commission from the emperor to paint a large picture of 'Peter the Great teaching Shipbuilding to his Subjects;' it was exhibited at London in 1845, and is now in the imperial Winter Palace. For some time before his death, he had been diligently working at a great picture of 'Bruce at Bannockburn.' He died in his painting-room, to which his bed had been removed, on the 22d of February 1850. The great merits of Sir W. A. as a painter consist in his conscientious fidelity, his skill in composition, and the dramatic force of his representations. The impulse contributed by him to historical painting, especially of national subjects, entitles him to a very high place in the history of Scottish art. Among his chief works, many of which are well-known through engravings, are—'John Knox admonishing Queen Mary,' 1823; 'Queen Mary signing her abdication,' 1824; 'Death of the Regent Moray,' 1825; 'Polish Exiles,' 1834; 'The Slave-market at Constantinople,' 1837; 'Battle of Prestonpans,' 1842; 'Waterloo,' two pictures, from the French and English positions, the first of which was bought by the Duke of Wellington.

ALLA'NTOIS, a delicate membranous bag, which makes its appearance in the eggs of birds during incubation, and is a provision chiefly for the aëration of the blood of the embryo or chick. It sprouts from the lower part of the intestine of the chick, and rapidly enlarges, so as almost completely to enclose it, lining nearly the whole extent of the *membrana putaminis*—the double membrane which is immediately within the egg-shell. It is covered with a net-work of arteries and veins, corresponding to the umbilical artery and vein of Mammalia; and the aëration of the blood is accomplished by the air which enters through the pores of the shell; but as the lungs become capable of their function, the circulation in the A. diminishes, and its footstalk contracts, and at last divides, leaving only a ligamentous remnant. The A. is never developed in the eggs of Fishes and Amphibians, hence these are called Anallantoid Vertebrates; while Reptiles, Birds, and Mammalia, in which it is present, are called Allantoid. In the Mammalia, it is superseded at an early period of fœtal life by other contrivances, but continues to exist in the lower animals for receiving the urinary secretion through the urachus, a purpose which it serves in birds and reptiles likewise. In the human species, it disappears very early, only a minute vesicle remaining.

ALLA'RD, generalissimo of the army of Lahore, and previously adjutant to Marshal Brune under Napoleon, was born in 1783. After the murder of Marshal Brune (q. v.), A. left France (1815), intending to emigrate to America; but changed his plan, entered into the service of Abbas-Mirza of Persia, and afterwards went to Lahore (1820), where he engaged in the service of Runjeet Singh (q. v.), by whom he was made generalissimo, and whose forces he organized and trained in the European modes of warfare. Having married a native of Lahore, he identified himself with the interests of his adopted country, but could not entirely forget France. The July revolution brought him back to Paris, where he was received with distinction, and was made French *chargé d'affaires* in Lahore. He presented to the Royal Library of Paris a valuable collection of coins, and returned to Lahore (1836), leaving his wife and children in Paris. In the subsequent battles of Runjeet Singh with the Afghans, A. repeatedly distinguished himself, and died at Peshawur, January 23, 1839. His remains were, according to his own wish, buried with military honors at Lahore.

ALLEGHA'NIES, a name perhaps originally limited to the mountain-cradle of the river next mentioned, but often popularly extended to the whole chain, otherwise called the Appalachians (q. v.).

ALLEGHA'NY, a river, which, rising in the north part of Pennsylvania, unites with the Monongahela at Pittsburgh to form the Ohio. Though it flows through a hilly country, yet it is navigable for nearly 200 miles above Pittsburg, whence by the Ohio and the Mississippi, the navigation extends to the Gulf of Mexico.

ALLEGHENY, a city of Pennsylvania, opposite Pittsburg, on the north bank of the Alleghany River, has besides its factories numerous and important public institutions, such as the Western Penitentiary, a Presbyterian college, a Catholic orphanage, a college for colored persons. Pop. (1870) 53,180; (1880) 78,681, nearly half being Germans.

ALLE'GIANCE (Fr. *allégeance*, from Lat. *alligo* or *ad-ligo*, to bind to, or attach). 'A.,' says Blackstone, 'is the tie or *ligamen* which binds the subject to the sovereign, in return for that protec-

tion which the sovereign affords the subject. A. is the highest legal duty of a subject, and consequently its violation, *Treason* (q. v.), is the highest legal offence. A. is of three kinds: 1 *Natural or implied A.*, which every native or naturalized citizen owes to the community to which he belongs. Independently of any express promise, every man, by availing himself of the benefits which society affords, comes under an implied obligation to defend it, and this equally whether the attack be from without or from within. In time of war, this obligation involves the duty either of bearing arms in defence of the state, or of contributing to the additional taxes and other impositions which the support of a standing army may render necessary. In peaceful times, it will be adequately fulfilled by an efficient performace of ordinary citizen duties. 2. *Express A.* is that obligation which arises from an expressed promise, or *oath of A.* The old English oath of A. corresponded in the case of the sovereign, as absolute superior of all the lands in England, to the oath of fealty which, by the feudal law, all vassals were required to take to subject superiors: 'As administered for upwards of six hundred years, it contained a promise to be true and faithful to the king and his heirs, and truth and faith to bear of life and limb and terrene honor, and not to know or hear of any ill or damage intended him, without defending him therefrom.'—Blackstone, Kerr's edition, vol. i. 368. This oath being thought to favor too much the notion of non-resistance, another form was introduced by the Convention Parliament. That in use since the passing of the new Naturalization Act in 1870 (33 Vic. c. 14), is as follows: 'I do swear that I will be faithful and bear true A. to Her Majesty Queen Victoria, her heirs and successors, according to law. So help me God.' From the reign of Queen Elizabeth down to the present time, the oath of A. has been required from all public functionaries, before entering on their offices, and by all professional persons before being permitted to practice. 3. *Local* or temporary A. is that obedience and temporary aid due by an *Alien* (q. v.) to the state or community in which he resides. Local differs from the higher kinds of A. in this, that it endures only so long as the alien resides within the Queen's dominions, whereas natural A., whether implied or expressed, is perpetual, following not only the individual himself, but his children and grandchildren. By the provisions of the act above referred to, A. may now be renounced, even by natural-born subjects, and this whether born within the realm or not, by a declaration of alienage (sect. 4), and it is forfeited by the acceptance of the allegiance of a foreign state (sect. 6). But the allegiance thus forfeited may be resumed. A natural-born British subject who has become an alien in pursuance of this act, may, on performing the same conditions as are required of an alien applying for a Certificate of Nationality (see NATURALIZATION), apply to one of Her Majesty's principal Secretaries of State for a certificate of readmission to British nationality (sect. 8). In a colony, the like powers are conferred on the Governor.

By the law of England, and agreeably to the spirit of the constitution, a usurper in undisputed possession of the crown, or king *de facto*, is entitled to A., because he then represents, not the sovereign whom he has dispossessed, but the general will in which the ultimate sovereignty of England resides. This doctrine was applied when Edward IV. recovered the crown from the House of Lancaster, and treasons committed against Henry VI. were capitally punished. The sovereign may by proclamation summon his subjects to return and take part in the defence of the kingdom, when menaced or endangered. Of this, an instance occurred in 1807, when all seamen and seafaring men who were natural-born subjects were recalled from foreign service. The option of accepting the foreign A. would now be given them, and the same legal outlet is furnished from the provisions of the otherwise unenforceable Foreign Enlistment Act (q. v.).

A'LLEGORY, as a figure of rhetoric, signifies properly, the embodiment of a train of thought in a visible form, by means of sensible images, having some resemblance or analogy to the thoughts. A., therefore, is one of the Tropes (q. v.), for it involves a transfer of meaning. It differs from metaphor chiefly in extent; metaphor is confined to a single expression, or at most to a sentence. A. is carried through the whole representation. It is not abstract ideas alone that are adapted to allegorical treatment; not only may virtue and vice, for instance, be personified and treated allegorically, but real persons may be represented by allegorical persons.

We find A. in use from the earliest ages. Oriental people are specially fond of it. As examples from antiquity may be cited, the comparison of Israel to a vine in the 80th Psalm; the beautiful passage in Plato's *Phædrus*, where the soul is compared to a charioteer drawn by two horses, one white and one black; the description of Fame in the 4th Book of the *Æneid*. Bunyan's *Pilgrim's Progress* is perhaps the most fully carried out A. of modern times. —A. is not confined to language, but is carried into painting and sculpture, and also into scenic representation—as in the ballet and pantomime; the consideration of it is, therefore, of importance in the fine arts generally.

ALLEGORICAL INTERPRETATION is that kind of interpretation by which the literal significance of a passage is either transcended or set aside, and a more spiritual and profound meaning elicited than is contained in the form or letter. The common idea is that it originated with the Alexandrine school, but this is by no means the case, as we find it employed by the older Hindus. From the scholars of Alexandria, however, it was adopted by the Jews of Palestine, a sect of whom in particular, namely, the Essenes, made abundant use of it. The apostle Paul himself allegorizes, or at least spiritually interprets the history of the free-born Isaac and the slave-born Ishmael (Gal. iv. 24). Allegorical interpretation, however, with reference to the Old Testament, was most extensively employed by Philo Judæus, a philosophical Jew of Alexandria, and a contemporary of Jesus Christ. His writings stimulated the allegorizing tendencies of the Alexandrine school of Christian theologians, the most famous of whom are Clemens Alexandrinus and Origen. The latter went so far as to say that 'the Scriptures are of little use to those who understand them as they are written.' As a specimen of his method of biblical interpretation, we may adduce the following: He maintained that the Mosaic account of the Garden of Eden was allegorical; that Paradise only symbolized a high primeval spirituality; that the fall consisted in the loss of such through spiritual and not material temptation; and that the expulsion from the Garden lay in the soul's being driven out of its region of original purity. The Neoplatonists were at first averse to allegorizing, but gradually acquired a relish for it from the Jews and Christians, and applied it to the ancient myths.

ALLE'GRO, the fourth of the five principal degrees of movement in music, implying that the piece is to performed in a quick or lively style. A., like all the other degrees of movement, is often modified by other terms, such as *A. non tanto, A. ma non troppo, A. moderato, maestoso, giusto, commodo, vivace, assai, di molto, con brio*, &c. As a substantive, A. is used as the name of a whole piece of music, or a movement of a symphony, sonata, or quartet.

A'LLEMANDE, the name of a dance invented by the French in the time of Louis XIV., and which again became popular at the Parisian theaters during the reign of the first emperor. It has a slow waltz kind of tempo, and consists of three steps (*pas marchés*) made in a sliding manner, backwards and forwards, but seldom waltzing or turning round. The whole charm of the dance lies in the graceful manner of entwining and detaching the arms in the different steps. Both the dance and the music are said to have originated in Alsace; and thus the introduction of the A. at the court of Versailles was a sort of artistic way of symbolizing the incorportion of the newly acquired German provinces.

A'LLEN, BOG OF, a general name applied to a congeries of morasses east of the Shannon, in King's County and Kildare, Ireland, comprising in all about 238,500 Eng. acres. The strips of arable land which intersect this bog are occasionally watered by rivers which have their sources in the contiguous fens such as the Barrow, Boyne, and Brosna; the Grand Canal also passes through it. The average elevation of the morasses is 250 feet above the sea-level. They approach to within 17 miles of Dublin on the east, and almost to the Shannon on the west. The depth of the peat found in them is about 25 feet.

ALLEN, JOHN, M.D., a *littérateur* of considerable talent, was born at Redford, in the parish of Colinton, near Edinburgh, in 1770. He was educated at the university of Edinburgh, where he took his degree at the age of twenty-one. Four years later, he entered the lists against Dr. Gregory in defence of Hume's speculations on liberty and necessity. In 1801, he published *An introduction to the Study of the Animal Economy*, translated from Cuvier. About a year after, along with his friends, Lord and Lady Holland, he set out on a tour through France and Spain, where he resided till 1805. On his return, he devoted himself to the discussion of political questions in the pages of the *Edinburgh Review*. He was a keen reformer, and brought to bear upon constitutional questions a wealth of research, a closeness of reasoning, and a vigor of understanding that rendered him a formidable adversary. He is said to have contributed upwards of forty articles to the *Edinburgh Review*, chiefly on British, French, Spanish, and South American politics. His most valuable work is considered to be his *Inquiry into the Rise and Growth of the Royal Prerogative in England* (1830). On one or two occasions, he held temporary political offices, and was, in addition, for some time Master of Dulwich College. He died in 1843.

A'LLENTOWN, a thriving borough of Pennsylvania, U. S., 85 miles to the east of Harrisburg, and 50 to the north of Philadelphia. It is situated on an affluent of the Lehigh, with canal and railway communication. It is within easy reach of slate, limestone, coal, and iron. Pop. in 1880, 18,063.

ALLEYN, EDWARD, a distinguished actor, the contemporary and friend of Shakspeare, was born in 1566, and died in 1626. His connection with the English stage during the period of its highest

prosperity, invests his life with interest to the student of literary history; but it is as the munificent and pious founder of Dulwich College (q. v.) that he principally claims the remembrance of posterity. The building of the college was begun in 1613, and in 1619 the institution obtained the royal charter, after some obstruction on the part of Lord Bacon, who wished the king to apply part of the grant to the foundation of two lectureships at Oxford and Cambridge. A. himself took up his quarters in the college as master, living, with his wife as a pensioner, on equal terms with the sharers of his bounty. He also founded numerous almshouses in London.

A'LLIA, a small stream which fell into the Tiber, eleven miles north of Rome. It is celebrated as the scene of the defeat of the Roman army by the Gauls under Brennus in 387, or, according to others, 390 B.C. Immediately afterwards, Rome was taken, plundered, and burnt. It is difficult to identify the A. with any of the modern streams; but the evidence seems in favor of the *Scolo del Casale*.

ALLIA'CEOUS PLANTS are those of the genus *Allium* (q. v.), or others nearly allied to it. The term is generally employed to denote not only the possession of certain botanical characters, but also of a certain smell and taste, well known by the term *alliaceous*, and of which examples are readily found in the onion, leek, garlic, and other familiar species of *Allium*, much employed for culinary purposes. These plants contain free phosphoric acid, and a sulphuretted oil, which is partly dissipated in boiling or roasting. The A. flavor is, however, found also, although in comparatively rare instances, in plants of entirely different botanical affinities—for example, in *Alliaria officinalis*, of the natural order *Cruciferæ* (see ALLIARIA) in the young shoots of *Cedrela angustifolia*, a tropical American tree of the natural order *Cedrelaceæ*, allied to mahogany; and in certain species of *Dysoxylyn* and *Hartighsea*, of the kindred order *Meliaceæ*, the fruit of which is used instead of garlic by the mountaineers of Java.

ALLI'ANCE, a compact between independent families or nations. See TREATY, HOLY ALLIANCE, TRIPLE ALLIANCE.

ALLIA'RIA, a genus of plants of the natural order *Cruciferæ* (q. v.), closely allied to *Sisymbrium* and *Erysimum*, but differing from both in having the stalks of the seeds flat and winged. The best known species is *A. officinalis* (*Erysimum A.* of Linnæus, and ranked by some botanists in the genus *Sisymbrium*), known by the popular names of Sauce-alone and Jack-by-the-Hedge. It is a native of Britain, not unfrequently found on hedge-banks and in waste places in dry rich soils, and is common in most parts of Europe. It is a biennial, with a stem 2—3 feet high; large, stalked heart-shaped leaves; white flowers, and pods much longer than their stalks, which are somewhat spreading. It is remarkable for its strong alliaceous odor, is occasionally used as a pot-herb in Britain, and very generally at least by the poorer classes, in some continental countries. It seems more deserving of cultivation than many other plants which have long received the constant care of the gardener, being wholesome, nutritious, and, to most persons, pleasant. The powdered seeds were formerly employed as a sternutatory.

Alliaria officinalis.
a, upper part of stem, with leaves and flowers; *b*, extremity of a branch, in fruit.

ALLICE, or ALLIS. See SHAD.

A'LLIER, a river in France, a tributary of the Loire, has its source in the water-shed of the east of the department of Lozère; flows with a northerly course through Haute-Loire, Puy-de-Dôme, and Allier; and after a course of more than 200 miles, falls into the Loire below the town of Nevers. It is navigable for a considerable portion of its length.

ALLIER, a department in the center of France, has an area of 2810 sq. m., and a pop. of (1881) 416,759. It is a hilly district, especially in the south, sloping down towards the river Loire in the north, and is partly woody, but generally well cultivated, producing the usual kinds of grain with wine and oil. It is also rich in minerals, especially iron, coal, antimony, manganese, and marble. There is some manufacturing industry in cotton, wool, linen, carpets, pottery, and glass; but the majority of the population is engaged in agriculture. Mineral springs are found at Vichy, Neris, and Bourbon-l'Archambault. The chief town is Moulins. Other important places are Montluçon, La Palisse, Gannat. At Chantelle-le-Chateau are the extensive ruins of King Pepin's Castle.

ALLIGA'TION, from a Latin word signifying 'to bind together,' is a rule in arithmetic which teaches to solve such questions as the following: 3 lbs. of sugar at 6*d*. are mixed with 5 lbs. at 10*d*.; what is the price of a pound of the mixture? or: In what proportion must sugar at 6*d*. be mixed with sugar at 10*d*., to produce a mixture at 8½*d*.? The solution of the first is

$$\frac{3\times 6 + 5\times 10}{3+5} = 8\tfrac{1}{2}d.$$

In the second, the proportional number for one ingredient is the difference between the price of the other and that of the mixture; the number for the cheap sugar is therefore 1½, and for the dear, 2½, which are as 3 : 5, so that there must be 3 lbs. at 6*d*. for every 5 lbs. at 10*d*. If there are more than two ingredients, the problem becomes indeterminate; that is, it admits of a variety of answers. Thus: Of three metals, whose specific gravities are 10, 15, and 16, it is required to compose an alloy, whose specific gravity shall be 14. The conditions will be answered by mixing them in any of the following proportions: 1, 2, 1; 2, 2, 3; 6, 2, 11, &c.

ALLIGA'TOR, a genus of saurian reptiles, of the family of the *Crocodilidæ*, and still regarded by some naturalists as a mere subgenus of *Crocodilus*; although it has recently been proposed to constitute a family or sub-family of *Alligatoridæ*, and to divide it into the genera *Jacare*, *Alligator*, and *Caiman*. The alligators differ from the true crocodiles in the shorter and flatter head, the existence of cavities or pits in the upper jaw, into which (and not into mere notches between the teeth, as in the crocodiles) the long fourth teeth of the under jaw are received, and the much less webbed feet. In consequence of the different manner in which provision is made in the upper jaw for the reception of the longest teeth of the lower, the head of the alligators is broader and the snout more obtuse than in the crocodiles.

Alligator.

Their habits are less perfectly aquatic; they frequent swamps and marshes, and may be seen basking on the dry ground during the day, in the heat of the sun. They are most active during the night, and then make a loud bellowing. They have great strength in their tails, with which the larger ones can easily upset a light canoe. They feed chiefly on fish, but do not object to other animal food. The females lay their eggs, 20—60 in number, in the mud, and leave them to be hatched by the heat of the sun, but keep watch over the spot, and show much affection for their young ones, many of which, however, fall a prey to the old males, and to vultures and fishes. There are several species, varying from two to twenty feet and upwards in length. Perhaps the most fierce and dangerous is that found in the southern parts of the United States, as far up the Mississippi as the Red River, *A. Lucius*. The snout is a little turned up; and its resemblance to that of a pike has led to the specific name *Lucius*. In cold weather, these animals bury themselves in the mud, and become so torpid, that they may be cut to pieces without showing signs of sensibility; but a few hours of bright sunshine are enough to revive them. Like the other species, they are so protected by their mailed plates, that they are not easily killed, except by a shot or blow over the eyes. A very strong kind of leather is prepared from the skin, which is used for making saddles. It is said that a considerable quantity of oil can be extracted from an A., which is transparent and burns well. The alligators of South America are there very often called *Caymans*, probably an Indian name, and some of them bear the name of *Yacaré*, particularly *A. sclerops*, also distinguished as the Spectacled Cayman, on account of a prominent bony rim surrounding the orbit of each eye. This species appears to be widely distributed over tropical America, and attains a great size. Alligators are not known to exist in any quarter of the world except America, in which, however, true crocodiles are also found. But among the fossils of the south of England are remains of a true *A.* (*A. Hantoniensis*) in the Hordle beds. The flesh of alligators is eaten by Indians and negroes. It has a musky flavor.—The origin of the name is uncertain, but it is supposed to be a corruption of the Portuguese *lagarto*, a lizard. Cuvier adopted it as a scientific name.

ALLIGATOR APPLE. See CUSTARD APPLE.

ALLIGATOR PEAR. See AVOCADO PEAR.

ALLITERA'TION is the frequent occurrence in a composition of words beginning with the same letter. In Old German, Anglo-Saxon, and Scandinavian poetry, A. took the place of rhyme.

This kind of verse, in its strict form, required that in the two short lines forming a couplet, three words should begin with the same letter, two in the first line or hemistich, and one in the second; as in the following couplet of Anglo-Saxon poetry:

*F*irum *f*oldan
*F*rea almihtig.—*Cædmon.*

A. has not quite disappeared from Icelandic poetry to this day. Alliterative poems continued to be written in English after it had assumed its modern form; the most remarkable is *Pierce Plowman*, a poem of the 14th c., of which the following is a specimen, the two hemistichs being written in one line:

*M*ercy hight that *m*aid, | a *m*eek thing withal,
A full *b*enign *b*urd, | and *b*uxom of speech.

Even after the introduction of rhyme, A. continued to be largely used as an embellishment of poetry, and is so, though to a less extent, to this day:

The fair *b*reeze *b*lew, the white *f*oam *f*lew,
The *f*urrow *f*ollowed *f*ree.—*Coleridge.*

Besides the Gothic, there are other nations widely separated from each other, among whom the essential distinction of verse is A.; the Finns, for instance, and the Tamuls, in the south of India.

But A. is not confined to verse; the charm that lies in it exercises great influence on human speech generally, as may be seen in many current phrases and proverbs in all languages: Ex., 'life and limb;' 'house and home,' 'wide wears, tight tears,' &c. It often constitutes part of the point and piquancy of witty writing. Among modern writers this application of A. is perhaps most felicitously exemplified by Sidney Smith, as, when in contrasting the conditions of a dignitary of the English Church and of a poor curate, he speaks of them as 'the Right Reverend Dives in the palace, and Lazarus-in-orders at the gate, *d*octored by *d*ogs and *c*omforted with *c*rumbs.'

In the early part of the 17th c., the fashion of hunting after alliterations was carried to an absurd excess; even from the pulpit, the chosen people of God were adressed as 'the chickens of the church, the sparrows of the spirit, and the sweet swallows of salvation.' *Ane New-year Gift*, or address presented to Mary Queen of Scots by the poet, Alexander Scott, concludes with a stanza running thus:

Fresh, fulgent, flourist, fragrant flower formose,
Lantern to love, of ladies lamp and lot,
Cherry maist chaste, chief carbuncle and chose, &c.

In the following piece of elaborate trifling, given (but without naming the author) in H. Southgate's *Many Thoughts on Many Things*, Alliteration is combined with Acrosticism:

A n Austrian army, awfully arrayed,
B oldly by battery besieged Belgrade;
C ossack commanders, cannonading come,
D ealing destruction's devastating doom;
E very endeavour engineers essay
F or fame, for fortune, forming furious fray.
G anntgunners grapple, giving gashes good:
H eaves high his head heroic hardihood;
I brahim, Islam, Ismael, imps in ill,
J ostle John Jarovlitz, Jem, Joe, Jack, Jill;
K ick kindling Kutusoff, kings' kinsmen kill
L abor low levels loftiest, longest lines;
M en march 'mid moles, 'mid mounds, 'mid murd'rous mines.
N ow nightfall's near, now needful nature nods,
O pposed, opposing, overcoming odds.
P oor peasants, partly purchased, partly pressed,
Q uite quaking, 'Quarter! quarter!' quickly quest.
R eason returns, recalls redundant rage,
S aves sinking soldiers, softens signiors sage.
T ruce, Turkey, truce! truce treach'rous Tartar train!
U nwise, unjust, unmerciful Ukraine.
V anish, vile vengeance! vanish, victory vain!
W isdom wails war—wails warring words. What were
X erxes, Xantippe, Ximenes, Xavier?
Y et Yassy's youth, ye yield your youthful yest.
Z ealously, zanies, zealously, zeal's zest.

A'LLIUM, a genus of plants of the natural order *Liliaceæ* (q. v.), containing a large number of species, perennial—more rarely biennial—herbaceous plants, more or less decidedly bulbous-rooted, natives chiefly of the temperate and colder regions of the northern hemisphere. The flowers are umbellate, enclosed in a spathe, and the umbel often bears also small bulbs along with its flowers. The perianth is of six spreading pieces, resembling petals, having the stamens inserted in their base. The fruit is a triangular capsule, and the seeds are angular. The leaves are generally narrow, although in some species, as *A. ursinum*, they are rather broad, and in a considerable number they are rounded and fistulose. GARLIC (q. v.), ONION (q. v.), LEEK (q. v.), SHALLOT (q. v.), CHIVE (q. v.), and ROCAMBOLE (q. v.), are species of this genus in common cultivation. The first four are cultivated in the gardens of India as well as of Europe, along with *A. tuberosum;* and the hill-people of India eat the bulbs of *A. leptophyllum*, and dry the leaves, and preserve them as a condiment. A number of other species are occasionally used in different countries—Eight or nine species are natives of Britain, of which the most common is RAMSONS (*A. ursinum*), a species with much broader leaves than most of its congeners. It is most frequently found in moist woods and hedge-banks; but occasionally in pastures, in which it proves a troublesome weed, communicating its powerful odor of garlic to the whole dairy produce. Crow Garlic (*A. vineale*), another British species, is sometimes very troublesome in the same way, in drier pastures. Both are perennial, and to get rid of them, their bulbs must be perseveringly rooted out, when the leaves begin to appear in spring.

A'LLOA, a seaport town in Clackmannanshire, Scotland, is situated on the left bank of the Forth, where the river widens into its estuary, 7 miles (by road) below Stirling. Population in 1881, 10,601. It is a town of considerable antiquity, and is an active center of trade and manufactures. The principle articles manufactured are whisky and ale, the latter of which is highly esteemed. There are extensive glass, iron, and brick works, and ship-building yards. Copper utensils, shawls, and blankets, leather, tobacco, and snuff are manufactured to a considerable extent; and a large quantity of coal is regularly exported from the pits in the immediate neighborhood of the town. The latter forms one of the chief items in the coasting trade, besides which there is a considerable foreign trade, chiefly outwards. The 1087 vessels that entered the port in 1880 had a tonnage of 140,719 tons. The harbor is good, with 16 feet of water at neap, and 22 at spring tides; it is furnished with a dry-dock. There is a steam-boat ferry across the Forth, connecting the town by a short junction line with the Scottish Central Railway. It is also connected with that line, and with the Edinburgh and Northern Railway, by the Stirling and Dunfermline branch. There is regular steam-communication by the river with Edinburgh and Stirling. In the neighborhood is Alloa Tower, 89 feet high, supposed to have been built in the 13th c., once the residence of the Erskines, and at different times of Scottish princes.

ALLOCU'TION, which simply means an 'address,' is applied, in the language of the Vatican, to denote especially the address delivered by the pope at the College of Cardinals on any ecclesiastical or political circumstance. It may be considered as corresponding in some measure to the official explanations which constitutional ministers give when questions are asked in parliament, or to the political messages of the French emperor. The court of Rome makes abundant use of this method of address, when it desires to guard a principle which it is compelled to give up in a particular case, or to reserve a claim for the future which has no chance of recognition in the present.

ALLO'DIUM, or ALLODIAL TENURE (in Law), is the free and absolute right of property in land, independent of any burden of homage or fidelity to a superior. When the principal landholders of England submitted to the yoke of military tenure, and surrendered their lands into the hands of the Conqueror at the council of Sarum, feudality, the previous existence or non-existence of which has been a subject of much discussion, was formally recognized, and it henceforth became a fundamental maxim in the law of real property, that 'the king is the universal lord and original proprietor of all the lands in his kingdom, and that no man doth or can possess any part of it, but what has mediately or immediately been derived as a gift from him, to be held upon feudal services' (Blackstone, vol. ii. p. 51, Kerr's edition). This maxim, though, as Blackstone remarks, it was even at first little more than a fiction, was not peculiar to England, but prevailed wherever the feudal system obtained, and still forms what may be called the starting-point in all feudal tenures of land. Even where subinfeudations have prevailed to the greatest extent, every title is traceable, in the last instance, to the paramount and universal superiority of the crown. See FEUDAL SYSTEM. The surrender of lands in England being the result of political measures, was one universal national act, and, consequently, allodial tenures at once ceased to exist; but in many other countries it was accomplished by private arrangements between the allodial proprietors and the prince, the former being anxious to exchange their nominal independence for the greater security enjoyed by the vassals of the sovereign, the latter being willing to receive them as dependents, for the sake either of their personal services in war, or latterly, for the equivalents of these services in money or the produce of the lands. In such countries, feudality, though general, was not universal; and allodial tenures consequently continued to subsist alongside of those originating with the crown. In this position was Denmark, and it is curious that the only examples of allodial tenures to be met with in Great Britain are the Udal rights in the islands of Orkney and Shetland, which formerly belonged to that country. 'When these islands,' says Mr. Erskine, 'were first transferred from the crown of Denmark to that of Scotland, the right of their lands was held by natural possession, and might be proved by witnesses, without any title in writing, which had probably been their law formerly while they were subject to

Denmark; and to this day, the lands, the proprietors of which have never applied to the sovereign, or those deriving right from him, for charters, are enjoyed in this manner.' By the law of Scotland, all property and superiorities belonging to the crown itself, and all churches, churchyards, manses and glebes, the right to which does not flow from the crown, are regarded as allodial; and the term in a wider sense, as opposed to *feudal* generally, is sometimes used with reference to movable property.

The etymology of the word A. has been much discussed, and numerous absurd derivations have been proposed. But *allodium* is doubtless 'Merovingian Latin,' appearing in French as *alleu*, which Brachet derives from *ald*, said to be an old High-German word for free ownership. Skeat, following Cleasby and Vigfusson, traces it to the old Norse, *alda-odal*, a property of ages, or held for ages. This compound again comes from *aldr*, old age (akin to English *eld*) and *odal*, a patrimony (akin to the Anglo-Saxon *ædele*, noble). *Ald'odal*, contracted to *allodal*, would give rise to low Latin *allodialis*, from which the substantive is most probably derived.

ALLO'PATHY. See HOMŒOPATHY.

ALLO'TMENT OF LAND, although not a technical, is a well-understood expression in the law of England; and under the General Enclosure Act (41 Geo. III. c. 109), is used to denote the kind of conveyance or distribution directed to be made to the person or persons who at the time of the division and enclosure shall have the actual possession of the lands, tenements, or hereditaments, in lieu of, or in right of which the allottment is made, but without prejudice to any question of title. By the ancient Statute of Merton (20 Henry III. c. 4), the lord of the manor, or any other owner of a common, may enclose so much of the waste as he pleases for tillage or wood-ground, provided sufficient is left for other parties entitled to the use of the same. This right to enclose common fields and waste lands has in modern times been very generally extended throughout England by means of local acts of parliament, a number of the regulations of which have been consolidated by the act above referred to, by section 7 of which commissioners are appointed to make the allotment.

Generally speaking, this term, as a legal word, may be considered as signifying the grant or allowance of a portion of land too inconsiderable to be made the subject of a formal conveyance; and in this sense it has been used to denote the system or species of agricultural holding which prevailed to some extent in England towards the close of the last century, but which was not in common use throughout the country till 1830, when the agricultural laborers in many counties—owing to the use of thrashing-machines and other improvements, which they dreaded would lower their wages—rose in insurrection against their employers. To meet this danger, the A. system was resorted to, and different societies were established for its promotion; and by the comparative contentment and comfort it produced, it may be considered to have been successful in its object. It has been stated to have diminished crime among the peasantry, and generally to have improved and elevated their character, By the form of agreement usually signed by A. tenants, the use of the spade in the cultivation of land is insisted upon, and the plough prohibited, and there are other conditions of the occupancy more or less capricious. The A. may be forfeited for non-payment of the rent, the tenant's misconduct or crime, or wilful neglect of his land; but it has been thought unadvisable to exclude any one from enjoying an A. on account of his previous bad character, as, from the nature of the industrious occupation which the A. necessitates, there is the chance of his reclaiming his character. See SPADE HUSBANDRY.

ALLOTROPY is the term applied in chemistry to the existence of the same element in various forms, each of which, though containing no extraneous substance, possesses different properties from the others. The various conditions in which a single element can be obtained are known as its allotropic modifications, and though as yet only a few elementary substances have been observed to exhibit such modifications, yet it is generally believed that every element is capable of existing in several allotropic forms. Phosphorus affords an excellent illustration of this doctrine. In ordinary circumstances, and when freshly prepared, phosphorus is a pale, yellow solid, of the consistence and aspect of wax, and to some extent flexible and translucent. It requires to be placed in a vessel with water to keep it from taking fire spontaneously. At any ordinary natural temperature it appears luminous, and evolves an alliaceous odor when exposed to air, owing to a slow process of combustion taking place; and when warmed to 140° F., it bursts into flame, and burns vividly. Common phosphorus is soluble in alcohol, ether, the fixed and volatile oils, and especially in bisulphuret of carbon, 100 parts of which, when warm, dissolve 20 parts of phosphorus. But the same element, when dried and kept for some days, with little or no access of air, at a temperature ranging from 446° to 482° F., passes, weight for weight—without addition or subtraction of matter—into a reddish substance, which is known to chemists as *amorphous* phosphorus. The color of this new variety is scarlet, brownish red, or even blackish red; and it exists as a powder or cake, which does not evolve any odor, or readily take fire, and therefore needs not to be preserved under water. When heated to 140°, and even to a temperature a little short of 482°, it refuses to burn; and, in fact, it is questionable if phosphorus in this condition will take fire at all; though at 482°, and above, the red variety passes back again to the ordinary or yellow phosphorus, and then bursts into flame. Moreover, amorphous phosphorus is insoluble in alcohol, ether, the fixed and volatile oils, and even in bisulphuret of carbon. Probably the most striking difference between these two forms of the same substance is, that ordinary phosphorus is a deadly poison, as is too often evidenced in the death of children from sucking the ends of lucifer-matches; whilst the red or amorphous phosphorus is not known to be poisonous at all.—Besides the two varieties already mentioned, and which are best known, there are *black phosphorus*, *white phosphorus*, and *scaly phosphorus*. The only manner of accounting for the difference of properties evinced by ordinary and red phosphorus, is to refer the change to an absorption of heat during the passage of the ordinary into the red variety. It is an observed fact that such absorption or disappearance of heat does then take place; whilst, when the red phosphorus is heated till it passes back to the ordinary kind, a very rapid disengagement of heat occurs.

Sulphur furnishes another example of A. In the ordinary condition of roll-sulphur, it is a pale yellow, brittle, crystalline solid; insipid to taste, odorless when cold, and evolving a peculiar odor when heated or rubbed. It dissolves in small quantity in turpentine and the fixed oils, and to the extent of 35 per cent. in bisulphuret of carbon. When common sulphur is heated to 232°, it fuses, and forms a thin, yellow, limpid liquid like olive-oil; at 480°, it passes into a thick, dark-brown, viscid liquid, resembling in consistence ordinary treacle; and if, at this stage, it be poured into water, the sulphur forms itself into a thread-like mass or network, possessing great elasticity, like india-rubber, not at all brittle, and so soft that it can be moulded by the fingers into casts and seals. Again, this elastic form of sulphur is not soluble in turpentine and the fixed oils, or even in bisulphuret of carbon. There are also other allotropic forms of sulphur.

Oxygen may be taken as a third illustration of the same doctrine. In the ordinary form in which oxygen exists in the atmosphere and elsewhere, it is a gas with no odor, no bleaching properties, and no disinfectant powers. To a certain extent, it oxidizes metals, &c.; but comparatively, it may be regarded as a feeble oxidizing agent. By several processes—namely, the introduction of a heated glass rod into a jar containing ordinary air and a little ether; or the presence of clean-scraped sticks of phosphorus in a glass vessel with a confined portion of air; or the passage of electric discharges through or round a glass tube or bottle with air—the oxygen of the atmospheric air is transformed into an allotropic form called *ozone*. In the latter condition, oxygen possesses a very strong and peculiar odor, long known as the electric odor; has great bleaching powers, and is regarded as the agent in the air which bleaches clothes on the household bleaching-green; and possesses such powerful disinfecting properties, that tainted meat introduced into ozonized air, has the disagreeable odor destroyed, and smells fresh when taken out. Ozone is doubtless the great natural agent which removes many deleterious gases and vapors, and destroys infectious matter floating in or diffused through the air. See OZONE.

ALLOW'ANCES, OFFICERS'. In the British army—and to various degrees in the armies of other countries—military officers, besides their recognized pay, receive certain A. for special duties, or when placed under exceptional circumstances. Without detailing the actual amount of these A., it may be well to enumerate the principal modes in which they arise. An officer commanding and paying a troop or company, receives a contingent allowance as an indemnification for the expense of repairing arms, swords, and scabbards; for burials; and for the debts of soldiers who become non-effective. A kind of general average is struck for the probable amount of these charges. An officer on duty in the United Kingdom, in a situation entitling him to be lodged at the public expense, and whose lodging is not otherwise paid for by the public, receives an allowance as 'lodging-money,' varying in amount according to his rank. An officer marching with troops in the United Kingdom, on a route determined by competent authority, if unable to mess with his regiment or detachment on a particular day, receives an allowance in compensation. An officer sent on permanent or temporary duty from one place to another, receives a traveling allowance of so much per mile. An officer serving on a court-martial receives an allowance at so much per day, besides a traveling allowance if the place be distant. An officer temporarily detached on duty, where he cannot join his regimental mess, has an allowance for mess-money. Besides those here enumerated, there are A. for detention at ports of embarkation, &c., and others of a minor kind.

A. or extra payments to private soldiers and non-commissioned officers, will be noticed under PAY PENSION, &c.—The daily food

served out at the public expense, which is called a *ration* by soldiers, is more usually known to sailors as an *allowance*. See RATION.

A'LLOWAY KIRK, an old ruined church in the parish of Ayr, near the mouth of the Doon, celebrated in Burns's *Tam o' Shanter*. At very short distances from it are the cottage in which the poet was born, the monument erected to his memory in 1823, and 'the Auld Brig o' Doon,' over which Tam o' Shanter made his escape.

ALLOY' (in Chemistry) is a mixture of two or more metals, either natural, or produced artificially by melting them together. The A., or mixture, has often different properties from the component metals, and bears a distinct name. Thus bell-metal is an A. of copper and tin; tombak, of copper and zinc; brass, of copper, with a larger proportion of zinc, &c. Alloys are generally harder than the metals that compose them, and this is the motive for alloying the precious metals. Both gold and silver, when pure, are very soft, and easily worn away by use; and therefore, a certain proportion of copper is added, to give these metals the requisite hardness. In this case the word 'alloy' signifies the inferior metal added, and not the mixture. For coin, the proportion of copper to be added is fixed by law (see the following article), and differs in different states. It has been found by experiment that $\frac{1}{12}$ of A. gives the greatest durability. This is exactly the proportion in British gold coin, a pound troy of the metal containing 11 parts gold and 1 part copper. The A. in our silver coin is somewhat less, being 18 dwt. in the pound instead of 20 dwt. For convenience in reckoning, the standard of the coinage in France, and other countries that adopt its monetary system, as well as in the United States, is made $\frac{9}{10}$ pure metal and $\frac{1}{10}$ A., usually stated 900 (in 1000) parts fine. Our gold and silver standards similarly stated would be 917 and 925 respectively. Gold is sometimes alloyed with silver, or with a mixture of silver and copper. The color of gold and silver is affected by the nature and amount of the A. A strong A. of copper makes gold red; of silver, green; and a still stronger of silver, a bright yellow. A compound of mercury with another metal is an *Amalgam* (q. v.).

Alloys seldom possess the density which theory or calculation from the specific gravity of their constituents would indicate. Thus many alloys possess a greater density than the mean density of their constituents, while others have a less density. The increase in density of the A. indicates that the metals have contracted; in other words, that the metallic molecules have approached each other more closely; whilst the decrease in density denotes a separation of the molecules to greater distances from each other.

ALLOYS which exhibit a greater density than the mean density of the metals composing them.		ALLOYS which possess a less density than the mean density of the metals composing them	
Gold	and Zinc.	Gold	and Silver.
"	" Tin	"	" Iron.
"	" Bismuth.	"	" Lead.
"	" Antimony.	"	" Copper.
"	" Cobalt.	"	" Iridium.
Silver	" Zinc.	"	" Nickel.
"	" Tin.	Silver	" Copper.
"	" Bismuth.	Iron	" Bismuth.
"	" Antimony.	"	" Antimony.
Copper	" Zinc.	"	" Lead.
"	" Tin.	Tin	" Lead.
"	" Palladium.	"	" Palladium.
"	" Bismuth.	"	" Antimony.
Lead	" Antimony.	Nickel	" Silver.
Platinum	and Molybdenum.	Zinc	" Antimony.
Palladium	" Bismuth.		

The strength or cohesion of an A. is generally greater than that of the mean cohesion of the metals contained therein, or even of that of the most cohesive of its constituents. Thus, the breaking weight of a bar of copper or tin (meaning the longitudinal strain it can bear) is very much lower than the breaking weight of a bar composed of an A. of tin and copper. The following tables represent the

COHESION OF METALS.

	Bar, one inch square, breaks with lbs.
Barbary Copper,	22,570
Japan "	20,272
English Block Tin,	6,650
" " "	5,322
Banca Tin,	3,679
Malacca Tin,	3,211
Bismuth,	3,008
Zinc,	2,689
Antimony,	1,060
Lead,	885

When any two of the above metals combine together, they generally—though not always—yield an A. which is much stronger than we should expect; thus the

COHESION OF ALLOYS.

	Bar, one inch square yields with lbs.
10 parts of Copper and 1 part of Tin,	32,093
8 " " 1 " "	36,088
6 " " 1 " "	44,071
4 " " 1 " "	35,739
2 " " 1 " "	1,017
1 " " 1 " "	725
4 " English Tin and 1 " Lead,	10,607
4 " Banca " " 1 " Antimony,	13,480
4 " " " " 1 " Bismuth,	16,692
4 " English Tin " 1 " Zinc,	10,258
4 " " " " 1 " Antimony,	11,323

The power of conducting electrical currents is not so great in an A. as the mean conducting-power of its components.

The composition of the more commonly occurring and commercially important alloys, is as follows: Plumber's solder, 1 tin and 2 lead; soft solder, 2 tin and 1 lead; common pewter, 4 tin and 1 lead; gun-metal, 9 copper and 1 tin; bronze, 9 copper and 1 tin and zinc; cymbals and Chinese gongs, 4 copper and 1 tin, bell-metal, 3 copper and 1 tin; speculum metal, 2 copper and 1 tin; pot-metal or cock-metal, 2 copper and 1 lead; gilding-metal, 16 copper and 1 to 1½ zinc; Mannheim gold—pinchbeck or bath-metal, 16 copper and 4 zinc; Bristol brass, for soldering 16 copper and 6 zinc; ordinary brass, for casting, 16 copper and 8 zinc; Muntz sheathing-metal, 16 copper and 10⅔ zinc; spelter solder for copper and iron, 16 copper and 12 zinc; spelter solder, for brass-work, 16 copper and 16 zinc; Mosaic gold, 16 copper and 16½ zinc; hardest silver solder, 4 silver and 1 copper; hard silver solder, 3 silver and 1 copper; soft silver solder, 2 silver and 1 copper; German silver, 100 copper, 60 zinc, and 40 nickel; type-metal, ordinary, 15 lead, 4 antimony, and 1 tin, or 14 lead, 5 antimony, and 1 tin—small types, 4 lead and 1 antimony—large types, 6 lead and 1 antimony; stereotype metal, 48 lead, 6 antimony and 1 tin; Britannia metal, 50 tin, 4 antimony, 4 bismuth, and 1 copper.

ALLOY, or ALLAY (in law), the term used to denote the base metal mixed with gold and silver in the coinage of the realm. The gold and silver to be converted into sovereigns, half sovereigns, shillings, and the other current silver coins, must be of the true standard, or of *sterling* quality, as it is called; and by the statute 25 Edward III. c. 13, all the coin of the kingdom must be made of such sterling metal. By the 56 Geo. III. c. 68, gold coin—with certain exceptions recited in the act—is declared to be the only legal tender for payments, and that such gold coin shall be of the weight and fineness prescribed by the indenture with the Master of the Mint; and according to the standard thus indicated, the pound troy of gold, consisting of twenty-two carats—or twenty-fourth parts—fine, and two of A., is divided into forty-four guineas and a half, of the present value of twenty-one shillings each. In the case of silver, the pound troy is declared by the same act—extended by a recent statute, the 12 and 13 Vic. c. 41—to consist of eleven ounces two pennyweights of fine silver, and eighteen pennyweights of A., and in weight to be divided into sixty-six shillings. The regulation of the coinage forms part of the prerogative of the crown, although parliament also exercises a control over it; indeed, since the Revolution, the coinage has been chiefly regulated by the authority of parliament. See COINAGE and MINT.

ALL-SAINTS' BAY, in the province of Bahia, Brazil, in 12°—13° S. lat., and 38°—39° W. long. It forms a superb natural harbor, in which the navies of the whole world might anchor. Its length from N. to S. is 37 miles; its breadth from E. to W. 27. It contains several islands, the largest of which, Itaparica, is 18 miles long, and 3 broad. The entrance to the bay is easy. The town of Bahia (q. v.) lies just within it, on the right hand.

ALL-SAINTS' DAY, in old English, All-Hallows, All-Hallowmas, or simply Hallowmas, a festival of the Roman Catholic Church, introduced because of the impossibility of keeping a separate day for every saint. As early as the 4th c., on the cessation of the persecution of the Christians, the Sunday after Easter was appointed by the Greek Church for commemorating the martyrs generally; and in the Church of Rome a similar festival was introduced about 610 A. D., when the old heathen Pantheon (the present Rotonda, or Santa Maria dei Martiri) was consecrated, on the 13th of March, to Mary and all the Martyrs. But the real festival of All Saints was first regularly instituted by Gregory IV., in 835, and appointed to be celebrated on the 1st November. It was admitted into England about 870. The choice to the day was doubtless determined by the fact, that November 1, or rather the *eve* or night preceding it, was one of the four great festivals (1st February, 1st May, 1st August, and 1st November) of the heathen nations of the north; for it was the policy of the church to supplant heathen by Christian observances. See BELTANE and HALLOW-EVE.

ALL SOULS' COLLEGE, Oxford, was founded in 1437 by Henry Chichele, sometimes Fellow of New College, and successively Bishop of St. Davids and Archbishop of Canterbury, for a warden, 40 fellows, 2 chaplains, and clerks. However, by an ordinance framed by the commissioners appointed under the statute 17 and 18 Vict. c. 81, ten of the fellowships have been suppressed in order to the endowment of two professorships, to be called 'the Chichele Professorship of International Law and Diplomacy,' and 'the Chichele Professorship of Modern History.' The remaining fellowships are open to all, irrespective of birth (date or place), position, or profession, provided only the candidates have passed all the examinations required for B. A., and have obtained either some prize or scholarship open to general competition, or a 'first-class' place in one of the public examinations of the university. The candidates also must be examined in Jurisprudence and Modern History. The patronage includes 19 benefices, situated in Kent, Oxford, Essex, Gloucester, Berks, Bucks, Herts, Northampton, Salop, Surrey, and Wilts, of an annual value of £7925. In 1882, this college had 110 members on its books.

ALL-SOULS'-DAY, a festival of the Roman Catholic Church, which falls on the 2d of November. The object of it is, by prayers and almsgiving to alleviate the sufferings of the souls in purgatory. It was first instituted in the monastery of Clugny, 993, and the following is the account given of the circumstance in which it originated: A pilgrim returning from the Holy Land, was compelled by a storm to land on a rocky island somewhere between Sicily and Thessalonica. Here he found a hermit, who told him that among the cliffs of the island was situated the opening into the under world, through which huge flames ascended, and the groans and cries of souls tormented by evil angels were audible. The hermit had also frequently heard the complaints and imprecations of the devils, at the number of souls that were torn from them by the prayers and alms of the pious; they were especially enraged, he said, against the Abbot and monks of Clugny. The pilgrim on his arrival acquainted Odilo, Abbot of Clugny, with what had come to his knowledge, and the abbot thereupon appointed the day after All Saints to be kept in his monastery as an annual festival for 'All Souls.' The observance was quickly adopted by the whole Catholic world. By another account, the scene of the incident is transferred to Sicily, and the institution to the year 998.

In some parts of the west of England it is still 'the custom for the village children to go round to all their neighbors *souling*, as they call it—collecting small contributions, and singing the following verses, taken down from two of the children themselves:

> Soul! soul! for a soul-cake;
> Pray, good mistress, for a soul-cake.
> One for Peter, two for Paul,
> Three for Them who made us all.
>
> Soul! soul! for an apple or two;
> If you've got no apples, pears will do.
> Up with your kettle, and down with your pan;
> Give me a good big one, and I'll be gone.

The soul-cake referred to in the verses is a sort of bun, which, until lately, it was an almost general custom for people to make, and to give to one another on the 2d of November.'—*Notes and Queries*, First Series, vol. 4.

A'LLSPICE, a name frequently given to the kind of spice called PIMENTA (q. v.) or Jamaica pepper, the fruit of *Eugenia pimenta* and *E. acris*. The name originated in its being supposed to combine the flavor of different spices, particularly cinnamon, nutmeg, and cloves.—The name CAROLINA A., or AMERICAN A., is given to the aromatic bark of *Calycanthus floridus* (see CALYCANTHUS), which is employed in the U. S. as a substitute for cinnamon.—The berries of *Benzoin odoriferum*, natural order *Lauraceæ*, are said to have been used for A. in the same country during the war with Great Britain.

ALLSTON, WASHINGTON, one of the best known of the painters and poets of America, was born at Georgetown, South Carolina, in 1779. He at first prosecuted the study of medicine, but was afterwards induced, by his acquaintance with the painter Malbone, to devote himself to art. When he had completed his studies in America, he went to London, where he became a friend of his countryman West, who was at that time president of the Academy. In the year 1804, he proceeded to Rome, where he lived for some years in the closest intimacy with J. Vanderlyn, Thorwaldsen, and Coleridge. After a short stay in America, to which he returned in 1809, he once more visited England in 1811, when he gained the 200-guinea prize of the British Institution. In 1817 he went to Paris with Leslie, and the year after returned to America. In 1819, he was elected an Associate of the Royal Academy of London. He now permanently fixed his residence at Cambridge Port, near Boston, where he lived, cultivating his art, and the muses, till his death on the 8th of July 1843. His pictures are very numerous. The subjects of them are mostly taken from Scripture, such as, Jacob's Dream, Elijah in the Wilderness, Saul and the Witch of Endor, the Deliverance of Peter out of Prison, &c. The style of A. is noble, his ideas are imaginative, and many of his paintings evince a true poetic spirit. In coloring he comes nearer the old masters than most modern painters do. Among his printed works the most remarkable is the poem, *The Sylphs of the Seasons* (London, 1813), and the art-novel, *Monaldi* (Boston, 1842). His *Lectures on Art* appeared posthumously (1850).

ALLU'VION. This is a legal term, signifying land gained from the sea by the washing up of sand and earth so as to make it *terra firma*. The right of property thus arising is regulated as follows in the laws of England and Scotland: By the law of England, if the addition to the soil thus made be by little and little, by small and imperceptible degrees, it goes to the owner of the land immediately behind; but if the A. be a sudden and considerable acquisition from the shore, the ground acquired shall belong to the crown. Where, however, the crown may have made a grant to a subject *cum littore maris*—that is, the space between the high and low water marks—it would seem that a sudden or considerable increase of lands by A. within these limits must belong to the grantee. In the Scotch law, again, if the A. is made insensibly, it is said to 'accresce' to, or become the property of the owner of the ground to which the addition is made; but if it be caused by a violent flood, or by any convulsion of nature, the ground so added to the soil does not belong to the owner of the latter, but remains the property of the person of whose land it originally formed part. The Scotch law does not recognize such right in the crown on this subject as is allowed by the law of England. In Scotland, the shore is not considered to be the property of the sovereign; but it is presumed to be granted as a part and pertinent of the adjacent land, under the burden of the crown's right as trustee for the public uses, of which navigation and fishing are the chief.

ALLU'VIUM, a term originally applied to those deposits which were supposed to have been formed subsequently to the Flood, while Diluvium (q. v.) included its products. In modern geological classification, these two terms, in this sense, have been abolished, as their connection with the Deluge is denied. The diluvial and alluvial deposits are included under the Pleistocene formation (q. v.). The name is now given to those deposits of mud, soil, sand, gravel, &c., which are brought down by streams and rivers and spread over lower lands. See DELTA; DENUDATION.

ALLYGU'RH, a fort in the district of the same name in India. Lat. 27° 56′ N., long. 78° 8′ E. It lies on the route between Agra and Delhi, being 55 miles from the former, and 74 from the latter. Partly to this commanding situation, and partly to the strength derived from its surrounding marshes, it owes any importance that it possesses. It was stormed by the British in 1803, being then the principal dépôt of the French party in the Doab—an exploit of sufficient consequence to be commemorated by a medal in 1851. But within six years after 1851, A. became the arena of a still more desperate struggle. Ten days after the outbreak at Meerut, the native troops in garrison mutinied. Fortunately, the Europeans escaped with comparatively little sacrifice of life. But the temporary loss of the place almost cut off the communications between the south-east and the north-west.—The district of A. (or *Aligarh*), in the N.W. Provinces, has an area of 1964 sq. m.; pop. (1872) 1,073,333.

A'LLYL (Lat. *allium*, garlic) is an organic radical, represented when in combination by C_3H_5, and when in the free state by $C_{12}H_{10}$. The first compound discovered was iodide of allyl, which was obtained by Berthelot and De Luca in 1854; two years later, they isolated allyl; and shortly afterwards, Wertheim demonstrated its existence in the oils of mustard and garlic. Its properties, and those of some of its most important compounds, are described in the article GARLIC, OIL OF.

A'LMA, a river in the Crimea, rising at the foot of the Tchadir Dagh, and flowing westward into the Bay of Kalamita, about halfway between Eupatoria and Sebastopol. On the steep banks of this stream, through the channel of which the British troops waded amidst a shower of bullets, a brilliant victory was won on the 20th of September, 1854, by the allied armies of Britain and France, under Lord Raglan and Marshal St. Arnaud, over the Russian army commanded by Prince Menschikoff.

A'LMACK'S. A suite of assembly-rooms in King Street, St. James's. They were built in 1765 by Almack, a tavern-keeper, and were hence called Almack's Rooms;* they are now generally called Willis's Rooms, from the name of the present proprietor. The name of A. is chiefly associated with the balls that have, since the opening of the rooms, been held there under the management of a committee of ladies of high rank; and has become synony-

* Almack, it is said, was originally a poor Scottish Highlander, named M'Call. As a preparatory step to rising into importance in London, he inverted the syllables of his name.

mous with aristocratic exclusiveness. The handsome rooms are also much used for dinners and concerts, as well as balls.

ALMA'DA, a town of Portugal, in the province of Estremadura, on the south bank of the Tagus, opposite to Lisbon, and distant from it less than two miles. There is frequent steam-communication with Lisbon. A. is built upon a height, from the summit of which, above the town, there is a magnificent view of Lisbon and the Tagus. A. has a strong castle on a rock. The surrounding country is well cultivated. A. has long been celebrated for its figs. Near it is the gold mine of Adissa. Pop. 5500.

ALMADE'N, or ALMADEN DEL AZOGUE, a town in Spain, 50 miles S.W. of Ciudad Real, is the *Cisapona Cetobrix* of the Romans, and is situated in the chain of the Sierra Morena. Pop. 8000. It is famous for its exceedingly rich quicksilver mines, producing annually about 1,500,000 lbs. These mines were worked by the ancient Iberians; afterwards by the Romans. They were rented by the Fuggers of Augsburg in the 16th c., but were taken under the care of the Spanish government in 1645. Some years since, the firm of Rothschild undertook the working of these mines. There is a school of mines in the place.

A'LMAGEST, the name given by the Arabs to the great work of Ptolemy the astronomer (q. v.).

ALMA'GRO, a town of New Castile, Spain, in the province of Ciudad Real, and 13 miles east-south-east from Ciudad Real. It is situated in a high arid plain, but is very well built, with wide paved streets, a fine square, and a public walk lined with trees. Its most noteworthy building is an old church of beautiful architecture. It is a place of greater activity than most Spanish towns, and its whole appearance indicates prosperity. Brandy, soap, and earthenware are manufactured, and lace-making gives employment to about 8000 women in A. and the neighboring villages. The surrounding country is celebrated for its mules. There are two great annual fairs, at which mules and lace are sold. Pop. (1877) 8628.

ALMAGRO, Diego d', a Spanish *conquistador*—i.e., adventurer—in the conquest of South America, was born in 1475. He was a foundling, and derived his name from the town in the vicinity of which he was found. Along with many other adventurers, he went, as was common in those days, to seek his fortune in the new world which Columbus had opened up. There he amassed considerable wealth by plunder, and became one of the most influential persons in the new colony of Darien, when he was persuaded to join Pizarro in his attack on Peru. The undertaking was crowned with astonishing success. He was now appointed, in the absence of Pizarro, who had returned to Spain with rich presents, governor of the conquered country, and received permission from the Spanish court to conquer for himself a special province south of the territory subdued by Pizarro. In 1534, therefore, he marched on Chili, penetrated deeply into the land, and returned in 1536, just when the Peruvians had flown to arms under their young Inca, Mungo Capac, and shut up the Spaniards in Cuzco and Lima. As these towns lay south of Pizarro's district, they were claimed by A. He dispersed the Peruvian army before Cuzco, and advanced with his forces against Lima, hoping to make himself sole master of the country. But the crafty Pizarro contrived, by means of a truce, to gain time for collecting his forces. On the 6th of April 1538, a desperate engagement took place near Cuzco, in which A. was defeated and taken prisoner. He was condemned to death; and on the 26th of the same month, he was strangled in prison, and his corpse beheaded in the market-place of Cuzco. His son, Diego d'A., gathering together several hundreds of his fathers followers, stormed the palace of Pizarro, whom he assassinated (1541); he then proclaimed himself captain-general of Peru; but the friends of the murdered governor resisting his claims, Baca de Castro was sent out from Spain, as supreme arbiter, to quell all disturbances. Diego was now requested to submit; and on his refusing, was attacked by the troops of Baca, when the bloodiest battle took place that had ever been known in America (1542). Diego, having been defeated and taken prisoner, was executed along with forty of his companions.

ALMALEE', or ALMALI', a large town of Asiatic Turkey, in the vilayet of Konia. It is situated on the river Myra, about 25 miles from the sea, and is much frequented by European merchants from Smyrna, &c., who purchase the various products of the place. A. has numerous mills propelled by water, tan-yards, dye-works, and factories. The inhabitants are very industrious, and everywhere may be seen indications of their prosperity—in the clean and comfortable houses, neat apparel, excellent roads, fences, bridges, &c. A. is built in a picturesque valley at the edge of a large plateau, 5000 feet above the sea, and is embosomed in gardens, which, together with the minarets and lofty poplars interspersed through the town, give it a striking appearance. Pop. said to be 12,000.

A'LMA MA'TER (Lat. nourishing mother) is a name given to a university in relation to those who have studied at it, to distinguish it from inferior schools of learning. The word *Alma* (nourishing, sustaining, or kind) was applied by the Latin authors to such of the deities as were friendly to men—Ceres, Venus, &c, and also to the earth, the light, the day, wine, and the soil.

A'LMANAC, from the Arabic article *al*, and *manah*, to count, a word received by the European nations from the east, denoting a book or table containing a calendar of the civil divisions of the year, and other useful or entertaining information. Till a comparatively modern date, this additional matter consisted of astrological predictions and other analogous absurdities; it now embraces, in the best almanacs, a wide variety of useful notes and information, chronological, statistical, political, agricultural, &c.—The Alexandrian Greeks had almanacs. The time at which they first appeared in Europe is not precisely known. The oldest of which copies (in manuscript) still exist, are of the 14th c.; there are specimens in the libraries of the British Museum and of Corpus Christi College, Cambridge. The earliest European A. worthy of notice was compiled by the celebrated astronomer Purbach, and appeared between the years 1450 and 1461; but the first *printed* A. was that composed by his pupil, Regiomontanus, for the thirty years from 1475 to 1506, for which he received a munificent donation from Mathias Corvinus, king of Hungary. Bernard de Granolachs of Barcelona commenced the publication of an A. in 1487; the printer Engel of Vienna, in 1491; and Stöffler of Tübingen, in 1524. Copies of these are now very rare. In 1533 Rabelais published, at Lyon, his A. for that year, and renewed the publication in 1535, 1548, and 1550. The fame and popularity of the celebrated astrologer, Nostradamus, who prophesied minutely the death of Henry II. of France, the execution of Charles I. of England, the great fire of London, the Restoration, &c., gave such an impulse to the publication of predictions, that, in 1579, Henry III. of France prohibited the insertion of any political prophecies in almanacs—a prohibition renewed by Louis XIII. in 1628. Before this, in the reign of Charles IX., a royal *ordonnance* required every A. to be stamped with the approval of the diocesan bishop.

Prophetic almanacs still circulate to an incredible extent in France in rural districts, and among the uneducated. The most popular of all these is the *Almanach Liégeois*, a venerable remnant of superstition. It was first published at Liege—according to the invariable title-page which takes no note of time—in 1636, by one Matthieu Laensbergh, whose existence, however, at any time seems very problematical. The *Almanach Liégeois* is a most convenient one for those who are unable to read, for by certain symbols attached to certain dates, the most unlettered persons can follow its instructions: thus the rude representation of a phial announces the proper phase of the moon under which a draught of medicine should be taken; a pill-box designates the planet most propitious for pills; a pair of scissors points out the proper period for cutting hair, a lancet for letting blood. Of course, amidst innumerable predictions, some may naturally be expected to come to pass. So in 1774, that A. predicted that in the April of that year a royal favorite would play her last part. Madame Dubarry took the prediction to herself, and repeatedly exclaimed: 'I wish this villanous month of April was over.' In May Louis XV. died, and Madame Dubarry's last part was really played. The credit of old Matthieu was established more firmly than ever. In 1852 a number of commissioners, appointed by M. Maupas, minister of police, having examined between 7000 and 8000 of the national chapbooks, which included a great number of almanacs, pronounced them so deleterious, that it became necessary forcibly to check their circulation. Although still in vogue amongst the ignorant peasantry, it is gratifying to learn that their popularity is greatly on the wane, and that various periodicals on a better plan have started up in France of late years.

In England, so far was any restraint from being put upon the publication of prophetic almanacs, or 'Prognostications,' as they were usually called, that the royal letters-patent gave a monopoly of the trade to the two Universities and the Stationers' Company, under whose patronage, and with the *imprimatur* of the Archbishop of Canterbury, such productions as *Moore's A.* and *Poor Robin's A.* flourished vigorously; although 'it would be difficult to find, in so small a compass, an equal quantity of ignorance, profligacy, and imposture, as was condensed in these publications.' The memory of Partridge, long employed as the prophet of the Stationers' Company, is preserved in the lively diatribe of Swift, writing under the name of Bickerstaff. In 1775, a decision of the Court of Common Pleas, in favor of a bookseller named Carnan, abolished the monopoly of the Stationers' Company. In 1779, Lord North brought in a bill renewing their privileges. After a powerful speech against the measure of Erskine, who exposed the pernicious influence of the productions published under the monopoly, it was rejected. The Stationers' Company, however, still maintained their ground by buying up all rival almanacs; and it was not until the publication, in 1828, of the *British A.* by the Society for the Diffusion of Useful Knowledge, that the eyes of the English public became opened to the irrational and deleterious nature of the commodity which their own indifference or folly, as much as the selfishness of their

purveyors, had hitherto maintained in existence. The success of this admirable publication stimulated the Stationers' Company to publish the *Englishman's A.* The *British A.* is itself now published by the Stationers' Company. *Whitaker's Almanack* is a valuable compendium of varied information.

In Scotland the earliest almanacs seem to have been produced about the beginning of the 16th c. Shortly after the beginning of the 17th c., the Almanacs or 'Prognostications' published at Aberdeen had begun to establish that celebrity which is hardly yet extinct. About the year 1677, they were sold for a *plack* each; and the annual circulation amounted, on an average, to 50,000 copies. In 1683 appeared a rival publication, under the title of *Edinburgh's True Almanack, or a New Prognostication.* For a long time the Scottish almanacs continued, like all others of that age, to contain little besides a calendar, with a list of fairs, and—what constituted the great attraction—predictions of the weather. But something more instructive and comprehensive became requisite, and the *Edinburgh A.* seems to have been among the first to respond to this requirement of advancing civilization; for, by various additions, such as a list of Scottish members of parliament, it had, in 1745, been extended from the original 16 pages to 36. In twelve years from that date, it had swelled to 72 pages; in 1779 it had reached 252 pages. Since 1837, it has been published under the title of *Oliver and Boyd's New Edinburgh A.*, and now extends to above 1000 pages. It contains an amount of information on all public matters, especially on those connected with North Britain, which, in its completeness, leaves little to be desired.

What *Oliver and Boyd's Edinburgh A.* is to Scotland, is *Thom's Irish A.* to Ireland—a work not less excellent, and even more extensive.

Almanacs containing astrological and other predictions are still published in Great Britain, but their influence is extremely limited, even among the most ignorant portion of the community, and their contents are fitted to excite amusement rather than any stronger emotion.

Of important national almanacs are the French *Almanach Impérial*, begun in 1679, a bulky octavo volume, full of useful information; the Belgian Royal A., very similar in character; the Prussian Royal A.; and the American A., a very meritorious publication. The *Almanach de Gotha*, begun in 1763, has a European or rather a cosmopolitan character. See GOTHA, A. DE.

The most important astronomical A. published in Britain is the *Nautical A.*, projected by the astronomer-royal, Dr. Maskelyne, and first published with the authority of government, in 1767. After his death it gradually lost its character, and in 1830, in consequence of the numerous complaints made against it, the government requested the Astronomical Society to pronounce upon the subject. The suggestions of the Society were adopted, and, in 1834, the first number of the new series appeared, with such additions and improvements as the advanced state of astronomical science rendered necessary. Still older than this A. is the French *Connoissance des Temps*, commenced in 1679 by Picard, and now published under the authority of the *Bureau des Longitudes.* Its plan is similar to that of the *Nautical A.*, but it contains a larger amount of original memoirs, many of them of great value. Equally celebrated is the Berlin *Ephemeris*, published so long under the superintendence of the late Professor Encke, being an improvement on the *Astronomisches Jahrbuch*, conducted by his predecessor Bode.

Another kind of A., which has especially flourished in Germany and France, belongs rather to the class of publications known in Britain as *Annuals.* Such have been the *Almanach des Muses, des Dames, Populaire, Icarien, Napoléonien*, &c., the latter of which were specially devoted to the interests of particular parties, political or religious. Of this kind, the examples in Britain are innumerable, and, in fact, the publication of an A. has now become a favorite medium of advertising and puffery.

The heavy stamp-duty of fifteenpence per copy, to which almanacs were long liable in the United Kingdom, was abolished in 1834, since which time, the character, number, and circulation of this class of publications have strikingly advanced. There is now a very large sale of almanacs in Great Britain for popular use, at not more than one penny each.

ALMANAC is also the term applied by antiquaries to calendars found carved, usually on staves, but also on tablets of wood, scabbards of swords, handles of hatchets, &c. The inscribed characters are sometimes the Runic—hence the name of *runstaffs, Scipiones Runici*—and sometimes the Gothic. The saints' days are denoted by symbols, as a pair of shoes for St. Crispin's Day. These primitive almanacs were in use among the Scandinavian nations, and the examples of them found in Britain are thought to have been introduced by the Norsemen. See ALMANAC in AM. SUPP.

ALMA'NSA, a town of Murcia, Spain, in the province of Albacete, and 43 miles east-by-south from Albacete, on the Madrid and Alicante Railway. It is situated in a wide plain, and is tolerably well built, and rather flourishing. The *vega*, or plain around the town is irrigated by water from a large reservoir called the *Pantano of Almafora*, and is very fertile. Many of its ague-breeding swamps have been drained and brought under cultivation. A. carries on manufactures of linen, hempen, and cotton fabrics, the materials of which are supplied from the neighborhood, also of brandy, leather, and soap. Pop. 8736.—Near A. the French, under the Duke of Berwick, natural son of James II. of England, gained a victory, on 25th April 1707, over an army of Spanish and English troops, commanded by Henry de Ruvigny, Earl of Galway. The French were more than twice the number of their opponents. Ruvigny fought under orders from home, contrary to his own judgment, and was deserted by the Spaniards almost as soon as the battle began. The battle of A. was, in its results, one of the most important in the War of the Spanish Succession. See SUCCESSION WARS.

ALMANSOR, or, with his full name, Abu-Jafer-Abdallah-ben-Mohammed-al-Mansor (al-mansor, 'helped by God'), the second calif of the house of the Abbasides (q. v.) reigned from 754 to 775. Warfare, treachery, and murder were his steps to the throne, and his whole rule was as cruel as its beginning. He especially persecuted the Christians in Syria and Egypt. In war against external foes, he had but little success. He removed the seat of the califate from Kufa to Bagdad, which he built at immense cost, raising the money by oppressive taxation. He introduced the pernicious custom of making his freed slaves, mostly foreigners, rulers of provinces. The best feature in his character was his patronage of learning. He caused the *Elements* of Euclid to be translated from the Syriac, and the famous fables of Bidpai (q. v.) from the Persian language. A. died during a pilgrimage to Mecca, in the sixty-third year of his age.

A'LMAS, a town of the Austrian empire, in Hungary, 16 miles west from Maria Theresiopol. The inhabitants are almost all Roman Catholics. Pop. (1880) 8000.—Almas is the name of many small towns and villages in Hungary.

ALMAZO'RA, a town of Valencia, Spain, in the province of Castellon, four miles south-by-east from Castellon de la Plana, in a plain on the left bank of the Mijares, three miles from its mouth. It has some wide and well-paved streets and squares. Linen and woollen fabrics and paper are manufactured. The surrounding country is fertile, producing wheat, barley, maize, oil, oranges, &c., Pop. 5850.

ALMEI'DA, one of the strongest fortified places in Portugal, is situated on the river Coa, on the Spanish frontier, in the province of Beira. Pop. 2500. In 1762, it was captured by the Spaniards, who soon afterwards surrendered it. Here, in 1810, when the French, under Marshal Ney, attempted to cross the Coa into Portugal, the English colonel, Cox, defended the town against Marshal Massena; but the explosion of a powder-magazine compelled him to capitulate. In their retreat from Portugal, 1811, the French, under General Brenier, destroyed a great portion of the fortifications of A.; which, however, were speedily repaired by the English.

ALMEIDA, DON FRANCESCO D', a famous Portuguese warrior, who flourished in the latter part of the 15th and the beginning of the 16th c. He was the seventh son of the Count of Abrantes, and at an early period distinguished himself in the wars with the Moors, but especially at the conquest of Granada, in 1492. In 1505 his sovereign, Emanuel I., in consideration of his great abilities, appointed him viceroy of the Portuguese possessions in the East Indies. On the 25th of March, he set sail from Lisbon with a fleet of 36 vessels, containing 1500 men, many of whom were noblemen, and all of good family. On the 22d of July, he reached Quiloa, on the Mozambique coast, where he was soon involved in a quarrel with the king of that city, the result of which was that A. deprived him of his crown, built a fortress to overawe the inhabitants, and proceeding to Zanzibar, destroyed the town of Mombaza. He then sailed for the Indies, asserting everywhere the superiority of the Portuguese flag. At Cananor, Cochin, Coulan, Ceylon, and Sumatra, he either built fortresses, to protect the factories and commercial interests of his nation, or established new factories. With the King of Mallacca, a commercial treaty was formed about the same time. His son, Lorenzo, carried on several expeditions as his father's lieutenant, visited Ceylon, and discovered the Maldive Islands and Madagascar. The chief design of A. was to make the Portuguese sole masters of the Indian seas, and by blockading the Persian and Arabian gulfs, to exclude the Egyptians and Venetians from commerce with the east. To frustrate his endeavors, the Egyptian sultan fitted out, by the help of the Venetians, a large fleet, which, under the command of the Persian, Mir-Hakim (or Hossein, according to others), was sent to the assistance of the king of Calicut. In the port of Chaul, young Lorenzo was attacked in very disadvantageous circumstances by Mir-Hakim. He fought with astonishing bravery; his ships had all but made their escape out to the open sea, when his own was separated from the others, and struck upon a rock; one chance shot carried off one of his legs, and another tearing away a part

of his side, killed him. His father speedily took measures to revenge the death of his son upon the hated Mussulmans, when Alfonso d'Albuquerque appeared on the scene (1507), having been sent out by the Portuguese government to supersede A., whom it had begun to distrust, on account of his brilliant successes. The latter refused to recognize Albuquerque as viceroy, and for some months kept him prisoner at Cochin. He now sailed along the coasts, burning and plundering various seaports, amongst others Goa, and at length utterly destroyed the Egyptian fleet at Diu. From this fierce and avenging expedition, he returned to Cochin, resigned his office into the hands of his successor, and set out on his homeward voyage, November 13, 1508. But he was not destined to see his native land again, for he was slain in an obscure affray with the savages at Cape Saldanha, in the south of Africa, where his men had landed. He was a man of stern, vigorous, and yet impulsive character, capable of severe retaliation of injuries, but not destitute of clemency and generosity.

ALMERI'A (Arab. Al-Meryah, 'the conspicuous'), anciently Murgis, or *Portus Magnus*, the chief town in the Spanish province of the same name, at the mouth of the river Almeria. It has a well-defended harbor, a cathedral, besides 26 churches and monasteries, and a grammar-school. In the time of the Moors, it was, next to Granada, the richest and most important town in the kingdom, and flourished alike in arts, industry, and commerce, being the 'great port' of traffic with Italy and the east. At one time, it was as terrible a nest of pirates as Algiers itself, under the Moorish chief Ibn Mayman, when even Granada, according to the proverb, was merely its 'farm.' Now, it has only a few trifling manufactures, although it still keeps up considerable trade in cochineal, red silk, lead, grapes, and especially wine. The cotton-tree has been planted in the environs of A. by English merchants. Pop. (1877) 40,323.

ALMODO'VAR DEL CA'MPO, a town of New Castile, Spain, in the province of Ciudad Real, 22 miles south-west from Ciudad Real. It stands on the summit of a ridge, near the Vega, a branch of the Guadiana. The streets are tolerably clean, but ill paved. There are ruins of an ancient castle. The inhabitants are chiefly employed in agriculture, and the only manufactures are domestic. Pop. 10,360.

ALMOHADES, the name of a dynasty that ruled in Africa and Spain during the 12th and 13th centuries. The word is Arabic, and signifies Unitarians. It was taken as a term of distinction; for the A. considered themselves the only Mohammedans who worshiped God properly. The founder of this sect, which at first was religious rather than political, was called Mohammed Ibn-Toumert, a native of the Atlas region. He was a man of a bold and subtile intellect, and extremely ambitious. He had traveled much, and acquired a manifold knowledge and experience. His first measures were extremely prudent. He commenced preaching with great zeal the reformation of all abuses, affecting himself an austere and unselfish life. He went about covered with rags, prohibiting wine, music, and all pleasures. At first, his denunciations were generally held in contempt; but at length his partisans became so numerous, that Ali, king of Marocco, was compelled to take measures against him. It was, however, too late. The Arabs and Berbers flocked to his standard; and at the end of a few years, he was master of the provinces of Fez, Marocco, Tlenzen, Oran, and Tunis. Mohammed imposed on his disciples new ceremonies, and composed for their benefit a special treatise, entitled *On the Unity of God*. The A. extended their conquests into Spain, subjugating Andalucia, Granada, Valencia, and a part of Aragon, and Portugal as far as the Ebro and Tagus. Mohammed was succeeded in his authority by Abdelmoumen, who had formerly been his lieutenant. Under him and his descendants, Jussuf and Jacob, the dynasty of the A. continued to flourish in great splendor. But in 1212 they were completely defeated by the Spaniards in the famous battle of Tolosa, the result of which was a general revolt of the Christian provinces under their sway. The power of the A. was destroyed in Spain in 1257, and in Africa in 1269.

A'LMOND (*Amygdalus*), a genus of the natural order *Rosaceæ* (q. v.), sub-order *Amygdaleæ* or *Drupaceæ*, consisting of trees or shrubs, distinguished by the coarsely furrowed and wrinkled shell (*endocarp* or *putamen*) of the drupe, and by the young leaves being conduplicate, or having their sides folded together. According to the greater number of botanists, it includes the PEACH (q. v.), constituted by some into a distinct genus, *Persica*, in which the drupe has a fleshy covering (*sarcocarp*), whereas, in the species to which the name A. is commonly given, this part is a dry fibrous husk, which shrivels as the fruit ripens, and finally opens of its own accord. The A.-tree (*Amygdalus communis*) is very similar to the peach-tree, and is distinguished from it principally, besides the difference of the fruit, by the fine glandulous serratures of the leaves, the stalk of which equals, or even exceeds, in length the breadth of the blade. It is a tree about 20—30 feet high, a native of the East and of Africa, but has now become completely wild in the whole south of Europe. Even in the more northern parts of Germany and of Britain it is planted for the sake of its beautiful flowers, which are produced in great abundance, and resemble those of the peach in form and often in color, although generally

Almond (*Amygdalus communis*).

paler and sometimes white. The blossoms appear before the leaves, and are very ornamental in shrubberies in March and April; and even when frosts destroy the germ of the fruit, the brilliancy of the flower is not impaired.

The wood of the A.-tree is hard, and of a reddish color, and is used by cabinet-makers, &c. But it is chiefly valued on account of the kernel of its fruit, well known by the name of ALMONDS, and forming an important article of commerce, for the sake of which it is extensively cultivated in the south of Europe and other countries of similar climate. It is mentioned in the Old Testament, and appears to have been cultivated from a very early period. It was introduced into Britain as a fruit-tree before the middle of the 16th c.; but it is only in the most favored situations in the south of England that it ever produces good fruit.—Almonds are either sweet or bitter. The bitter appear to be the original kind, and the sweet to be an accidental variety, perpetuated and improved by cultivation. SWEET ALMONDS contain a large quantity of a very bland, fixed oil, emulsion, gum, and mucilage sugar, are of a very agreeable taste, and very nutritious, and are used in the dessert, in confectionary, and medicinally in an emulsion, which forms a pleasant, cooling, diluent drink. BITTER ALMONDS contain the same substances, and, in addition, a substance called *amygdalin*, from which is obtained a peculiar volatile oil. (For the *oils* derived from almonds, see the following articles.)—The muddy water of the Nile is clarified by rubbing bitter almonds on the sides of the water-vessels, in the same way in which the nuts of the *Strychnos potatorum* (see CLEARING NUT) are used in India. The principal varieties of A. in cultivation are—the common *sweet* A., with thick hard shell; the *brittle-shelled*, with a very thin, almost leathery brittle shell, and sweet kernels; the *bitter* A., with thick hard shell (sometimes also with a brittle shell), and bitter kernels; the *large-fruited*, with large flowers of a whitish rose-color, and very large sweet fruit; the *small-fruited*, with very small sweet fruit; and the *peach* A., with a slightly succulent blackish *sarcocarp* (see above), yellow shell, and sweet kernels. The sarcocarp is, in the different varieties, more or less dry, or somewhat fleshy and juicy, so that some authors have disputed even the specific distinction between the A. and the peach. In commerce, the long almonds of Malaga, known as Jordan almonds, and the broad almonds of Valencia, are most valued. Large quantities of almonds are annually imported into Britain and America from France, Spain, Italy, and the Levant. Bitter almonds are brought to Britain chiefly from Mogadore.—The DWARF A. (*A. nana*) is very similar to the common A., except that it is a low shrub not more than 2 or 3 feet in height. Its fruit is also similar, but much smaller. It is common in the plains of the south of Russia, and is frequently planted as an ornamental

Almond.

shrub in Britain, flowering freely in March and April, but not producing fruit. It is very beautiful when covered with its pink flowers in spring, and deserves to be more frequently planted than it is. A sheltered but sunny situation is favorable to it,—Other species, little known, but very similar to these, are found in the east, and one on arid hills in Mexico.

ALMONDS, FIXED OIL OF. When almonds are subjected to pressure, a fixed greasy oil exudes. Either bitter or sweet almonds may be employed; but the former are generally used, as they are cheaper than the sweet almonds, and the expressed cake is valuable in the preparation of the *essential oil*. 1 cwt. of the almonds generally yields 48 to 52 lbs. of the fixed oil. When first obtained, it possesses a turbid or milky appearance; but when allowed to stand at rest, the impurities settle, and a clear, light, yellow oil remains above. It has the specific gravity of 918, and solidifies when reduced to—13° F. It has no odor, and to the taste is truly oleaginous and bland. The fixed oil of A. is used in medicine, and possesses a mild laxative property, when administered in large doses. It is often given to newly born infants, mixed with sirup of violets or sirup of roses. It is beneficial, also, in allaying troublesome coughs, when administered with confection of roses and sirup of poppies.

ALMONDS, VOLATILE OIL, or ESSENTIAL OIL OF. The cake, which is left after the expression of the fixed oil from bitter A., contains, among other matters, a portion of two substances, called, respectively, amygdalin, and emulsin or synaptase. When the cake is bruised and made into a paste with water, the synaptase acts as a ferment upon the amygdalin, and 1 atom of the latter resolves itself into 2 atoms of volatile oil of bitter A., 1 atom hydrocyanic (prussic) acid, 1 atom of grape-sugar, 2 atoms formic acid, and 7 atoms of water. This paste is placed in a retort, and allowed to stand for 24 hours, when heat is cautiously applied, and distillation carried on. The volatile oil rises in vapor, and passes over into the receiver, accompanied by much water, and contaminated with a considerable amount of prussic acid. The oil is not originally present in the bitter A.; in fact, the latter do not contain a trace of the oil ready formed, so that the oil is purely the product of the fermentation of amygdalin, 100 parts of which yield 47 of crude oil. Commercial oil of bitter A. has a golden yellow color, but may be purified so as to be almost colorless. The crude oil is very poisonous, owing to the prussic acid dissolved therein, and many fatal cases have occurred from the wilful, accidental, and careless use of the oil. It is unfortunate that the manufacturers of the volatile oil should not subject the crude oil to the action of lime and an iron salt, and then re-distil, when the prussic acid would be left fixed by the lime and iron, and the pure volatile oil be alone obtained in the receiver. As so procured, the pure oil is not a dangerous poison. The oil has an agreeable odor, an acrid, bitter taste, and burns with a smoky, white flame. It is heavier than water, being of the density of 1083; is soluble in water to the extent of 1 part in 30 parts of water, and is very soluble in alcohol and ether. Heated to 356° F., it boils, and distils over unaltered; and, exposed to the air, it is gradually oxidized into benzoic acid. The oil is called by the chemist the hydride of benzoyle. In medicine, the volatile oil is used in place of prussic acid, but is very variable in strength, being sometimes four times the strength of medicinal prussic acid. The dose is a quarter of a drop to a drop and a half in an emulsion. The cook and confectioner employ the oil for flavoring custards, &c., and the perfumer uses it for scenting toilet-soap, &c.

A'LMONER is the name given originally to that member of a religious order who had the distribution of the money and other things set apart for alms, which, by canonical law, was to amount to at least a tenth of the revenues of the establishment. Afterwards, those ecclesiastics also received this name who were appointed by princes to the same office in their households. The Grand A. of France was one of the principal officers of the court and of the kingdom, usually a cardinal, and, in right of his office, commander of all the orders, and also chief director of the great hospital for the blind. Queens, princes, and princesses had also their almoners, and bishops were usually appointed to this office. In England, the office of *Hereditary Grand Almoner* is now a sinecure, his only duty being to distribute the coronation medals among the assembled spectators. The *Lord High Almoner*, who is usually a bishop, distributes twice a year the Queen's bounty, which consists in giving a silver-penny each to as many poor persons as the Queen is years of age.

ALMO'RA, the principal town of the British district of Kumaon (q. v.), India, 87 miles north from Bareilly, on the crest of a mountain ridge, 5337 feet above the sea, on the head-waters of the Kosila, a branch of the Ramgunga. It consists chiefly of one street, three-quarters of a mile long. The houses have a ground story of stone; the upper stories are of wood, covered with a sloping roof of heavy gray slate, on which small stacks of hay are sometimes erected. The ground story is generally white-washed and tricked out with grotesque paintings. Detached houses, both of Europeans and Brahmans, are scattered along the face of the mountain below the town. A. is a British military station, the lines of the regular troops and Fort Moira being close to the town. Since it came under British sway, it has been rapidly increasing in prosperity. Pop. (1871) 6151.

ALMORAVIDES ('The *Moravides*'), or MORABETHUN, the name of an Arab dynasty that ruled in Africa and Spain in the 11th and 12th centuries of the Christian era. The name A., which is commonly given to this dynasty by Western writers, is a corruption of the Arabic word *Al-morabeth*, 'the champion of religion.' This sect took its rise about 1050 among the Arab and Berber tribes which dwelt on the slopes of the Atlas range facing the Atlantic, and was founded by a Moslem teacher called Abdalla-ben-Yasim, who undertook to rescue these tribes from the gross ignorance in which they were plunged, and instructed them in the doctrines of the Mohammedan faith. The new proselytes soon exhibited the fruits of this teaching by descending from their hills, under the leadership of a chief named Abu-bekr, and conquering the kingdom of Fez. The adjoining kingdom of Morocco shared the same fate; and the victorious enthusiasts, under the famous Yussuf-ben-Taxfin, the cousin of Abu-bekr, next crossed the Strait of Gibraltar, and subdued Spain to the Tagus on one side, and to the Ebro on the other. But this extensive and powerful dominion was of too rapid growth to possess much stability; and during the reign of Ali, the son of Yussuf, arose the sect of the Almohades (q. v.), which after a time expelled the A. from Africa, and in 1144 subdued their power in Spain. It was the Almoravide princes who introduced the *Maravedi* (q. v.) into Spain, and in that and the word *Marabuts* (q. v.) their name is still preserved.

A'LMUG TREE, or ALGUM TREE. This name, occurring in the Old Testament, was formerly supposed to denote a species of *Acacia*, or a coniferous tree like the cypress; but it is now thought more probable that it was one of the kinds of Sandalwood (q. v.), the *Santalum album*, a native of India.

ALMUÑECA'R (Arab. *Al Munneeab*, the gorge), a seaport town of Andalusia, Spain, in the province of Granada, 31 miles south of Granada. The port is somewhat exposed. The town is generally well built. It was a place of importance in Moorish times, when the coast of Granada was highly cultivated and extremely productive, particularly in sugar and cotton. Efforts have recently again been made to extend the culture of both. The inhabitants of A. are chiefly engaged in agriculture and sugar-refining. There is a considerable trade in cotton, sugar, and fruit. Pop. 8000.

ALNUS. See ALDER.

A'LNWICK (town upon the Alne), the county town of Northumberland, is situated in lat. 55° 25′ N., long. 1° 42′ W., and is distant about 34 miles from Newcastle. The streets are broad, well paved, and well lighted, the houses modern, built of stone, and in some instances handsome. A large market-place occupies the center of the town. The town-hall is a spacious building crowned with a tower. A. was at an early period a fortified town, and some fragments of the ancient walls even yet remain. An ancient gate built by Hotspur, still forms one of the entrances to the city. A. Castle, the residence of the Dukes of Northumberland, stands at the north entrance of the town. It was repaired some years ago, and is considered one of the most magnificent baronial structures in England. During the middle ages, it was a bulwark against the invasions of the Scots, who thrice besieged it. A. is the election town for the north division of the county. It has various charity schools, a mechanics' institute, a theater, a town-hall, and a corn exchange. Pop. (1881) 6691.

A'LOE (*Aloë*), a genus of plants belonging to the natural order *Liliaceæ* (q. v.) sub-order *Aloineæ*, distinguished by a regular cylindrical perianth in six pieces, expanded at the mouth, and nectariferous at the base, the stamens hypogynous, or springing from beneath the germen, the ovules indefinite in number, the fruit a membranous three-celled capsule. The species are numerous, natives of warm countries, especially of the southern parts of Africa. About fifty miles from Cape Town is a mountainous tract completely covered with aloes, and the hills on the west side of Socotra exhibit them in similar profusion. The species all have stems, but vary in height from a few inches to thirty feet. They have permanent succulent leaves. The negroes of the west coast of Africa make cords and nets of the fibres of their leaves, and stockings are woven from the fibres of a species found in Jamaica. But aloes are chiefly valuable for their medicinal properties. The well-known drug called ALOES (q. v.) is the inspissated juice of the leaves of several almost tree-like species, and particularly of *A. Socotrina*, a native of the island of Socotra; *A. purpurascens*; *A. spicata*, and *A. fruticosa*, which principally yield the Cape aloes; *A. Indica*; *A. rubescens*; *A. Arabica*; *A. linguæformis*; *A. Commelini*; and *A. vulgaris*, which is found in the East and West Indies, in Italy, and in some of the islands of the Mediterranean, being the only species which can be reckoned European, although it

also is probably an introduced plant. The extract prepared from its leaves is known as Hepatic aloes, or as Barbadoes aloes. The bitter principle of aloes has been called Aloesin. It forms several compounds with oxygen, which possess the properties of acids.—The juice of aloes was anciently used in embalming, to preserve dead bodies from putrefaction. In the East Indies, it is employed as a varnish to prevent the attacks of insects; and has even been applied to bottoms of ships to protect them from marine worms. A beautiful violet color is obtained from the leaves of the Socotrine A., which does not require any mordant to fix it. It also affords a fine transparent color for miniature painting.—Mohammedan pilgrims suspend an A. over their doors on their return from Mecca, to signify that they have performed the pilgrimage.

Aloë fruticosa: *b*, the flower.

The AMERICAN A. is a totally different plant. See AGAVE.

A'LOES is a drug of great antiquity, for we find Dioscorides (50 A.D.) making mention of *Aloë* as a substance obtained from a plant, and possessing cathartic properties. The great demand for A. in Britain has led to its importation from numerous sources, including Bombay, Arabia, Socotra, Madagascar, the Cape of Good Hope, the Levant, and the West Indies. The drug is the inspissated juice of various species of Aloe (q. v.). All these are characterized more or less by producing large, thick, fleshy leaves, stiff and brittle, pointed, and generally terminating in a strong spine, filled with a mucilaginous pulp internally, and containing in the proper vessels of their exterior portion an intensely bitter juice, which yields the medicinal substance A. It is obtained, sometimes in the form of tears, by incision, spontaneous exudation, and inspissation upon the plant; sometimes by spontaneous evaporation of the juice which drops or exudes by pressure from the leaves when cut away near the base; sometimes by evaporating the same juice with the aid of heat; and lastly, by evaporating together the juice and a decoction of the leaves.

Owing to the great difficulty of determining the true botanical source of any given sample, the following names are made use of in commerce to denote the various kinds of A. found in the market —namely, Socotrine, Clear, Cape, East Indian, Barbadoes, and Caballine A. The most important are:

1. Socotrine A. (*Aloë Socotrina*), so called from its supposed source, the island of Socotra, near the mouth of the Arabian Gulf. This is the most esteemed of all the varieties used in medical practice. Many hold that this is only a fine variety of East Indian A., but the characters given in the *Edinburgh Pharmacopœia*—a garnet-red translucency in thin pieces, and almost complete solubility in spirit of the strength of sherry—define a particular species, which is the true Socotrine A. of pharmacologists.

2. East Indian A. (*Aloë Indica*), also called Hepatic A., from its liver-brown color, is imported into Bombay from Arabia and Africa, and is known in India by the name of Bombay A. A considerable portion is probably obtained from the same sources as the Socotrine A., which it resembles in color; and according to Dr. Pereira, 'the two are sometimes brought over intermixed, the Socotrine occasionally forming a vein in a cask of Hepatic A.'

3. Barbadoes A. (*Aloë Barbadensis*) is prepared in the West Indies from *A. Socotrina*, and from a variety of *A. vulgaris*. We learn from Browne's *Natural History of Jamaica* that the largest and most succulent leaves are placed upright in tubs, that the juice may dribble out. This evaporated, forms what is sold as Socotrine A.; but the common A. is obtained by expressing the juice out of the leaves, boiling it with water, evaporating and pouring it into gourds; whence this kind is often called gourd A. It is much used for veterinary medicine, and thus brings a high price in the market.

Caballine A. (*Aloë caballina*) is a very coarse kind, and is so called because it is considered fit only for horses. It contains many impurities, such as wood, sand, and charcoal, and evidently constitutes the lowest stratum in the vessels in which the better sorts are allowed to cool. It is now in a great measure superseded in veterinary practice by Barbadoes A.

All kinds of A. are remarkable for their disagreeable taste. The odor is peculiar, and is more perceptible when the drug is breathed upon. A. is in a great measure soluble in water, and more so in hot than cold water. A. was formerly considered to be a gum-resin; but the portion which was thought to be of the nature of gum is now regarded as a variety of *extractive*, and to it the name of Aloesin has been given.

Action.—When employed in small doses, A. exerts a tonic, and in larger doses, a cathartic action. It is considered by some authorities to stimulate the liver, and also to supply the place of deficient bile in torpidity of the intestinal canal, and more especially towards its lower part. Both taken singly, and also in combination with other cathartics, A. is perhaps the most important and most extensively used of vegetable remedies of its class; and there is no end to the variety of cases in which it may be employed with advantage.

ALOES WOOD (called also Agila Wood, Eagle Wood, or Agallochum) is the inner part of the trunk of *Aquilaria ovata* and *A. Agallochum*, trees of the natural order *Aquilariaceæ* (q. v.), natives of the tropical parts of Asia, and supposed to be the aloes or lign aloes of the Bible. They are large spreading trees with simple alternate leaves. Aloes-wood contains a dark-colored, fragrant, resinous substance, and is much prized in the east as a medicine, and for the pleasant odor which it diffuses in burning. It has been prescribed in Europe in cases of gout and rheumatism. The resinous substance is found only in the inner part of the trunk and branches; the younger wood is white, and almost scentless. A similar substance, still more esteemed, is obtained in the south-eastern parts of Asia and the adjacent islands, from the central part of the trunk of *Aloexylon Agallochum*, an upright-growing tree with simple alternate leaves, and terminal panicles of small flowers, of the natural order *Leguminosæ*, sub-order *Cæsalpinieæ*. This tree abounds particularly on the highest mountains of Cochin-China and the Moluccas; a character of sacredness is attached to it, and it is cut with religious ceremonies. The A. W. which it yields is not only much prized in the east as a perfume, but many medicinal virtues are ascribed to it. The ancients ascribed to it similar virtues, and so valued it for these and its fragrance, that Herodotus says it once sold for more than its weight in gold. It was regarded almost as a universal medicine. Its very fragrance was supposed to have a beneficial influence, and it was therefore worn about the person. As it admits of a high polish and exhibits a beautiful graining, precious gems were set in it; and it was cut into fantastic forms and worn in head-dresses, &c. There seems to be allusion to a similar use of it in Psalm xlv. 8, 'All thy garments smell of myrrh and *aloes* and cassia.' Or perhaps this merely refers to its being employed to perfume clothing. It was also from a very early period much used to perfume the apartments of the great. The fragrance continues undiminished for years. *Lign Aloes* is a corruption of *Lignum Aloes* (Aloes Wood).

ALONG-SHORE, a phrase applied in navigating near a coast, to denote a passage near to, and parallel with, the shore. 'Along-shore-men,' or "long-shore-men,' is a peculiar designation given to some of the humbler and rougher men employed about docks and shipping, in the Thames and other rivers.

ALOO'F, at sea, is simply 'at a distance.' To 'keep the loof,' or 'keep the luff,' is a command given to the man at the helm.

ALOPECU'RUS. See FOXTAIL.

ALO'RA, a town of Andalusia Spain, in the province of Malaga, 18 miles north-west of Malaga, on an elevated site near the right bank of the Guadalhorce. Some of the streets are well built and well paved; some are very steep and irregular. There are ruins of an ancient Gothic castle. The inhabitants are mostly employed in agriculture. Soap and sulphate of soda are manufactured. The neighborhood produces much oil and excellent wine. Pop. (1877) 10,014.

ALO'SA. See CLUPEIDÆ and SHAD.

ALOST, or AALST (the name signifies 'to the east,' and was probably given to the town because it lay near the eastern frontier of the province), a town in Belgium, the old capital of the province of East Flanders, is situated on a tributary of the Scheldt, called the Dender, which is here converted into a canal. It is a walled city with five gates, has considerable trade in hops, corn, &c., and large manufactures, besides numerous breweries, distilleries, bleach-fields, print-works, copper and iron foundries, flax and cotton mills, &c. The finest building in A. is the church of St. Martin, an unfinished edifice, but one of the grandest in Belgium, and containing a famous painting by Rubens—'St. Roch beseeching our Saviour to stay the Plague of A.,' and also the mausoleum of Thierry Martens, who was born here, and who introduced the art of printing into Belgium, 1475 A.D. A. has a town-hall (founded in 1200 A.D.), a college, a hospital, chamber of commerce, academy of design, &c. Pop. 19,000.

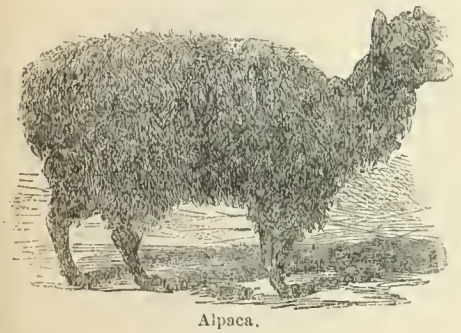
ALOYSIA, a genus of plants of the natural order *Verbenaceæ* (q. v.), to which belongs a shrub, *A. citriodora*, much cultivated in greenhouses and apartments in Britain for the grateful fragrance which its leaves emit when slightly bruised. It is frequently to be seen in the windows of cottagers, and is by them generally named *Verbena*. It was formerly known to botanists as *Verbena triphylla* and has also been referred to the allied genus *Lippia*. The leaves are in whorls of three. It is a native of Chili. In the Channel Islands and the south of Ireland, it becomes a luxuriant

shrub in the open air, reaching a height of 10—25 feet, with osier-like shoots.

ALP, ALB, also called the Rauhe or Swabian Alp, is a chain of mountains above 60 miles in length, and from 12 to 15 in breadth, situated between the Neckar and the Danube. It forms the watershed between these two rivers and the basin of the Rhine, and lies almost entirely within the kingdom of Würtemberg. It is also in the vicinity of the Black Forest, but presents a totally different appearance, on account of its being clothed with forests of hard wood instead of pine. It forms a table-land intersected by a few narrow deep valleys. The average height of the system is rather more than 2000 feet. On the north, it descends to the Neckar in ridges of rocky cliffs, and abrupt pointed headlands; but on the south, it gradually slopes away to the level of the valley of the Danube. The scenery is often very picturesque, for the sharp, precipitous crags are frequently crowned with the strongholds, generally ruins, of the famous old German families, such as the Hohenzollerns, Hohenstaufens, &c. The geological formation of the Alp is calcareous, and presents a regular stratification. Caverns of a very remarkable character abound among the rocks. The valleys at the base of the hills are fertile, and produce abundance of wine and fruit, but the high table-land has an extremely poor and barren soil.

ALPA'CA, or PACO (*Auchenia Paco;* see AUCHENIA), an animal of the same genus with Lama (q. v.), and so closely allied to it, that many naturalists regard it as a variety rather than a distinct species. It is remarkable for the length and fineness of the wool, which is of a silken texture, and of an uncommonly lustrous, almost metallic appearance. The A. is smaller than the lama; the legs and breast are destitute of callosities. In form, it somewhat resembles the sheep, but with a longer neck and more elegant head. It carries its long neck erect; its motions are free and active, its ordinary pace a rapid bounding canter. The eyes are very large and beautiful. The wool, if regularly shorn, is supposed to grow about six or eight inches in a year; but if allowed to remain upon the animal for several years, attains a much greater length, sometimes even thirty inches and not unfrequently twenty. Its color varies; it is often yellowish brown; sometimes gray, or approaching to white; sometimes almost black.

The A. is a native of the Andes, from the equator to Tierra del Fuego, but is most frequent on the highest mountains of Peru and Chili, almost on the borders of perpetual snow, congregating in flocks of one or two hundred. In a wild state, it is very shy and vigilant; a sentinel on some elevated station gives notice of the approach of danger by snorting to alarm the flock. Alpacas seem instinctively to know when a storm is coming on, and seek the most sheltered situation within their reach. Flocks, the property of the Peruvian Indians, are allowed to graze throughout the whole year on the elevated pastures, and are driven to the huts only at shearing-time. When one is separated from the rest, it throws itself on the ground, and neither kindness nor severity will induce it to rise and advance alone. It is only when brought to the Indian huts very young, that they can be domesticated so as to live without the companionship of the flock; but then they become very bold and familiar. Their habits are remarkably cleanly.



Alpaca.

The Indians have from time immemorial made blankets and ponchos or cloaks of A. wool. It is not quite fifty years since it became an article of commerce, but its use for the manufacture of shawls, coat-linings, cloth for warm climates, umbrellas, &c., has gradually increased, and more than 2,000,000 lbs. are now annually imported into Britain. The credit of introducing and raising to its present magnitude the Alpaca wool-manufacture in Britain, is due to Sir Titus Salt.

Attempts have been made to introduce the A. into Europe; but not yet with very satisfactory results. The only considerable flock known to exist is in the Pyrenees. There seems no reason, however, to doubt that the mountains of Wales and Scotland are suitable for this branch of husbandry; and it is to be hoped that enterprise such as has been directed to the manufacture of A. wool in Britain, will soon, and with equal success, be directed to the production of it. There are probably not yet more than two or three hundred alpacas in Britain, and these mostly in parks connected with the residences of noblemen and gentlemen, not in the situations for which they seem to be peculiarly adapted. An attempt was made in 1821 to introduce the A. into the United States; a fund was raised, and, in 1857, a cargo of them was shipped to Baltimore, but the result showed that they could not be acclimatized.

A. wool is straighter than that of the sheep, very strong in proportion to its thickness, and breaks little in combing. The fibre is small, and it is very soft, pliable, and elastic.—The flesh of the animal is said to be very wholesome and pleasant.

ALP-ARSLA'N, a Persian sultan, the second of the Seljukide dynasty, born in Turkestan in 1028 or 1030. In 1053, he ascended the throne of Khorassan, after the death of his father Daoud, and in 1063 he also succeeded his uncle. His first act was to unite the whole of his dominions in one vast monarchy. He next embraced Islamism, and it was on this occasion that he took the surname of Alp-Arslan (the Lion-heart), his real name being Mohammed-Lhazed-Dyn-Abou-Choudja. The Calif of Bagdad gave him the title of Adhad-eddin (Defender of the Faith), with this extreme honor—namely, that prayer should be made in his name. He had an excellent vizier, Nisam-al-Mulk, one of those lettered ornaments of early Mohammedanism. The vizier was the founder of all the colleges and academies in the kingdom. While he directed the internal administration of affairs, A. made war successfully. He suppressed revolts, and extended the northern boundaries of his dominions. In 1067 and 1068 he pursued the course of his conquests, carrying off the gates of the church of St. Basil at Cæsarea, which were enriched with gold and pearls, and overthrowing the Greeks under Nicephorus Botoniates. In 1069 he invaded Armenia and Georgia, at that time Christian kingdoms. The most remarkable incident in this expedition was the blockade of the convent of Mariam-Nishin, situated on an island in the middle of a lake, and considered impregnable. An earthquake overthrew the walls during the siege, when it immediately surrendered. He next proceeded against the Greeks who, under their brave emperor, Romanus IV., had thrice driven back the Turks beyond the Euphrates. In August 1071, a bloody battle was fought near the fortress of Malaskerd, between the towns of Van and Erzeroum. A. gained the victory. The Greek emperor was taken prisoner, and only obtained his liberty by a ransom of £1,000,000, and an annual tribute of £160,000. Rather more than a year after this (December 15, 1072), A. perished at Berzem in Turkestan by the poniard of Jussuf Cothoul, whom he had insulted. He was buried at Mervé, in the tomb of his ancestors.

ALPES is the name of two departments in France, the *Basses-Alpes* (or Lower Alps), and the *Hautes-Alpes* (or Upper Alps). The department of the BASSES-ALPES occupies the N.E. part of Provence, and includes an area of 2680 square miles. It is, for the most part, mountainous, consisting of spurs or offshoots from the Maritime Alps, which run in numerous chains towards the Rhone. In the north, the climate is cold, the soil poor, and the cultivation bad; in the south, the climate is much better—almonds, apricots, peaches, and various other choice fruits are grown, amongst which the plums of Bignolles form a well-known article of commerce. The wines of this region are reckoned excellent. On the sides of the Alps, oxen and sheep find admirable pasturage. The mines produce lead, green marble, &c. At Digne and Gréoulx there are hot mineral springs. Pop. (1876) 136,166; the trade carried on is insignificant. The department is watered by the Durance. The chief town is Digne; pop. 5540.

The HAUTES-ALPES, lying north of the Basses-A., and forming a part of the old province of Dauphiné, is traversed by the chief range of the Cottian Alps, which here rise, in Mount Pelvoux, to the height of 14,000 feet, and Mount Olan to 13,120 feet. The scenery, especially along the course of the impetuous Durance, is singularly picturesque. The *Hautes-A.* is the highest department in France, the fierce north wind and the perpetual snow on the lofty peaks, make the climate severe and the winter long, so that the barren soil will yield little else than potatoes, a little rye, oats, and barley. Here and there, in the most southerly valleys, nut-trees, chestnuts, vines, and other choice fruits, thrive. Only horned cattle, asses, and mules are bred profitably. The most important roads through this department are: 1st, The road from Grenoble to Briançon; 2d, The road from Briançon to Susa, in Piedmont, over the Col-de-Genevre, which, in 1859, was used to transport masses of French soldiery into Italy; 3d, The road from Gap to Marseille. The area is 2150 square miles; pop. (1876) 119,094. The inhabitants are employed in the manufacture of leather, linen, and woollens. A number are likewise engaged in the mines, which produce lead, copper, iron, and anthracite. Chief town, Gap; pop. 7249.

ALPES MARITIMES, a dep. of France, in the extreme south-east, on the shores of the Mediterranean and confines of Italy, formed in 1860, of the ancient county of Nice, then ceded to France, and formerly belonging to the kingdom of Sardinia, and of the arrondissement of Grasse, detached from the department of Var. The chain of the A. M. forms the northern boundary of the department, and from it numerous spurs run seaward, among which are lovely and fertile valleys. The chief rivers of the de-

partment are the Loup, the Var, and the Paillon, at the mouth of which Nice is situated. The climate is mild and pleasant in the vicinity of the sea, and in the lower valleys, although the higher mountains reach to altitudes where winter always reigns. The vine and olive are much cultivated in the more favored localities; oranges, lemons, and figs are produced in abundance and of excellent quality; a considerable extent of land is devoted to tobacco, and not a little to the cultivation of herbs and flowers for the preparation of essences and perfumes. Grasse is particularly famous for the manufacture of perfumery.

In many parts of the department, there are noble forests. In the more elevated parts, much land is used for the pasture of sheep, and also of goats, of which these regions possess a highly esteemed breed. The silk-worm is reared to a considerable extent, and the keeping of bees is a source of no little wealth, honey being largely produced and exported. The mineral riches are not great. There are some quarries of white marble, and some mineral springs. Among the chief branches of industry, besides those which are strictly rural, are brass-founding and the making of bijouterie. The tunny, anchovy, and sardine fisheries give employment to many people on the shores of the Mediterranean, and great quantities of anchovies and sardines are exported from the port of Cannes. The department is divided into three arrondissements—Nice, Puget-Théniers, and Grasse. The capital is Nice (q. v.) and the other principal towns are Antibes (q. v.), Villefranche, Cannes (q. v.), Grasse (q. v.), and Menton, or Mentone (q. v.), on the eastern frontier.—The county of Nice was bestowed in 1388 on Amadeus VII., Duke of Savoy, and latterly formed part of the kingdom of Sardinia till 1860, except that it was seized by France in 1792, and for a time formed into the department of Alpes Maritimes. It was restored to Sardinia in 1815. After the treaty of 1860 was concluded, it was apprehended that the people of this region, on account of their race, customs, and language, would not show the same willingness to be transferred to France as the people of Savoy; but no transference of territory was ever more easily accomplished, or with less apparent dissatisfaction of those most nearly concerned. The pop. of the department in 1876 was 203,604.

A'LPHABET. The A. of any language is the series of letters, arranged in a fixed order, with which that language is written. Picture-writing was doubtless the earliest method invented of conveying thought through the eye. The idea of an ox was readily expressed by a sketch of the animal, or, for shortness, by an outline of his head and horns. Or the picture was used symbolically; as the figure of an eye, to express the action of seeing, or the attribute of wisdom. In process of time, some of those pictures came to be used phonetically—i. e., to represent, not ideas, but sounds. But the sounds so represented would at first be whole words, or, at all events, syllables; and the important step was yet to be taken of analyzing syllables into their elementary sounds, and of agreeing upon some one unvarying picture or sign (a letter) to represent each. This constituted the invention of the A. By what steps alphabetic writing most probably rose out of picture-writing, will be seen under the head of HIEROGLYPHICS. See also CHINESE LANGUAGE and CUNEIFORM CHARACTERS.

The Phœnician A. is the oldest of which we have any account; and from it have originated, directly or indirectly, all the modes of writing now in use in the world. It is the foundation of the Greek, the Latin, and the Arabic alphabets; and the great influence of the nations speaking these tongues accounts for the widespread similarity. Taking both ancient and modern times into account, as many as 400 alphabets have been enumerated; but of those now in use, if we set aside slight variations of form, the number does not exceed 50. Aner's *Spraehhalle* (Vienna, 1849) contains a rich collection of alphabets. We must confine ourselves here to those more immediately connected with the history of the English A.

A point of considerable importance is the *order* of the letters. In modern alphabets, this appears at first sight to be quite arbitrary; but traces of a principle of arrangement, or natural system according to which the series grew, have recently been brought to light.* The evidences of such a natural order are best seen in the Hebrew A., which was almost identical with the Phœnician. The table given below exhibits the Hebrew letters, with their names, and sounds or powers; and also the names of the letters composing the early Greek A., as borrowed from the Phœnician.

Leaving out of account the letters enclosed in brackets, which are not easily accounted for, and are possibly later interpolations, the whole fall into four groups, the law of which will best appear in the scheme given at the top of the next column.

Without entering at present into the nature of the relation between the letters in the several rows, horizontal and vertical, of the scheme (for which see LETTERS), it will be seen that group (1) in the Hebrew A. consists of a vowel followed by three mute letters, all having one character (flats or medials); that group (2) consists of a vowel followed by three mutes, also having one character (aspirates); and that group (4) consists in like manner of a vowel followed by three mutes, all of the same character (sharps.) The order, moreover, according to the organ of utterance, in which the mutes follow in each group, is invariable: the labial (lip-sound) coming first; the palatal (palate-sound), second; and the dental (tooth-sound), last. This principle of arrangement is characterized by Dr. Latham as a *circulating order*. Group (3) likewise consists of a vowel and four consonants of one character (liquids); but in this case the order of the vocal organs is not observed—at least in the form in which the Hebrew A. is known to us; in order to be symmetrical with the other groups, the sequence would require to be *m l n*.

Vowels.	Labials.	Palatals.	Dentals.	
a	*b*	*g*	*d*	Flats or medials.
e	*v*	*ch*	*th*	Aspirates.
o	*p*	*k*	*t*	Sharps.
i	*l*	*m*	*n*	Liquids.

		Name.	Sound or Power.	GREEK.
	א	Aleph,	a vowel or breathing.	Alpha.
	ב	Beth,	B.	Beta.
1	ג	Gimel,	G (gun).	Gamma.
	ד	Daleth.	D.	Delta.
	ה	He,	a vowel or breathing.	E(psilon).
	ו	Vau,	V or F.	F = V (digamma).
2	[ז]	Zayn,	Z.]	Zeta.
	ח	Kheth	KH or CH.	Eta.
	ט	Theth,	TH.	Theta.
	י	Yod,	J.	Iota.
	[כ]	Kaph,	K, variety of.]	Kappa.
	ל	Lamed,	L.	Lambda.
3	מ	Mem,	M.	Mu.
	נ	Nun,	N.	Nu.
	[ס]	Samekh,	S, variety of.]	Sigma.
	ע	Ayn,	a vowel.	O(mikron).
	פ	Pe,	P.	Pi.
	[צ]	Tsadi,	TS.]	
4	ק	Koph,	K or Q.	Koppa.
	[ר]	Resh,	R.]	Rho.
	[ש]	Sin,	S.]	San.
	ת	Tau,	T.	Tau.

The nucleus of the original A. would thus seem to have consisted of sixteen letters, grouped in four tetrads or quaternions, on an organic principle of arrangement. This principle is obscured in English and other modern alphabets, by some of the letters having gradually come to represent quite other sounds than their original. There is sufficient evidence, for example, that in the earliest Latin alphabet, from which the English is derived, the third letter, C, has the power of G (in *gun*). There was a subsequent period in the development of that language when the distinction between the sharp and flat palatal sounds seems to have been lost, and when two syllables like *kam* and *gam* would have been both pronounced alike (*kam*). C thus acquired the power of K, and the letter K itself went almost out of use. But about the time of the First Punic War (264—241 B.C.), the distinction between the sharp and the flat sounds revived; and while the original C continued ever after to have the power of K (*Cicero*, for instance, was pronounced *Kikero*), a new character (G) was formed from it, by a very slight alteration, to express the flat sound. Again, the modern H, which has in most cases become a mere evanescent breathing, can be traced back until it becomes a strong guttural, like CH in the Scotch word *loch*. The place of the third consonant in the cycle of aspirates is a complete blank in the alphabets derived from the Latin; because that language being originally destitute of the sound, dropped the sign of it from the first. The Latins were, in fact, completely destitute of the genuine aspirate sounds; for even the letter F had not the sound we give it. Therefore, when they had to represent the aspirate consonants of the Greek language, φ, χ, θ, they had recourse to the combinations *ph, eh, th*—a clumsy expedient still followed in modern alphabets derived from the Roman, and constituting one of their most serious defects.—The cycle of the sharps is pretty perfect in the English alphabets, for Q is only a variety of K.

It is easy to conceive a language represented by sixteen characters of the nature above described. The most serious deficiency would seem to be the want of *r* and *s*. But the sound of *th* is very nearly allied to that of *s* (witness 'loves or lov*eth;*' also the pronunciation of a person who li*thpth*), and one character might be made to stand for both, as easily as in English *c* is made to represent two sounds so different as those exemplified in cat and city. Some nations again, are said to make no distinction be-

* The theory was first propounded in 1833, by Professor Key, of University College, London, in the *Penny Cyclopædia*, art. 'Alphabet'

tween *r* and *l*, so that one character might stand for both these sounds.

But whether or not the Phœnician A. had originally only sixteen letters, it is evident that when transplanted into Greece, it had twenty-one letters, if not twenty-two. In accommodating itself to the necessities of the Greek tongue, it gradually underwent a series of changes. Some of the letters were modified: *He* became *e*; *Cheth*, *ee*; *Sigma* became ς=*x*, and the name *Sigma* was transferred to *San*. Other letters were altogether dropped as *Digamma* (=v) and *Koppa*. On the other hand, for such simple sounds as had no representatives in the Phœnician, new characters were invented, and annexed to the end (*v*, *φ* *χ*, *ψ*, *ω*).

GREEK ALPHABET.

1	2	3	4	*Name.*	*Power.*
		A	α	Alpha	a
		B	β	Beta	b
		Γ	γ	Gamma	g
		Δ	δ	Delta	d
		E	ε	Epsilon	e (short)
		Z	ζ	Zeta	ds
		H	η	Eta	e (long)
		Θ	θ	Theta	th
		I	ι	Iota	i
		K	κ	Kappa	k

Another important change was in the *direction* of the writing. In the Phœnician and other Semitic languages, the writing proceeded from right to left. The Greeks, on borrowing the Phœnician A. also wrote for some time from right to left. The mode called *bustrophedon* (turning like an ox in ploughing), of writing alternately from right to left and from left to right, was then introduced; and finally the direction from left to right prevailed throughout the West, to the exclusion of the other modes.

1	2	3	4	*Name.*	*Power.*
		Λ	λ	Lambda.	l
		M	μ	My	m
		N	ν	Ny	n
		Ξ	ξ	Xi	x
		O	ο	Omikron	o (short)
		Π	π	Pi	p
		P	ρ	Rho	r
		Σ	σ ς	Sigma	s
		T	τ	Tau	t
		Υ	υ	Ypsĭlon	ū
		Φ	φ	Phi	f ph
		Χ	χ	Chi	ch
		Ψ	ψ	Psi	ps
		Ω	ω	Oměga	o (long)

In the classical period of the Greek language, the A. had come to consist of twenty-four letters, as in columns 2, 3, 4 of the following table. Column 1 (copied from Ballhorn's *Alphabete*) gives some of the earlier forms of the Greek letters, found on coins and other inscriptions, of the period when writing still proceeded from right to left; column 2 is from the Alexandrian Codex (q. v.), as given in Key's *Alphabet;* and Nos. 3 and 4 are the modern printed forms of capitals and small letters. The small characters are merely cursive forms or variations of the capitals; and it would not be difficult to show how, in each case, the endeavor to trace the capital on soft material rapidly and without lifting the hand, would give rise to the form now used as the small letter.

With regard to the *figures* or shapes of the letters, it is believed that they all arose out of pictures of hieroglyphic characters. The names of the Hebrew letters are also the names of material objects; and the letters themselves were at first, in all probability, rude outlines of the objects. Aleph, for example, means an 'ox,' and the letter was in its origin an outline of an ox's head. The history of Gimel, which means 'camel,' is probably similar. The Hebrew characters known to us are believed to be comparatively modern, and much corrupted from their original forms, and the likenesses are more difficult to trace in them than in the Samaritan and the early Greek, or even in the Latin. Mem, again, is the Hebrew word for 'water,' and some of the earliest forms of the letter M are zigzag lines, similar to the sign of *Aquarius* (♒) in the zodiac, intended no doubt to represent the undulations of water. Ayn, the name of the Hebrew letter equivalent to O, also means an 'eye,' and the picture of an eye would naturally degenerate into a circle, first with a dot in the center (which some ancient O's actually have), and then without a dot.

The A. came into Italy not directly from Phœnicia, but from Greece, and that at a time when the Greek A. had undergone some of the changes described above, although not all of them; *v*, *φ*, and *χ* had been added, but not *ψ* and *ω*. Moreover, there must have been distinct and independent importations into more than one part of Italy, and that, probably, from different parts of Greece, or, at all events, at different periods. The Etrurian A. is evidently an earlier importation than the more southerly Latin, as it departs less from the Phœnician. There are even differences in different parts of Etruria itself. The alphabets of Etruria north of the Apennines (for numerous inscriptions recently discovered show that this remarkable race must have extended at one time as far north as the Alpine valleys of Provence, Tyrol, Graubünden, and Styria) differ slightly from the alphabets of the inscriptions in Etruria proper, which are demonstrably taken from the A. of the Greek colony of Cære.

The Latin A., which became that of Rome, and thus of the whole

1. a		12. m	
2. b		13. n	
3. c		14. o	
4. d		15. p	
5. e		16. q	
6. f		17. r	
7. z		18. s	
8. h		19. t	
9. i		20. v	
10. k		21. x	
11. l			

western world, was borrowed from a newer form of the Greek—namely, that imported by the Dorian Greeks of Cumæ and Sicily. The writing in the oldest Latin inscriptions is never from right to left, as is mostly the case in Etrurian. On the other hand, the Kaph and the Koph (K and Q) of the Phœnician, which disappear in Etrurian, are retained in Latin. The Greek A. of Cumæ had not yet received the addition of *ψ* and *ω*; but it still retained the

A	a		N	n	
Æ	æ		O	o	
B	b		P	p	
C	c		R	r	
D	d		S	s	
E	e		T	t	
F	f		U	u	
G	g		W	w	
H	h		X	x	
I	i		Y	y	
L	l		Þ	þ	th (*thin*)
M	m		Đ	đ	th (*thine*)

representative of the Phœnician *Vau*, the Digamma, and also *Koppa*, and thus consisted of twenty-four letters. The Latin tongue, being destitute of aspirate sounds, dropped the three letters *θ*, *φ*, *χ*, so that the original Latin A. consisted of twenty-one letters, the forms of which, as seen on the oldest inscriptions, were as in the fol-

ing table. See Corssen's *Aussprache, Vocalismus und Betonung der Lateinischen Sprache* (Leip. 1858).

Z was early dropped, and the new letter G (see above) substituted for it; and thus the Latin A. continued to the last to consist of twenty-one letters, until it was applied to the modern tongues of Western Europe. The distinction made between *u* and *v*, and between *i* and *j*, in printing Latin books, is a modern innovation; and no Latin word contains either *y* or *z*. The five additional letters that make up the twenty-six of the English A., arose from the addition of *z*, and the development of *i* into *j*, and of *u* into *w*, *v*, and *y*.

The Anglo-Saxon A. had two useful letters, which have disappeared from modern English—namely, one for the sound of *th* in *thin*, and one (or rather two) for that of *th* in *thine*. These were derived, in all probability, from the Mœso-Gothic A., which (as well as the Russian and other Slavonic alphabets) was founded on the Greek rather than the Latin. The loss of these letters is owing to the influence of the Norman-French, the alphabet of which is exclusively Latin. The forms of the Anglo-Saxon letters are as given on previous page.

'The characters between brackets were written by the Anglo-Saxons, but being for the most part mere corruptions of the Roman forms, are now seldom printed.' Vernon's *Anglo-Saxon Grammar*.

The peculiarities of the several letters will be noticed in their proper places. For their classification, and the defects and redundancies of the English A., see Letters and Articulate Sounds. Other points connected with this subject will be found under Black-Letter, Orthography, and Phonetic Writing.

ALPHEIUS (now Ruféa, Rufiá, or Rofiá) is the chief river of Peloponnesus (Morea), rising in the south-east of Arcadia, and flowing west through Elis, and past the famous Olympia, into the Ionic Sea. This river is one of the most celebrated in ancient song, and is connected with a beautiful and characteristic Greek legend. The nature of the upper course of the A. was calculated to affect strongly the imagination of the Greeks. In its passage through Arcadia, a country consisting of cavernous limestone, and abounding in shut-in basins and valleys, it repeatedly disappears under ground and rises again. After these feats, it was capable of anything—even of flowing under the sea—and the Greek colonists of Sicily thought they recognized it in their new country. Close on the margin of the sea in the island of Ortygia (the site of Syracuse), there was a beautiful and copious fountain; and just where the water of this fountain joined the sea, another strong spring bubbled up under the salt water. This could only be another freak of the A.; and it was popularly believed that the sweepings of the temple of Olympia, after the great festival, when thrown into the river, reappeared in the springs of Ortygia. Strabo asserts as a fact that a cup did so.

This wonderful phenomenon found its explanation, as usual, in a myth, connecting it with the history of the gods. The river-god Alpheius became enamored of the nymph Arethusa while bathing in his stream. To escape him, she prayed to Diana, who changed her into a fountain, and opened up an underground passage for her to Ortygia. The river still pursued the object of his love, passing from Greece to Sicily below the sea, without mingling his waters with it, and appearing in the spring that bubbles up by the shore.

A'LPINE HUSBANDRY. The characteristic feature of A. farming is, that the preparation of fodder is the chief object, and the cultivation of grain only secondary. In the less elevated regions bordering on the flat country, it is the practice to break up the grass from time to time, and take a succession of grain crops. In more elevated districts, the moisture of the climate and the shortness of the season of vegetation, prevent crops requiring tillage from coming to perfection, and there the whole attention is devoted to pasturage and the preparation of meadow-hay. The top-dressing of the plots devoted to hay growing, with the solid and liquid manure of the cattle, the cutting and making of the hay, and transporting it to the farm-offices, occupy a great part of the labor of the population of the Alps. They turn to account for hay-making those shelves and crevices among the mountains which are inaccessible to cattle, and even goats; the herbage, which often grows luxuriantly in such situations, is cut, bound up in cloths or nets, and carried down difficult paths on the head, or is flung over the precipices.

The grass-lands in the lower regions near the dwellings being mostly reserved for hay, the cattle are pastured in summer in those regions that lie too high or too remote to be inhabited in winter. These pastures consist of plateaus and slopes, which immediately on the disappearance of the snow, become clothed with a rich carpet of herbage and flowers. Each separate locality or pasture is called an *Alp*. Some of these 'alps' belong to individuals; others to the commune or parish. The more rocky and steep places are pastured by sheep and goats. There are three zones or stages in the A. pastures. The cattle are driven to the first and lowest stage about the end of May; about a month later, they ascend to the 'middle Alps;' and by the end of July, they reach the Upper Alps. As the days shorten, they descend in the same gradual way, so that the whole 'Alp-time' lasts about 20 weeks. The pastures are provided with huts for those who have charge of the cattle, who also convert the milk into cheese. Little butter is made. The departure for the 'Alps' in spring, and the return in autumn, are made the occasion of popular festivals.

ALPINE PLANTS. This appellation is given not only to those plants which are found at elevations approaching the limit of perpetual snow in the Alps of Central Europe, but also to plants belonging to other mountainous regions in any part of the world, whose natural place of growth is near snows that are never melted even by the beams of the summer's sun. As the elevation of the snow-line, however, varies very much in different countries, according to the latitude, and also from peculiar local circumstances, the term A. P. is not so much significant of the actual elevation of the habitat, as of the average temperature which prevails there. On the Andes, near the equator, at an elevation of 12,000—15,000 feet above the level of the sea, many kinds of plants are found, of humble growth, resembling in their general appearance those which occur in Germany and Switzerland at an elevation of 6000 feet; and these, again, either resemble, or are even identical with, the species which in Lapland grow upon hills of very little elevation, or which, in the northern parts of Siberia, are found at the level of the sea. Similar plants occur also in the Himalaya Mountains, at elevations varying remarkably within very narrow geographical limits from local causes, which also create great differences in the general dryness or humidity of the atmosphere. The laws of this natural distribution of plants have been in our own day for the first time investigated and elucidated by Humboldt, Wahlenberg, Schouw, Decandolle, and others, and form the most essential part of a branch of science still in its infancy, and much requiring further study, phytogeography, or the science of the geographic distribution of plants.

When the A. P. of Central Europe are spoken of, those are meant which grow at an average height of 6000 feet, marking what, in the language of phytogeographic science, is called a *zone*. This, on its northern limit, the Riesengebirge, or Giants' Mountains, falls as low as 4000 feet, and rises, in the southern Alps and Pyrenees, to an elevation of 9000 feet, and sometimes even above it. Although very rich in forms peculiarly its own, this zone contains many plants which are likewise found on much lower hills, and even in the plains. The number of these, however, diminishes as the elevation increases. Hence the small spaces clear of snow in the highest regions possess a very characteristic flora, the plants of which are distinguished by a very low diminutive habit, and an inclination to form a thick turf, frequently, also, by a covering of woolly hairs, whilst their stems are very often either partly or altogether woody, and their flowers are in proportion remarkably large, of brilliant colors, and in many instances very odoriferous, upon which accounts, they remarkably attract and please the occasional visitors from the plains. In the Alps of Central Europe, the eye is at once caught by gentians, saxifrages, rhododendrons, and various species of primrose. With these and other phanerogamous plants, are associated a number of delicate ferns and exceedingly beautiful mosses. The highest mountains in Scotland exhibit a somewhat similar flora, and beautiful plants, both phanerogamous and cryptogamous, are found on them, which never appear in lower situations, as the Alpine Speedwell (*Veronica Alpina*), the small Alpine Gentian (*Gentiana nivalis*), the Rock Scorpian Grass, or Alpine Forget-me-not (*Myosotis Alpestris*), *Azalea procumbens*, *Woodsia Ilvensis* and *hyperborea*, &c. Many A. P. are limited to a very small district. Thus, the flora of Switzerland differs considerably from that of Germany, the latter being now known to contain 3400 phanerogamous plants, of which the former contains 2200, and along with them also 126 species which have hitherto been found only in the Swiss Alps.—There are, moreover, particular species of plants which are found only in single localities, as *Hypericum coris*, upon the mountain of Wiggis in the canton of Glarus; *Wulfenia Carinthiaca*, upon the Küweger Alp, in Upper Carinthia, and many others. There are, however, many species which, occurring on the mountains of Central Europe, appear also in those of Britain and of Scandinavia at lower altitudes, but are not found in the intervening plains. See Species, Distribution of.—Cryptogamic plants are generally found in Alpine regions in much greater abundance than elsewhere. The transplanting of A. P. into gardens is attended with great difficulties, and is rarely successful. Their great beauty, even when dried, makes them favorites with those plant-collectors who have amusement more in view than the mere interests of science. Small herbaria of them are offered for sale everywhere in Switzerland; and in some places, large collections have been prepared and thrown open to the public.

ALPI'NIA. See Galangale.

A'LPNACH, or ALPNACHT, a Swiss village, in the canton of Unterwalden, at the foot of Mount Pilatus, 1½ miles from that part of Lake Lucerne called Lake A. It is known principally on account of its celebrated 'slide.' This was a sort of wooden trough by which the felled timber of Mount Pilatus was conveyed with amazing velocity from a height of 2500 feet down to the lake. In order to prevent friction, the trough was perpetually lubricated by a slender rill of water. It is no longer used, the wood being now drawn down by horses and oxen. Population of A., 1500.

ALPS, the most extensive system of lofty mountains in Europe, raise their giant masses on a basis of 90,000 square miles, between 6° 40' and 18° E. long., and extending in some places from the 44th to the 48th parallel of latitude. The word *Alp* or *Alb*, signifying in the Celtic language 'white,' was the name given to these mountains on account of their tops being perpetually covered with snow. The Alpine system is bounded on the N. by the hilly ground of Switzerland and the upper plain of the Danube; on the E., by the low plains of Hungary; on the S., by the Adriatic Sea, the plains of Lombardy, and the Gulf of Genoa; and on the W., by the plains of Provence and the valley of the Rhone. A string of lakes encircles both the northern and southern bases of these mountains, the former at an elevation of 1200—2000 feet; the latter, 600—700 feet. The varied natural scenery of France, Italy, Germany, and Hungary has a common center of union in this lofty region. Valleys open out in all directions, sending their melted snows on one side into the North Sea, on another into the Black Sea, and another into the Mediterranean.

The *water-system* of the A. may be thus briefly sketched: 1. In the basin of the Rhine, there is the Rhine itself, which partly forms the Lake of Constance, at the north-eastern extremity of Switzerland, and receives on the left the important tributaries of the Thur and the Aar; the latter of which flows through Lakes Brienz and Thun, and is itself augmented by various affluents, the largest of which are the Reuss and the Limmat. 2. In the basin of the Danube there flow from the south the Iller, Lech, Isar, and the Inn. Still further east, the Danube has for its tributaries the Traun, the Ens, the Raab, the Drave, and the Save, the last three of which have their sources in the extreme Eastern A. 3. In the basin of the Po, there are numerous streams, which rise in the Southern A.; the principal of these are the Dora, Baltea, the Sesia, the Ticino from Lake Maggiore, the Mincio from Lake Garda, and the Adige. 4. In the basin of the Rhone, there are the Rhone (flowing through the Lake of Geneva), and various Alpine tributaries, the most important of which are the Arve, the Isère, and the Durance. 5. The Var is the principal Ligurian coast-stream; the Piave, and the Tagliamento, the largest of those which fall into the Adriatic from the Southern A.

Divisions.—In order to give a clear view of the manifold ranges of this mountain-land, a distinction is generally made between the East, the West, and the Middle A.; the last of which is again divided into a northern, central, and southern chain; while a natural separation by river-valleys into groups is also made. I. WEST A.—The principal ranges of these are: 1. The Maritime A., extending from the middle Durance southwards to the Mediterranean, and rising in the Rocca dell' Argentera to a height of 10,795 feet. 2. The Cottian A., north of these, whose highest summit, Monte Viso, is 13,599 feet. 3. The Graian A., forming the boundary between Savoy and Piedmont, and attaining in Mont Iséran an elevation of 13,272 feet, and in Mont Cenis, an elevation of 11,457 feet. II. MIDDLE A. *Central Chain*—1. The Pennine A. between the plains of Lombardy and the valley of the Rhone. Highest summits: Mont Blanc, 15,744 feet; Monte Rosa, 15,151 feet; Mont Cervin, 14,836 feet. 2. The Leponian or Helvetian A., from the depression of the Simplon, along the plateau and masses of St. Gothard (12,000 feet), to the pass of Mont Splügen. 3. The Rhætian A., between the Inn, the Adda, and the Upper Adige. *Northern Chain.*—1. The Bernese A., between the Rhone and the Aar; highest summits: Finsteraarhorn, 14,026 feet; Jungfrau, 13,716 feet; Schreckhorn, 13,397 feet. 2. The A. of the Four 'Forest Cantons,' the Schwytz A., &c. *The Southern Chain.*—1. The Oertler A., between the Adda and the Adige; highest summit, Oertlerspitz, 12,822 feet. 2. The Trientine A., between the Adige and the Piave; highest summit, La Marmolara, 9802 feet. III. EAST A.—The principal chains of these are: 1. The Noric A., between the plains of the Drave and the Danube; highest summit, Gross-Glockner, 12,431 feet. 2. The Carnic A., between the Drave and the Save. 3. The Julian A., between the Save and the Adriatic Sea; highest summit, Mont Terglu, 9366 feet.

Elevation.—With respect to height, it is a general rule that the A. are lowest where the system is broadest, that is, in the E., and highest where the system is narrowest, that is, towards the W. Making a threefold distinction of crests, summits, and passes, the principal ranges may be characterized as follows. The crest-line (1) of West A., 6000—11,000 feet; (2) of Middle A., 9000—13,000 feet; (3) of East A., 3600—9000 feet. The summits: (1) of West A., 9000—14,000 feet; (2) of Middle A., 9000—15,800 feet; (3) of East A., 6000—12,000 feet. Height of the passes: (1) of West A., 4000—8000 feet; (2) of Middle A., 6500—11,000 feet; (3) of East A., 3500—6000 feet.

A comprehensive classification leads to a division of the elevations into three regions: 1. The lower range forming the buttresses of the main masses, and reaching a height of 2500—6000 feet; that is, to the extreme limit of the growth of wood. 2. The middle zone lying between the former limit and the snow-line, at the elevation of 8000—9000 feet. 3. The high A., rising to 15,744 feet. The middle zone forms the region of mountain pasturages, where the characteristic Alpine dairy-farming is carried on. These pastures consist of a rich carpet of grass and flowers. This threefold division of heights, however, does not everywhere coincide with the same phenomena of vegetation: the line of perpetual snow descends lower on the north side, and the boundaries of the zones above described vary accordingly. 1. The line of demarcation between the region of mosses and Alpine plants and that of perpetual snow, is from 8000—9000 feet on the northern declivities; but on the southern it approaches 10,000 feet. 2. The highest limit to which wood attains on the north is about 6000 feet, while on the south it is nearly 7000 feet. 3. Grain, beech, and oak, on the north, disappear at the elevation of 4000 feet; on the south, they contrive to exist, some hundreds of feet higher. 4. The region of the vine, as well as of maize and chestnuts, extends to an elevation of 1900 feet on the northern declivity, and on the southern declivity to 2500 feet. The ranges of outlying lower mountains which flank the high central Alps on the N., E. and W., are mostly wanting on the S., especially where the Middle A. descend into the plains of Lombardy. Thus the A. rise in steep rocky precipices from the level of the flat plains of the Po, whilst they sink more gradually into the plains on the north; hence their mighty masses closely piled together present an aspect from the south more grand and awful; from the north, more extended and various.

Valleys.—The variety in the valleys as to form and arrangement is not less striking than in the elevations. Most worthy of notice is the characteristic form of the wide longitudinal valleys that lie at the foot of the high central chains. On the E. side, they open directly into the plain; on the N., they are connected with the plain through transverse valleys which often end in lakes. The transverse valleys on the S. side are mostly in the shape of steep rocky ravines, forming in some parts long-stretching lakes. Besides the deep-sunk principal valleys, there are extensive series of basin-shaped secondary valleys, which are the scenes of Alpine life, properly so called. Many of the Alpine valleys have names distinct from the rivers flowing through them. Thus, the valley of the Rhone is styled the Upper and Lower Valais; that of the Adda, the Valteline; of the Arve, Chamounix.

Communications—Passes.—The valleys of the high A. form the natural means of communication. Some are more accessible than others. The entrance into a longitudinal valley is almost always smooth and easy; art has often had to force an entrance into a transverse valley. On many of the high roads which link the principal with the secondary valleys, it has been found necessary to blow up long ridges of rock, to build terraces, to make stone-bridges and long galleries of rock as a protection against avalanches, as well as to erect places of shelter (*hospices*) from storms. The construction of these roads may be reckoned among the boldest and most skilful works of man. In crossing the A., several defiles (usually seven) have to be traversed; for in addition to the pass of the main crest, there are other defiles on both sides, at the entrances of the different valleys. In the E., the number of these narrow passes or defiles is considerably increased. The names applied to the Alpine passes vary according to their natural features or the local dialect; as Pass, Sattel (Saddle), Joch (Yoke) Scheideck, Klause, Col, Chiusa. The traveler, in the course of a day's journey, experiences a succession of climatic changes, which is accompanied with an equal variety in the manners of the people.

No lofty mountains in the world can boast of being so easily crossed as the European A. Hence we can understand how the plains of Upper Italy, accessible from the French, German, and Hungarian sides, have been the theater of bloody strife for ages. The passage of the WEST A. is made by five principal roads. 1. The military road, La Corniche, a coast-road at the foot of the A. from Nice to Genoa, parallel to which a railroad now runs. 2. The causeway over the Col-di-Tenda, between Nice and Coni, made in 1778; highest point, 5890 feet. 3. The high-road over Mount Genèvre, connecting Provence and Dauphiné with Turin; highest point, 6550 feet. 4. The carriage-road made by Napoleon in 1805, over Mount Cenis, connecting Savoy with Piedmont; highest point, 6770 feet. Near this the chain is pierced by the railway tunnel (see TUNNEL, and CENIS). 5. The pass of the little St. Bernard, connecting Geneva, Savoy, and Piedmont; highest point, 7190 feet. By this pass, Hannibal crossed into Italy. It is not much used now. Besides these great roads, there are many smaller ones branching off from them, which form a pretty close network of

communication. The passage of the MIDDLE A. is made by eight principal roads. 1. That of the Great St. Bernard, connecting the valley of the Rhone with Piedmont; highest point, 8170 feet. It was crossed by Napoleon in 1800. 2. The magnificent road over the Simplon, constructed by Napoleon, 1801—1806, and connecting the Valais with the confines of Piedmont and Lombardy; highest point, 6570 feet. 3. Between the Great St. Bernard and Monte Rosa is the Col of Mont Cervin, the loftiest pass in Europe, being nearly 11,300 feet, connecting Piedmont with the Valais. 4. The pass of St. Gothard, connecting Lucerne with Lago Maggiore; highest point, 6800 feet. The borings of the railway tunnel met in 1880. 5. The Bernardin Pass, made 1819—1823, by the Swiss Grisons and Sardinia; highest point, 6800 feet. 6. The Splügen Pass, repaired in 1822, connecting the sources of the Rhine with the Adda. This pass was the one used by the Romans in their intercourse with the countries bordering on the Danube and the Rhine, and also by the German armies on their marches into Italy in the middle ages. 7. The Wormser Joch, also called the Orteles Pass, or Road, opened by Austria in 1824. It is the loftiest carriage-road in Europe, and connects the Tyrol with Lombardy. 8. The Brenner Pass, known to the Romans. It also connects the Tyrol with Lombardy; highest point, 4650 feet. It is now crossed by a railway. Besides these great roads, leading south into Italy, there are two which lead north from the valley of the Rhone, and cross the Bernese A., over the Grimsel Pass, 6500 feet high and the Gemmi Pass, 7400 feet high. The roads over the EAST A. are much lower, and also much more numerous than those in the MIDDLE or WEST A. The principal are—1. The road from Venice to Salzburg, crossing the Noric A. at an elevation of rather more than 5100 feet. 2. The road over the carnic A., which divides into three branches —the first leading to Laybach; the second, to the valley of the Isonzo; and the third to the valley of the Tagliamento. 3. The roads from the Danube at Linz to Laybach.

Geology.—The A. offer a rich field for geological investigations, the results of which hitherto may be thus summed up: The highest central mass—the Primary A., as they are called—that rises from the plain to the S.W. of Turin, and stretches in a mighty curve to the Neusiedlersee, in Hungary, consists chiefly of the crystalline rocks Gneiss and Mica-slate, with a much smaller proportion of Granite. Enclosed among the Central A. appear representatives of the Carboniferous and Jurassic formations; but so altered and become so crystalline that their age can only be guessed from a few remaining petrefactions, which are accompanied here and there by garnets. In the Graian, Pennine, and Rhætian A. occur great masses of serpentine; in the N. of Piedmont, and in the upper valley of the Adige, quartz-porphyry. In the E. there are, on the N. and S. sides of the chief range, vast deposits of clay-slate and grauwacke mixed with transition limestone.

Beginning on the Mediterranean coast and following in general the direction of the central chains, a belt of sedimentary rocks runs along the W. and N. sides to the neighborhood of Vienna. On the south side, a similar belt runs from Lake Maggiore to Agram. The undulating curves and colossal dislocations presented by these regions, show that the form of their mountains must have been the result of a mighty force acting northwards and southwards from the Central A. In respect of age, these sedimentary or calcareous A. include all the members of the series of formations from magnesian limestone up to the lowest strata of the tertiary group. The south-eastern portion of these calcareous mountains, forming the Julian A., mostly consist of cavernous rocks of the Jurassic and chalk groups; and are continued with this character into Dalmatia.

Minerals.—Precious stones are found in abundance in the trap and primary mountains, especially in the region of the St. Gothard. The rock-crystal of St. Gothard has a world-wide reputation. Mining and smelting become more and more productive as we advance eastward. Switzerland itself is poor in useful ores. Gold and silver are found in Tyrol, Salzburg, and Carinthia; there are also silver-mines in Styria and Illyria, and one near Grenoble, in France. Copper is found in the French A., in Tyrol, and Styria. The lead-mines near Villach, in Carinthia, yield nearly about 35,000 cwt. The yield of iron in Switzerland, Savoy, and Salzburg is trifling; Carinthia, on the other hand, produces 260,000 cwt., and Stiria 450,000 cwt. Quicksilver is extracted at Idria, in Carniola, to the amount of 1000—1500 cwt. The Alpine region is rich in salt, especially at Hall in Tyrol, and Hallein in Salzburg. Coal is found in Switzerland, in Savoy, and in the French A., but in no great quantity; the Austrian A. are, again, richer in this important mineral. The mineral springs, hot and cold, that occur in the region of the A. are innumerable. See AIX, ISCHL, LEUK, BADEN, &c.

Animals.—The Alpine mountains present many peculiarities worthy of notice in the animal as well as in the vegetable kingdom (see ALPINE PLANTS). On the sunny heights, the number of insects is very great; the butterflies are especially numerous. There are few fishes, although trouts are sometimes caught in ponds even 6000 feet above the level of the sea. Although the lofty mountains are inhabited by eagles, hawks, and various species of owls; yet the birds are few in comparison with the numbers in the plains, and those few are mostly confined to the larger valleys. Among the quadrupeds, the wild goat is sometimes, though rarely, to be met with; the chamois is more frequently seen, chiefly in the eastern districts. The marmot inhabits the upper Alpine regions. Wolves are seen more frequently in the west than in the east; in the latter, on the other hand, bears, lynxes, and wild-cats are found, although constantly diminishing in number. Of the domestic animals, goats and oxen are scattered everywhere in large herds. There are fewer sheep and horses, and these are not of good breeds. Mules and asses are used more frequently in the south than in the north, especially as beasts of burden. Swine and dogs are not common; the latter are used almost solely by the herdsmen, or are kept in the hospices, to assist in searching for the unfortunate wanderers who may be lost in the snow.

The Alpine mountains are rich in singularly beautiful natural scenery, of which the inhabitants of flat countries can scarcely form an idea. Nature in the A. has an infinite variety of aspects. Here the hardened masses of the icy glacier cover the naked rocks avalanches are hurled into immeasurable abysses, the fall of rocky or mountain-slips overwhelm the dwellings and cover the fields in the valleys; and in the east, the *bora*, with its hurricane strength, hurls before it the upraised masses of snow. There the sun glances upon the scattered silver threads of a water-fall, or mirrors himself in the peaceful waters of a glassy lake, while his rising and his setting are announced to the expectant traveler by the ruddy glow on the snowy mountain-tops. The inhabitant of the A., surrounded on every side by mountains, is unconsciously subdued by their presence, and receives from them a peculiar stamp of character; their dangers fascinate him as well as their charms. The most ceaseless variety of occupation demands all his time and his thoughts; in the mountains he acknowledges his only despots, who seize his soul, and lead it unresistingly. In his constant struggle with the elements, the Alpine dweller strengthens both his mind and body; he opens his heart to the impressions of nature; he gives utterance to his childlike gladness in simple songs, and at the same time defends with self-sacrificing devotion his mountain-fortress against foreign aggression. But the manners and spirit of the neighboring plains have penetrated into the larger valleys along with the dust of the highway. There the true Alpine life has more and more passed away. The simplicity and characteristic industry of the Alpine farms are now preserved only in the higher secondary valleys.

Six states share the A. The western portion is shared by France and Italy. Switzerland claims the Middle A. almost exclusively for her own. Bavaria has only a small share. Austria has the largest share of the A.—in the provinces of Tyrol, Illyria, Styria, and the archduchy. The wide valleys opening to the east allow the civilization of the plains to enter easily among the mountains. The value of the minerals, and the fertility of the soil, have permitted mining, manufactures, and agriculture to take firm root, and a flourishing trade has caused large towns to usurp the place of mere Alpine villages. In the Tyrol, the pastoral life of the mountains has long been mixed up with the working of mines of salt or other minerals. The inhabitants of whole valleys are occupied in various branches of industry to a greater extent than in any other district of the A., and their sons travel far and near as artisans. See H. and A. Schlagintweit, *Researches into the Physical Geography of the A.* (*Untersuchungen über die Physikalische Geographie der Alpen*), Leip. 1850.

ALPUJA'RRAS (a corruption of an Arabic word which signifies 'grass'—an allusion to the splendid pasturage on the north side), a range of mountains parallel to the Sierra Nevada, and approaching the coast of the Mediterranean Sea. Their southern side is precipitous, but the northern slopes away into broad valleys, beyond which rises the Sierra Nevada. They commence in the west at Motril, where they are separated by the Guadalfeo, from the lower Sierra de Holucar, and the adjacent vine-covered hill of Malaga, and stretched as far east as the river Almeria. The range is divided into two parts by the Adra, each of which bears a particular name. The highest peaks reach an elevation of 7000 feet. On the north side, owing to the copious rains, there is the richest pasturage, both in the deep valleys and on the uplands. The southern slope, however, is almost destitute of trees or shrubs, with the exception of the fertile valleys near the sea, which are abundantly watered by numerous little streams. Here flourish, under an almost tropical climate, all the products of the south, even the date-palm and the sugar-cane. The inhabitants are chiefly employed in rearing sheep, and in cultivating the vine and other fruits. A little mining also goes on. Lead, antimony, and silver are got. The Moorish element is still quite discernible in the population of this mountain region.

ALSA'CE, a German district, forming, along with Lorraine, an imperial territory (Reichsland), reunited (all but the small district of Belfort) to that country in 1871, after two centuries' pos-

session by France. It lies between the Rhine on the east and the Vosges Mountains on the west, extending south to Switzerland, and north to Rhenish Bavaria, and occupying 3360 English square miles. It is exceedingly fertile; rich also in mines and manufactures; and contains the important cities of Strassburg, Colmar, and Mühlhausen. In Cæsar's time, A. was occupied by Celtic tribes; but during the decline of the empire, the Alemanni and other tribes from beyond the Rhine occupied and completely Germanized it. It afterwards formed part of the German empire, under various sovereign dukes and princes, latterly of the House of Hapsburg; till a part of it was ceded to France at the peace of Westphalia, and the rest fell a prey to the aggressions of Louis XIV., who seized Strassburg (1681) by surprise in time of peace. By the peace of Ryswick (1697), the cession of the whole was ratified. Thus—as the Germans used to complain—was this fine land, and one of the noblest branches of the race, alienated from the German people, and the command of the German Rhine disgracefully surrendered to the enemy in the time of misfortune, and, more disgraceful still, not demanded back when fortune favored. German never ceased to be the language of the people, and all newspapers were, during the whole period of the French possession, printed in both languages. Pop. of Alsace-Lorraine, (1880) 1,566,670.

A'LSEN (Dan. *Als*), an island in the Baltic, in the Prussian province of Slesvig-Holstein, and extending from the Apenrade to the Flensborg Fiord, is separated from the mainland by the Sound of A., in part very narrow but deep. Its greatest length is nearly 20 miles; its greatest breadth about 12; lat. 54° 46′ N., long. 9° 52′ E. The island, one of the finest in the Baltic, has a picturesque appearance, is very fertile, with rich woods, and numerous lakes abounding in fish. Its fruit-trees are celebrated over all Slesvig. The Gravenstein apple, in particular, forms an important article of commerce. The chief towns are Sonderborg or Sūdborg (South Town), and Norborg or Nordburg (North Town). The former has an excellent harbor, with a population (1880) of 5863. Close to the harbor are the ruins of an old and famous castle belonging to the Augustenborg family. Here Christian II. of Denmark and Norway was confined from 1532 to 1549. In the war of 1864, A. was taken by the Prussians from the Danes.

ALSTER, a river in Holstein, is formed by the confluence of three streams, and, in the neighborhood of Hamburg, spreads itself out, and forms a lake, called the Great or Outer A., and within the town, the Inner A. It flows by several canals into the Eibe.

ALSTRŒME'RIA, or ALSTRŒMER'S LILY, a genus of plants of the natural order *Amaryllideæ* (q. v.), and, according to Lindley, of the tribe *Alstrœmerieæ*, which is distinguished by fibrous—not bulbous—roots, and by having the outer segments of the perianth different in form from the inner. In this genus, the two lower segments are somewhat tubular at the base, the capsules do not gape when ripe, are 3-valved or pulpy within, and the seeds globose. The leaves are twisted, so that what should be the upper surface, becomes the lower. The species are numerous, natives of the warmer parts of America. Many of them have tuberous roots. Some are sufficiently hardy to endure the open air in Britain, and are admired ornaments of our flower-gardens. Some have climbing or twining stems; amongst them is the salsilla (*A. salsilla*), a plant of great beauty, with lanceolate leaves, a native of Peru, which is cultivated in the West Indies, and its tubers eaten like those of the potato. In Britain, it requires the stove or a hot-bed. *A. ovata*, also a beautiful plant, with a slender twining stem, and ovate leaves, is cultivated in Chili for its tubers, which are used as food. It has been introduced into Britain, but its cultivation has made little progress. The tubers weigh from 3 to 6 ounces. A kind of arrow-root is also prepared in Chili from the succulent roots of *A. pallida* and other species.

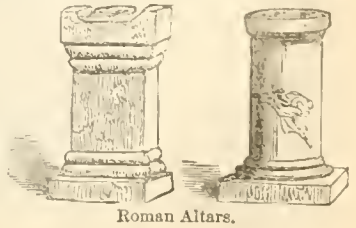
ALTA'Ï (i. e., gold mountain) is the term vaguely applied to the high range in the east of Asia, forming the northern border of vast table-land known by the name of Chinese Tatary, and extending from 80° to 142° E. long. The A. mountains constitute the boundary between the Russian and Chinese empires, or between the long icy lowlands of Siberia, stretching away to the Arctic Sea, and the variegated central plateau that lies south of them. Their general direction is from east to west. They are divided into many ranges and groups, each having a distinctive name. From the Sea of Okhotsk, in the extreme east of Asia, they extend in a broad and winding mass to the plains of Turkestan, a little to the west of Lake Zaisan, or Zaizang, a distance of more than 3000 miles. The breadth of the system is, in some places not less than 800—900 miles. From Okhotsk to the Lena, it is called the Aldan Chain; it is next separated into three groups by the valleys of the Amur, Yenisei, and Irtish, the last of which is called the Little A., to distinguish it from the spur that strikes off into Chinese Tatary in a south-easterly direction, and which is called the Great A., a range that in some places towers into the region of perpetual snow, and whose most easterly cliffs abruptly disappear in the dark clouds which overhang the sandy steppes of Gobi. The Russian A., between Semipalatinsk and the sources of the Obi, have been colonized by the Russians, and, as they rival the Ural Mountains in their mineral wealth, they have already become one of the most important districts of the Russian empire.

This chain consists of a broad Alpine range on the north-western edge of Chinese Tatary, and is called the Altai-Bjelki, or Snowy Mountains. It reaches in its highest peaks an elevation of nearly 11,000 feet. Little is known of the geology of the Altaian system. Jasper is found in considerable abundance near the summits, red porphyry lower down, and granite still lower. Around Lake Baikal there are numerous granite masses, interspersed with newer igneous formations, but active volcanoes do not appear until the range reaches Kamtchatka. The mines are rich in gold, silver, copper, and lead. The botany of the mountains is as imperfectly known as the geology, but it seems to be worthy of closer attention. North of the A.-Bjelki, lies the broad zone of A. mineral districts, the inhabitants of which are employed as miners and agricultural laborers, over whom a strict watch is kept. The south-east is peopled by the Calmucks of the mountains, a Mongolian race. They are heathens, and their government is a patriarchal one. They lead a nomadic life, encamping in summer among the rich pastures on the mountain-terraces, and in winter within the sheltered recesses of the woody glens.

ALTAI' MOUNTAINS. Since the article ALTAI was originally written, the explorations of Russian surveyors have led to a more definite knowledge of the form and limits of this important range, now described as a separate system, one of the four parallel chains which constitute the skeleton of Eastern High Asia, covering the great tableland. The A. forms an alpine girdle, intersected by wide valleys traversed by many streams, among which are the Tez river, flowing west to the Ubsa Nor (lake), and the Kobdo, flowing south to the Tke Aral Lake. The general direction of the range is from west to east, about the parallel of 50° north. It extends between the meridians of 81° and 100° east. On the east, the A. is separated from the Daurian mountain-system by lakes Kosgol and Baikal; on the west, it terminates in the Katunsk Mountains, a small isolated group, in which Mount Beluka rises to 12,790 feet, far above the line of perennial snow, with extensive glaciers on its western flanks. The climate of the A. is not so severe as might be inferred from its position. The winters are frequently mild, and comparatively little snow falls. The mountain slopes are covered with rich grass, and their flanks are in many parts adorned by magnificent cedar forests. Stags, hares, and wolves abound in the lower, and bears in the higher portions of the range. The A. is celebrated for its gold, silver, and lead mines. Barnaul, on the northern slope of the range, is the chief mining town; and the village of Zeminogorski, south of Barnaul, is in the center of the richest silver mines in the Russian Empire. North of the Ubsa Nor (lake), the Tangnu Ula Mountains, connected with the A. on the north, rise to upwards of 11,000 feet. They furnish abundance of white marble of an excellent quality.

ALTAMU'RA, a town of South Italy, in the province of Bari, and 28 miles south-west from Bari, at the eastern base of the Apennines. It is a well-built and beautiful town, surrounded with walls, and having a magnificent cathedral. The surrounding country is fertile, produces much oil and wine, and abounds in rich pastures. A. is supposed to occupy the site of the ancient *Lupazia*. Many fine Grecian antiquities have been dug up. Pop. 17,198.

A'LTAR (Lat. *altare*, from *altus*, high), the place whereon offerings were laid both by Jews and heathens. The first on record is that which Noah built on leaving the ark. The Israelites, after the giving of the Law, were commanded to make one. We find, from the Old Testament (1 Kings, iii. 3; 1 Kings, xi. 7; and 2 Kings, xxiii. 15), that altars were often erected on high places—sometimes, also, on the roofs of houses. Both in the Jewish tabernacle and temple there were two altars, one for sacrifices, and another for incense. For a minute description of these, see Exodus, Leviticus, and Numbers. The Jewish and oriental altars were generally either square, oblong, or approximating to such; those of Greece and Rome, on the other hand, were often round. Sacrifices were offered to the infernal gods, not on altars, but in cavities dug in the ground.—The word has been transferred into the Christian system. For upwards of five centuries, altars in the Christian churches were, for the most part, made of wood; but in 509 A.D it was decreed by a council held at Epone, in France, that none should be consecrated with chrism except those built of stone. In the first ages of Christianity, there was only one A. in a church; but, from a very early time, the Latins have used more than one. In the 12th c., the adorning of churches with images and



Roman Altars.

numerous altars was carried to a great extent, and they were embellished with gold, silver, and precious stones. The Greek Church use but one A. Altars were frequently placed at the west end of the ancient churches, instead of the east, but in England almost uniformly in the east. The only perfect A. of the old times in England is the high A. of Arundel Church, Sussex. The slab is 12 feet 6 inches long, by 4 feet wide, and 2½ inches thick. The support is of solid stone, quite plain, and plastered over. For 300 years after the time of Christ, the word A. was constantly used to describe the table of the Lord; subsequently, 'table' and 'altar' were used indifferently. In the first Prayer-book of King Edward, 1549, the word A. was used in the Rubric, and the Lord's Supper was still called the Mass; but in 1550, an order was issued for the setting up of tables instead of altars, and in the second Prayer-book of 1552, the word *altar* was everywhere replaced by *table*. The table was further ordered to be of wood, and movable.

In Mary's reign the altars were re-erected; but in Queen Elizabeth's, some were riotously pulled down, and injunctions were then issued directing that this should not be done, except under the oversight of the curate and at least one churchwarden. It was charged against Archbishop Laud that he had converted communion-tables into altars. What he really did was to remove the tables out of the body of the church, and place them 'altar-wise,' i. e., north and south, at the upper end of the chancels, where the altars formerly stood; and a dog having on one occasion run away with a piece of the consecrated bread, he directed that rails should be erected to prevent such desecrations in future. The old stone altars used frequently to be made in the shape of tombs, and they enclosed relics; this was from the early Christians having often celebrated the eucharist at the tombs of the martyrs, or, as others say, they were thus made with the design of representing Christ's humanity as having been real, and vouched for by the fact of his body lying in the tomb. The Credence Table and Piscina are adjuncts of an A. By the judgment in the Arches Court, 1845, in the case of Faulkner *v.* Litchfield, it was decided that altars may not be erected in churches. This case arose out of the erection, by the Cambridge Camden Society, of a stone A. in the Church of the Holy Sepulchre in that town.

The old English divines, and, indeed, all Protestant ecclesiastical writers of any importance, are unanimous in the opinion, that among Christians the word cannot mean what the Jews and heathens expressed by it. The later fathers used various phrases to denote the solemnity which should attach to the communion-table, such as 'the Mystical and Tremendous Table,' 'the Mystical Table,' 'the Holy Table,' &c. And they termed it an A., because *first*, the holy eucharist was regarded as a kind of commemorative sacrifice, or, more properly, a consecrated memorial before God of the great sacrifice on Calvary; and, *second*, the prayers of the communicants were held to be in themselves sacrifices or oblations—sacrifices of thanksgiving, as it were. This is the view of those who hold High Church opinions, but does not exclude the other view. Again, they termed it a *table* when the eucharist was considered exclusively in the light of a sacrament, to be partaken of by believers as spiritual food. In the former case, the sacrifice was commemorated; in the latter it was applied: in the former, it expressed more directly the gratitude; in the latter, more directly the faith of the Christian.

A'LTDORFER, ALBRECHT, painter and engraver, was born at Altdorf, in Bavaria, 1488, and died at Ratisbon, 1538. He is said to have been a pupil of Albert Dürer; but this is not certain. He belongs, however, to that religious school of artists of which Dürer was the head. His pictures are also animated by a glowing and romantic spirit of poetry, which is delightful to any one who appreciates the conditions of old German life. The landscape is delineated with the same truth and tenderness as the figures; a rich manifold life pervades the scenes, and everything is handled with the utmost delicacy. His master-piece, now in Munich, is 'The Victory of Alexander over Darius,' a painting which, it is said affects the beholder like a heroic poem. As an engraver, A. is reckoned among the lesser masters.

ALTE'A, a seaport town of Valencia, Spain, in the province of Alicante, and 25 miles north-east from Alicante. It stands on a rising ground, on the right bank of a small river called the Alga, and at the head of a bay. It has wide streets, but many of them are steep. The inhabitants are mostly engaged in agriculture; some of them are fishers and sailors. Linen fabrics, ropes, and soap are manufactured. Pop. 5502.

A'LTEN, KARL AUGUST, COUNT of, one of the chief Hanoverian generals in the French and German war, was born October 20, 1764; entered the Army in 1781, and gained distinction at the siege of Valenciennes, and in the decisive engagement at Hondschooten. He was first lieutenant in 1800, but on account of his unhappy capitulation at Lauenburg, found it advisable to leave Hanover, and came to England. Here he was made commander of the first light battalion in the German Legion (1803). In 1808 he assisted, as general of brigade, in covering the retreat of General Moore to Corunna, and in the following year commanded the troops stationed in Sussex. In 1811, he took part, under General Beresford, in the siege of Badajoz and the battle of Albuera, and in the following year was promoted by the Duke of Wellington. In almost all the engagements of the Spanish war of liberation—at Salamanca, Vittoria, the Pyrenees, Nivelle, Nive, Orthez, Toulouse, &c., A. took a prominent part, and had the command of a corps of 30,000 men, stationed near Madrid, in 1812. He fought with great distinction at Quatre-Bras and at Waterloo, where he was severely wounded; his efforts greatly contributed to the decision of the battle. After his return to Hanover, he was made minister of war, and in this capacity died, April 20, 1840.

A'LTENA, a town of Westphalia, Prussia, in the goverment of Arnsberg, 40 miles north-east from Cologne. It stands on the right bank of the Lenne, in a deep and picturesque valley. It has large public works, the machinery of which is moved by water-power, and manufactures great quantities of needles, pins, and other small articles of hardware. There are also stocking manufactories and tanneries. Pop. (1875) 7791.

A'LTENBURG, the capital of the duchy of Saxe-Altenburg, is situated in a fertile country about 24 miles from Leipzig, and contains (1880) 26,241 inhabitants. Standing on an almost perpendicular rock of porphyry, the old castle of A. forms a striking feature in the landscape. Its foundations are probably as old as the 11th c. A. possesses several excellent educational institutions, a museum, and a theater. Brushes, gloves, and cigars are among the chief manufactures carried on in A., and the book-trade is considerable. A railway connects it with Leipzig and Bavaria.

A'LTENGAARD, or ALTEN, a seaport town in the province of Finmarken, Norway, situated at the mouth of the river Alten, in lat. 69° 55′ N., and long. 23° 4′ E. Beyond this point, no cultivation is attempted; and even here, potatoes and barley alone are produced. A. has a harbor and considerable trade. It is visited principally by Russian and Norwegian vessels. Pop. about 1000.

ALTEN-ÖTTING, or ALTÖTTING, a place of pilgrimage not far from the Inn, is situated in one of the most beautiful and fertile plains of Upper Bavaria. It is frequented by thousands of Roman Catholics from Austria, Bavaria, and Swabia, on account of a famous image of the Virgin Mary (the '*Black Virgin*') which it possesses, and may be called the Loretto of Germany. It has also an extraordinarily rich treasure of gold, silver, and precious stones. From 1838 till their expulsion in 1873, A. was the headquarters for Germany of the Redemptorist fathers. There is also a Capuchin monastery here. A. was originally a *villa regia*. Several German emperors, such as Henry III. and Henry IV., held their court here. The emperor Leopold I., and other princes of the House of Hapsburg, made pilgrimages to it. A chapel, called Tilly's or Peter's Chapel, contains the tomb of Count Tilly, who was buried here at his own request. Maximilian I., and numerous other princes and princesses of the Bavarian family, had their hearts interred in it. Pop. (1880) 3168.

A'LTERATIVES, in Medicine, a term applied to remedies that have the power of changing the state of the living solids of the body, and consequently altering the functions which they perform. It is generally applied, however, to medicines which are irritant in full doses, but which almost imperceptibly alter disordered actions or secretions; acting specifically on certain glands, or upon absorption in general, when they are given in comparatively small doses, the treatment being continued for a considerable length of time. For example, mercury is an irritant in some of it preparations; but when small doses of blue pill, Plummer's pill, or corrosive sublimate are given at intervals for some length of time, they 'produce *alteration* in *disordered* actions, so as to cause an improvement in the nutrient and digestive functions, the disappearance of eruptions, and the removal of thickening of the skin or of other tissues' (Royle); and they will effect these changes without otherwise affecting the constitution or inducing salivation. So iodine, also another irritant in concentrated doses, and poisonous in some forms, is most useful, when given in small doses, in affecting the removal of enlarged glandular organs, and need not cause iodism, if carefully given.

The preparations of gold are likewise stimulants of the absorbents, and are used in cases of scrofula. Some preparations of arsenic are powerful A. in cases of skin-disease. So also are the decoctions of the *woods* and their substitutes, such as decoctions of sarsaparilla, and the like, which, when taken in large quantities of water, must operate partly by their diluting and solvent properties, and partly by the stimulant effect of the active principles of the several ingredients in these diet-drinks, conveyed into the capillaries.

It will be seen, therefore, that the term A. rather implies the method in which some drugs are administered, than any special alterative action possessed by them. The most useful, it may be added, are also the most dangerous in unskilled hands.

ALTE'RNATE, in Botany. See LEAVES.

ALTHÆ'A. See MARSH MALLOWS and HOLLYHOCK.

A'LTITUDE, in Astronomy, is the height of a heavenly body above the horizon. It is measured, not by linear distance, but by the angle which a line drawn from the eye to the heavenly body makes with the horizontal line, or by the arc of a vertical circle intercepted between the body and the horizon. Altitudes are taken in observatories by means of a telescope attached to a graduated circle (see CIRCLE), which is fixed vertically. The telescope being directed towards the body to be observed, the angle which it makes with the horizon is read off the graduated circle. The A. thus observed must receive various corrections—the chief being for parallax (q. v.) and refraction (q. v.)—in order to get the true A. At sea, the A. is taken by means of a sextant (q. v.), and then it has further to be corrected for the dip of the visible horizon below the true horizon (see HORIZON). The correct determination of altitudes is of great importance in most of the problems of astronomy and navigation. See LONGITUDE.—An ALTITUDE and AZIMUTH INSTRUMENT consists essentially of a vertical circle with its telescope so arranged as to be capable of being turned round horizontally to any point of the compass. It thus differs from a Transit Circle (q. v.), which is fixed in the meridian. See AZIMUTH.

A'LTO (*contralto deciso*) is the deepest or lowest species of musical voice in boys, in eunuchs, and best of all in females, where its beauty of tone gives it the preference. This quality of the human voice has been too much neglected by modern composers and singing-masters. The powers of expression which it possesses are quite peculiar, and cannot be supplied by any other kind of voice. Its tone-character (timbre) is serious, spiritual, tender, and romantic. The low A. in particular has a fulness of tone combined with power in the lower range. No other voice expresses so decidedly dignity, greatness, and religious resignation: it can also represent youthful manly power as well as romantic heroism. The high A. has generally the same range of compass as the mezzo soprano, but differs from it in the position of the cantabile and in its character of tone. A. voices generally consist of two registers, the lowest beginning at F or G below middle C, and reaching as high as the A or B above the octave C. The higher notes up to the next F or G partake more of the character of the soprano. See VOICE.

ALT-O'FEN, a town of Hungary, on the right bank of the Danube, about two miles above Ofen or Buda, of which indeed it may be considered a suburb. The towns are almost united. A. is a decayed place, but of great antiquity, and is believed to occupy the site of a Roman town, *Sicambria* or *Aquienum*. Remains exist of a Roman aqueduct, a bath, and an amphitheater. Attila made this his capital. Pop. (1869) 16,002.

A'LTON, a town of Hampshire, England, of considerable antiquity, near the Wey, 16 miles north-east from Winchester. It is pleasantly situated among picturesque hills and woods. Most of the houses are of brick, but some are of stone. The principal street forms part of the main road from London to Winchester. The church was erected in the reign of Henry VII., and is in the Perpendicular style. Its tower, older than the rest of the edifice, has massive Norman arches. A branch connects A. with the South-western Railway. Bombazines were formerly manufactured here. Good hops are grown in the neighborhood, and there are large breweries in the town, the ale of which is much esteemed. Pop. (1371) 4092; (1881) 4510.

ALTON, a city and port of entry of Illinois, U.S., on the left bank of the Mississippi River, 21 miles above St. Louis, 3 miles above the mouth of the Missouri River, the terminus of the Chicago and Alton Railway, and center of a large commerce. The city contains a Roman Catholic cathedral, 10 churches, 1 daily and 3 weekly newspapers, state penitentiary, and numerous mills and manufactories, with an abundant supply of coal and limestone. Pop. (1860) 6333; (1870) 8665; (1880) 9851.

ALTON, JOS. WILHELM EDUARD D', Professor of Archæology and the History of Art at Bonn, was born, 1772, at Aquileia, and died in 1840. In early years, his attention was directed to natural history, especially that of the horse, on which he published a splendid illustrated work (*Naturgeschichte des Pferdes*, Bonn, 1810), which was completed in 1817. In concert with his friend Pander, he projected an extensive work on comparative osteology, of which the first division was published at Bonn 1821—1828. His etchings of animals, &c. are esteemed as valuable. Albert, the late Prince Consort of Queen Victoria, was a pupil of A., in the History of Art.

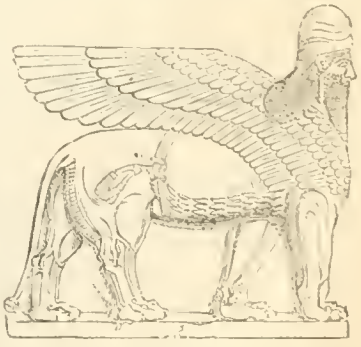
A'LTONA, the largest and richest city in the Prussian province of Slesvig-Holstein, is situated on the Elbe, so near Hamburg that the two cities are only divided by the state boundaries. Population (1880) 91,047. A. lies higher than Hamburg, and is much healthier; but, on the other hand, it is destitute of the numerous canals so necessary for the transport of goods, with which Hamburg is so abundantly provided. In a commercial point of view, it forms one city with Hamburg. Its trade extends to England, France, the Mediterranean Sea, and the West Indies. In 1872, 1073 vessels entered the port. There are many important industrial establishments in A.; among others, the manufacture of tobacco is largely carried on, one factory working up 600,000 lbs. yearly. A. is a free port, and enjoys many privileges in respect of trade and also of civil freedom; all sects are allowed the free exercise of their religion. The city is connected by a railway with Kiel, Rendsburg, and Glückstadt. The observatory is a private institution, which gained a great reputation under the direction of Schumacher, who died in 1851. The rise of A. to its present importance has been recent and rapid, for a continental town.

ALTOO'NA, a city of Pennsylvania, U.S., on the Central Railway, at the eastern base of the Alleghanies, 244 miles west of Philadelphia; contains 11 churches, 2 banks, 6 hotels, and large locomotive works and machine-shops. Laid out in 1849. Pop. (1870) 10,610; (1880) 19,716.

A'LTORF, the chief town in the Swiss canton Uri, is situated in a sheltered spot at the base of the Grumberg, about two miles from the head of the Lake of the Four Cantons, and contains (1870) 2724 inhabitants. It is a well-built town, having several open places, a church, a nunnery, and the oldest Capuchin monastery in Switzerland. The little tower on which the exploits of William Tell are painted in rude frescoes, is known to be older than the legend of Tell. The lime-tree under which the scene of the shooting of the apple was laid, was removed in 1567, and a stone-fountain erected in its stead. Situated on the St. Gothard road. A. has some transit trade, but little or no industry of its own.

A'LTO-RILIE'VO (Ital), high-relief, the term used in sculpture to designate that mode of representing objects by which they are made to project strongly and boldly from the background, without being entirely detached. In Alto-Rilievo, some portions of the figures usually stand quite free, and in this respect it differs not only from *basso-rilievo*, or low-relief, but from the intermediate kind of relief known as *mezzo-rilievo*, in which the figures are fully rounded, but where there are no detached portions. In order to be in high-relief, objects ought actually to project somewhat more than half their thickness, no conventional means being employed in this style to give them apparent prominence. In bass-relief, on the other hand, the figures are usually flattened; but means are adopted to prevent the projection from appearing to the eye to be less than half; because if an object projects less than half, or, to state it otherwise, be more than half buried in the background, it is obvious that its true outline or profile cannot be represented. This rule, that in all reliefs there shall be either a real or an apparent projection of at least half the thickness of round objects, was strictly observed in the best period of Greek art, but it has been often neglected in the execution of reliefs in later times, and hence attempts have been made at foreshortening and perspective, which have necessarily resulted in partial failure.

Relief forms a kind of intermediate stage between plastic art and painting, the mode of representation being borrowed from the former, whilst the mode of arrangement, to a certain extent, is in accordance with the latter. The plastic principle occupies the most prominent place in the simple and tranquil relief of the earlier art of Greece, whereas the pictorial principle preponderates in the crowded and often excited scenes represented in the later Roman reliefs. In such reliefs as have been produced in modern times, the one element or the other has prevailed, according as the one model or the other has been followed. The works which have been recovered from the ruins of Persepolis, Nineveh, and Babylon, still attest the extensive employment of relief in Persian and Assyrian art. Of the latter, which usually belongs to the class of *mezzo-rilievo*, some of the finest specimens in existence are now to be seen in the British Museum. Though never exhibiting the life and freedom of classical or modern European art, the elaborately executed and majestic reliefs of these semi-oriental nations are greatly in advance not only of the whimsical distortions of nature exhibited by the Hindus, but of the inanimate and motionless representations of the Egyptians.

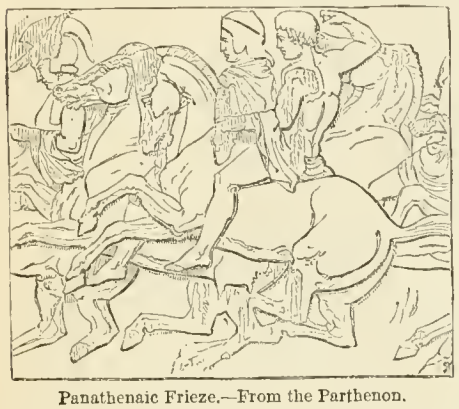


Winged Bull.

The earliest Greek reliefs possessed a hard and severe character, somewhat approaching to the art of those earlier nations of which we have just spoken, and were very slightly raised. Of this we

have an example in the two lions over the gate at the Mycenæ—probably the oldest Greek relief in existence. It was Phidias who gave to relief its true character, and finally brought it to a degree of perfection which it has never since attained. The alti-rilievi which adorned the metopes of the Parthenon at Athens, and the Temple of Apollo at Phigalia in Arcadia, now preserved in the British Museum, are still not only unsurpassed, but unapproached as examples of the style. In none of these do we see any attempt at perspective, and even foreshortening for the most part is avoided.

Under the Romans, sculpture was employed to an enormous extent in the decoration of tombs and sarcophagi, whole streets of such monuments being constructed, as, for example, on the Appian Way. The result of the demand thus created was, that sculpture became a manufacture rather than an art, and attempts were made to supply by technical execution and mere mass what had been lost in thought and spirit. Relief was now applied, often by Greek artists resident in Italy, to purposes for which the Greeks, in their own land and in their better times, had rightly conceived it to be unsuited. Behind figures standing nearly free, a second rank was introduced, and those numerous examples of a false style, still to be found in every gallery in Europe, were produced, the imitation of which afterwards led to such a lavish expenditure of artistic talent in Italy. The attempt which the Romans had made to invade the province of painting, by means of sculpture, was carried still further by the Florentine artists of the 16th and 17th c. Not only were several rows of figures represented in perspective, but even landscape was introduced with a success which, in the hands of such artists as Ghiberti, was positively marvellous. If the highest perfection in the true plastic style of relief was attained by Phidias in the metopes of the Parthenon at Athens, a corresponding merit may be claimed as regards the degenerate pictorial style by Ghiberti in the celebrated bronze doors of the Baptistery of San Giovanni at Florence. Even Canova's reliefs partook to far too great an extent of the character of paintings in stone; and to Flaxman, and above all, to Thorwaldsen, must be assigned the merit of restoring this style of art to its genuine and original principles. It is to be remembered, in studying the reliefs of classical times, that studiously as the Greeks avoided a pictorial conception of their subject, they did not eschew the use of color where it could be employed to heighten the effect of their reliefs. There is reason to believe that in many excellent examples the background was painted blue, and that the hems of the garments of the figures, and the like, were often colored or gilded.



Panathenaic Frieze.—From the Parthenon.

A'LTRINCHAM, a market-town of Cheshire, England, on Bowden Downs, eight miles south-west from Manchester. It is situated on the Cheshire Midland Railway, and near the Duke of Bridgewater's Canal, which has contributed greatly to its prosperity. It is a very neat and clean town, and on account of the salubrity of the air, is much resorted to by invalids from Manchester. It has manufactures of artificial manures, and an iron-foundry, but a chief employment of its inhabitants is the raising of fruits and vegetables for the market of Manchester. Pop. (1871) 8478; (1881) 11,249.

A'LUM, a whitish, astringent, saline substance; properly it is a double salt, being composed of sulphate of potash and sulphate of alumina, which, along with a certain proportion of water, crystallize together in octahedrons or in cubes. Its formula is $KOSO_3 + Al_2O_3 3SO_3 + 24HO$. A. is soluble in eighteen times its weight of cold water, and in its own weight of hot water. The solution thus obtained has a peculiar astringent taste, and is strongly acid to colored test papers. When heated, the crystals melt in their water of crystallization; and when the water is competely driven off by heat, there is left a spongy white mass, called burnt A. or anhydrous A. A. is much used as a mordant in dyeing. This property it owes to the alumina in it, which has a strong attraction for textile tissues, and also for coloring matters; the alumina thus becomes the means of fixing the color in the cloth. The manufacture of the colors or paints called lakes depends on this property of alumina to attach to itself certain coloring matters. Thus, if a solution of A. is colored with cochineal or madder, and ammonia or carbonate of soda is added, the alumina of the A. is precipitated with the color attached to it, and the liquid is left colorless. Alumina, the basis of pure clay—which is a silicate of alumina—derives its name from being first extracted from A. A. is also used in the preparation of leather from skins, and, in medicine, as a powerful astringent for arresting bleeding and mucous discharges. Its use in the making of bread, to give a white appearance and more pleasing consistence to bread made from indifferent flour, is highly objectionable. A. rarely occurs in nature, except in a few springs and in some extinct volcanoes, where it appears to be formed from the action of sulphurous acid vapors upon felspathic rocks. In this country, it is prepared artificially from A.-shale, obtained from coal-mines at Hurlett and Campsie, near Glasgow; and alum-slate, which occurs at Whitby, in Yorkshire, and there forms precipitous cliffs, extending about thirty miles along the east coast of England. The alum-slate, shale, or schist, consists mainly of clay (silicate of alumina), iron pyrites (bisulphuret of iron), and coaly or bituminous matter. When the shale is exposed to the air—as it is in the old *coal-wastes* or mines from which the coal has been extracted—the oxygen of the air, assisted by moisture, effects a decided change upon it. The original hard stony substance begins to split up into thin leaves, and becomes studded over and insterspersed with crystals. The latter are the result of the oxidation of the sulphur of the pyrites into sulphuric acid, and the iron into oxide of iron, both of which in part combine to form sulphate of iron, whilst the excess of the sulphuric acid unites with the alumina of the clay, and produces sulphate of alumina.

When the alum-shale thus weathered is digested in water, there dissolve out, the sulphate of alumina ($Al_2O_3 3SO_3$) and sulphate of iron ($FeOSO_3$); this solution is treated with chloride of potassium (KCl), which decomposes the sulphate of iron, forming sulphate of potash ($KOSO_3$) and chloride of iron (FeCl). When this liquid is evaporated to concentration, and allowed to cool, crystals of A. separate, consisting of sulphate of alumina, sulphate of potash and water, thus, $KOSO_3 + Al_2O_3 3SO_3 + 24HO$, and the chloride of iron is left in the solution or *mother-liquor*. The crystals of A. obtained from the first crystallization are not free from iron, and hence require to be redissolved in water, reconcentrated, and recrystallized. This operation is generally repeated a third time before the A. is obtained pure.—As the preliminary weathering of the shale takes some years to proceed, a more expeditious method is now largely resorted to. The shale is broken in fragments, and piled up over brushwood in long ridges, shaped like huge potato-pits, and the brushwood being set fire to, the coaly matter of the shale begins to burn, and the whole ridge undergoes the process of roasting; the results of which are the same as that of the weathering operations—namely, the oxidation of the sulphur and iron, and the formation of sulphate of alumina and sulphate of iron. This material is afterwards worked up as previously described. The roasting operation is so much more expeditious than the weathering process, that months suffice for years. The A. made at Tolfa, near Civita Vecchia, is extracted from alum-stone, a mineral containing sulphate of potash and sulphate of alumina, but united in such a form as to render them insoluble. When the mineral is calcined, the sulphates become soluble, and are extracted by lixiviation. The A. thus manufactured is prized, as being free of iron. The potash in A. can be replaced partly or altogether by soda or ammonia; the alumina by oxide of chromium or sesquioxide of manganese; or the sulphuric acid by chromic acid, or peroxide of iron, without altering the form of crystals. There are thus soda, ammonia, chrome, &c., alums, forming a genus of salts of which common A. is the only one of the species. The more important members of the class, expressed in symbols, are:

$KOSO_3 + Al_2O_3 3SO_3 + 24HO$, potash A.
$NaOSO_3 + Al_2O_3 3SO_3 + 24HO$, soda A.
$NH_4OSO_3 + Al_2O_3 3SO_3 + 24HO$, ammonia A.
$KOSO_3 + Cr_2O_3 3SO_3 + 24HO$, chromic potash A.
$FeOSO_3 + Al_2O_3 3SO_3 + 24HO$, ferrous A.

ALUM BAGH, a fort rendered famous, during the battles and sieges arising out of the Indian mutiny in 1857, by the indomitable resolution of its defenders. The A. B. ('Garden of the Lady Alum, or Beauty of the Soul') was a domain about four miles from the city of Lucknow, near the Cawnpore road. It comprised several buildings, including a palace, a mosque, and an emanbarra, or private temple, bounded by a beautiful garden, which was itself in the middle of a park, and the park enclosed by a wall with corner towers. It had belonged to some members of the royal family of Oude; but when the wars of the mutiny had been fairly begun, the A. B. was converted by the rebels into a fort. It was large enough to contain a powerful military force, and might have become a formidable stronghold, if well defended; but it proved powerless against a small British force.

In September, Outram, Havelock, and Neill crossed the Gauges from Cawnpore, marched rapidly towards Lucknow, and captured the A. B. on the way. About 300 soldiers were left at the place,

with four guns, a number of sick, wounded, and 4000 native camp-followers, under Colonel M'Intyre; while the three generals proceeded with the main body of their force to Lucknow. It was intended that M'Intyre should soon be relieved or reinforced; but Havelock and Outram, shut up for two months within the Residency at Lucknow, could scarcely send even a small note in a quill to the A. B. Not until the close of November did the British, under Sir Colin Campbell, relieve both Lucknow and the A. B. He brought away all the garrison from the former place, but left Sir James Outram, with 3500 men, to hold the A. B. It was at that time the only spot in the whole province of Oude in the hands of the British; and during the whole winter, Sir James had to defend it against the enemy. On the 12th of January 1858 he was attacked by an armed rabble of sepoys and other malcontents, amounting to 30,000 men. These, however, he completely defeated. They attacked him again with 20,000 men on the 21st of February, at a time when his small force was weakened by the absence of a detachment employed in escorting a convoy of provisions and stores from Cawnpore; he, however, met them with the same heroic resolution, and effectually repulsed them. In the next following month, Sir Colin Campbell re-conquered Lucknow; and the garrison at the A. B. was relieved from its perilous isolation. Although only a domain converted temporarily into a fort, the A. B. must ever occupy a memorable place in military history.

ALUM ROOT. This name is given in the United States to two plants, natives of that country, very different from one another, but agreeing in the remarkable astringency of their roots, which are medicinally used. One of these plants is *Geranium maculatum* (see GERANIUM), a plant of general habit and appearance very much resembling some of the species of geranium which are common weeds in Britain. The root contains more tannin than kino (q. v.) does. The tincture is of use in sore throat and ulcerations of the mouth, and is also administered in various diseases.—The property of astringency belongs, in an inferior degree, to some other species of *Geranium*, and of the kindred genera, *Erodium* and *Pelargonium*.—The other American plant to which the name A. R. is given is *Heuchera Americana*, a plant of the natural order *Saxifrageæ* (q. v.), an order in which also astringency is a prevalent property. The genus *Heuchera* has the calyx 5-cleft, the petals undivided, five stamens, and the styles remarkably long. *H. Americana* is everywhere covered with a clammy down; the leaves are roundish, lobed, and toothed; the peduncles, dichotomous and straggling. The root is a powerful styptic, and is used to form a wash for wounds and obstinate ulcers.

ALU'MINA, the most abundant of the earths (q. v.) is the oxide of the metal Aluminium (q. v.), the formula being Al_2O_3. It occurs in nature abundantly in combination with silica, associated with other bases. The most familiar of its native compounds is felspar, a silicate of A. and potass ($Al_2O_3.3SiO_3+KO.SiO_3$). This is one of the constituents of granite, and of several other igneous rocks. Certain varieties of these, by exposure to the atmosphere, become completely disintegrated, passing from the state of hard, solid rock, such as we are accustomed to see in building-granite, into soft, crumbling, earthy masses. It is the felspar which undergoes the change; and it appears to be owing to the action of rain-water charged with carbonic acid, which dissolves the potass and some of the silica of the felspar, leaving the excess of silica and the A. still united. It is not known, however, why certain specimens of granite are rapidly corroded and crumbled down, whilst others have resisted for ages the same causes of decay. By such a process of disintegration as we have described, the clays of our arable soils are produced. Clay consists of silica and A. in a state of chemical combination. It never is pure A., but the quantity of silica united to the latter is variable. When it is pure, clay is quite white, as we see in the porcelain clay of Devonshire and Cornwall, which is derived from colorless felspar. More frequently, clay is red, owing to the presence of oxide of iron; or black, from the diffusion through it of vegetable matter.

From alum, A. is prepared by adding to a solution of the former, water of ammonia, as long as it occasions a precipitate. The A. appears as a voluminous, white, gelatinous substance, consisting of the oxide of the metal combined with water. When A. is precipitated from a solution containing coloring matter, such as logwood, &c., it carries down the color chemically united to the flocculent precipitate; in this way are formed the colored earths, called *lakes* (q. v.). A. in the state of precipitate, after being gently dried, is readily soluble in acids and in alkalies; but if heated to whiteness, it loses the associated water, contracts greatly in bulk, and forms a white, soft powder, not at all gritty, and with difficulty soluble in alkalies and acids. A., as generally prepared, whether hydrated or anhydrous, is insoluble in water, possesses no taste, and does not alter coloring matters; but some time ago Mr. Walter Crum obtained A. in an allotropic form, in which it is soluble in water. It is quite different, therefore, in properties from the alkaline earths, and is a much weaker base. In the anhydrous state it absorbs water with great readiness without combining with it, so that it adheres to the tongue, and is felt to parch it. Clay retains this property; and the ends of tobacco-pipes are glazed, to prevent adhesion to the lips or tongue. A. is not fusible by a forge or furnace heat, but it melts before the oxyhydrogen blow-pipe into a clear globule, possessing great hardness. It occurs in nature in a similar state. The more coarsely crystallized specimens form the emery which is used for polishing; the transparent crystals, when of a blue color, owing to a trace of metallic oxide, constitute the precious gem the sapphire, and, when red, the ruby. A., in common with other sesquioxides, is a feeble base. The salts it forms with the acids have almost all a sour taste, and an acid action on coloring matter.

ALUMI'NIUM—sym. Al, eq. (old) 13·7, (new) 27·4—is one of the metals present in clay, granite, and other rocky and earthy substances. It was discovered by Wöhler in 1828, and was re-examined by him in 1846, when he obtained the metal in minute globules or beads, by heating a mixture of chloride of A. and sodium. In 1855, the French chemist Deville showed, as the result of a series of experiments, that A. could be prepared on a large scale and in a compact form without much difficulty. The mineral cryolite found in Greenland, which is a double fluoride of A. and sodium, was the ore first used for its manufacture; but bauxite, a mineral found in France, and consisting chiefly of alumina, or oxide of A. and oxide of iron, has more recently been employed as a convenient source of the metal. An aluminate of soda is first obtained by heating the bauxite with soda ash in a furnace, and separating it (the aluminate) from the insoluble portions by lixiviation. When carbonic acid is added to the solution, pure alumina is thrown down. The alumina is then formed into balls with common salt and charcoal which are heated in an earthenware retort through which chlorine gas in passed. In this part of the process, the charcoal combines with the oxygen, and the chlorine with the A.; the latter sublimes over with the common salt (chloride of sodium), and is collected as a double chloride of A. and sodium. When this double chloride is heated in a reverberatory furnace with fluxes and metallic sodium, the latter seizes the chlorine combined with the A., which is then set free, and falls to the bottom ready to be cast into ingots for use. A. was made for some years near Newcastle-on-Tyne, by Mr. J. Lothian Bell, but the demand for it not being sufficient to keep the work constantly in operation, it was stopped, and the metal has been chiefly manufactured in France.

The properties of A. are, that it is a white metal, somewhat resembling silver, but possessing a bluish hue, which reminds one of zinc. It is very malleable and ductile, in tenacity it approaches iron, and it takes a high polish. When heated in a furnace, it fuses, and can then be cast in moulds into ingots. Exposed to dry or moist air, it is unalterable, and does not oxidize as lead and zinc do. Cold water has certainly no action upon it, and in the majority of experiments, hot water has not sensibly affected it. Sulphuretted hydrogen, the gas which so readily tarnishes the silver in households, forming a black film on the surface, does not act on A., which is found to preserve its appearance under all ordinary circumstances as perfectly as gold does. When fused and cast into moulds, it is a soft metal like pure silver, and has a density of 2·56; but when hammered or rolled, it becomes as hard as iron, and its density increases to 2·67. It is therefore a very light metal, being lighter than glass, and only one-fourth as heavy as silver. This property was taken advantage of by Napoleon III., who ordered the eagles surmounting the standards of the French army to be made of A. instead of silver; and thus the same-sized eagle was reduced to one-fourth of its former weight. A. is very sonorous; and when a rod or small bell made of it is struck, it gives out a very sweet clear ringing sound. A. forms, with copper, several light, very hard, white alloys; also a yellow alloy, which, though much lighter than gold, is very similar to it in color. This gold-like alloy, which contains from 5 to 10 per cent. of A., and is of great strength, was discovered by Dr. Percy of London and has hitherto been much more used for manufacturing purposes than A. alone. It is much used for watch-chains, pencil-cases, and other ornamental articles. By itself, A. is used for jewellery, small statuettes, and other works of art. It is also employed for the tubes of opera-glasses. Its bluish color can be whitened by hydro-fluoric and phosphoric acids, and also by a heated solution of potash. On the whole, considering its valuable properties, this metal has not received such extensive application in the arts as might have been expected.

After experimenting for 30 years, Mr. Webster (near Birmingham) has discovered a method of making A. at one-tenth of its former cost, which is now a commercial success. Alum and pitch are calcined together, and the resulting cinder, after further processes, yields a substance containing nearly 90 per cent. of alumina. This method takes much shorter time than the other (a week instead of six months), and in vastly larger quantities. Some of the by-products are valuable, as a yellow liquor, which gives a fine blue dye.

ALU'NNO, NICCOLO, or Niccolo of Fuligno, one of the ear-

liest of the old Umbrian painters, was born at Fuligno, about 1430. Some of his pictures were carried off by the French; most were afterwards restored, but one, 'The Agony in the Garden,' still remains in the Louvre. There is also a 'Madonna between Two Angels,' of the year 1499, to be seen in the parish church of the village of Bastia. Fragments, too, are still in existence of an altar-piece for the cathedral of Assisi. The picture represented a Pieta, with two angels bearing torches, and, according to Vasari, weeping so naturally, that 'no one,' he thinks, 'could have painted them better.' A. is not so remarkable for the originality or fertility of his inventions, as for his selection of details, warmth of feeling, purity, and devout faith. His earnestness, however, leads him at times into exaggeration.

ALURED, or ALRED, of Beverley, in Yorkshire, an old English historian of the time of Henry I. Little is known regarding him; but he is said to have been educated at Cambridge, and to have greatly distinguished himself by the variety of his learning. It is also stated that he had enriched his mind by travel, both in France and Italy, and that at Rome he became domestic chaplain to Cardinal Othoboni. His permanent office, however, appears to have been that of canon and treasurer of the church of St. John in his native town of Beverly, where he wrote his *Annals*. This work commences with a fabulous period of British history, and extends down to the twenty-ninth year of Henry I. It was published at Oxford in 1716 by Thomas Hearne, and is a remarkable production, for various reasons. Its Latin is extremely good, and even elegant, while its accuracy, especially in dates, is unusual for the age in which its author lived. He is said, though it is very doubtful, to have written, besides the *Annals*, a work on the liberties or privileges of the church of St. John of Beverly. The work, whoever wrote it, is a translation of old Saxon documents, charters, &c., relative to that edifice, and is still in manuscript. A. died in 1128 or 1129.

A'LVA, a village of Stirlingshire, Scotland, pleasantly situated on nearly level ground at the mouth of a romantic glen of the Ochil Hills, 7 miles north-east from Stirling. The part of Stirlingshire in which A. is situated is detached from the rest of the county, and enclosed between the counties of Clackmannan and Perth. A. is a place of great industrial activity, having extensive woollen factories. Formerly the prevailing branch of industry was the blanket-trade. In later years this has been entirely superseded by the manufacture of shawls. Tweeds have also been introduced. The number of looms employed is about 1100, the steam-looms having been introduced during the summer of 1867. To the east of the village is a glen, named the Silver Glen, where two pits are still to be seen, marking the site of old silver mines. The communion cups still in use in the parish church are made of silver derived from these mines. Immediately behind the village is Alva Glen, noted for its picturesque beauty and magnificent water-fall. About a mile to the west of the village is Balquharn Glen, also a very romantic spot. Pop. (1861) 3147; (1871) 4096; (1881) 4961.

ALVA, Duke of. See Alba.

ALVARA'DO, a town of Mexico, in the department of Vera Cruz, on the Gulf of Mexico, at the mouth of the river Alvarado, 50 miles south-east from Vera Cruz. The situation, close to a lagoon, is unhealthy. A bar at the mouth of the river prevents the entrance of vessels of more than 12 or 13 feet draught, but within the bar, the harbor is sheltered from every wind. Great part of the town consists of cane-built cottages, roofed with palm-leaves. The river has a course of not much more than 100 miles, but collects the waters of an extensive swampy district. Much rice and cacao are produced in the country around Alvarado. Pop. 6000.

ALVARA'DO Pedro de, a famous companion of Cortes, was born at Badajoz in Spanish Estremadura, towards the close of the 15th c. In 1517 or 1518, he sailed for the new world, and in the same year was despatched from Cuba, by Velasquez, the governor of that island, to explore, under the command of Grijalva, the shores of the American continent. The expedition touched at Acozamil (the Isle of Swallows), and at various places in Yucatan. Ascending also the rivers Tabasco and Banderos, Grijalva was so enchanted with the beauty of the country, its fine cultivation, and the numerous traces of advanced civilization, that he named it *New Spain*. Now, for the first time, the Spaniards heard of the riches of Montezuma, and of his vast empire. A. was ordered to return to Cuba, and inform Velasquez of the result of the expedition. The sight of the gold which A. brought with him, stimulated the covetousness and ambition of Velasquez, who became greatly incensed against Grijalva, because the latter had not penetrated further into the new region, and on his return to Cuba deprived him of his command. In February 1519, Cortes sailed from Havanna, solely for the purpose of conquest, with eleven ships, containing 508 soldiers, and 109 seamen. A. commanded one of these ships; but a storm separating the fleet, he arrived at the rendezvous, Isle of Swallows, three days earlier than the others. Here the conquest of Mexico was planned by these intrepid adventurers. A. figured in every conspicuous incident; he was, indeed, hardly less distinguished than the sagacious Cortes himself, who knew his worth, and whom he served with unfaltering zeal and fidelity. While he held the city of Mexico, during the absence of his chief, he massacred, in the midst of a fête, a great number of Aztec nobles, which act is said to have excited the indignation of Cortes; but, on the other hand, it is asserted that the Mexicans had plotted the destruction of the Spaniards, and that A. had become cognizant of the scheme. In the famous night-retreat of 1st July 1520, A. commanded the rear-guard. After the conquest of Mexico, he was sent, in 1523, at the head of 300 foot, 160 horse, with 4 pieces of cannon, and a troop of Mexican auxiliaries, to subdue the tribes on the coast of the Pacific in the direction of Guatemala. He was completely successful, receiving everywhere the submission of the native chiefs, while the people brought him presents, in token of the sincerity of their friendship. He now returned to Spain, where the emperor, Charles V., gave him a splendid reception, and appointed him governor of Guatemala. On departing again for the new world, he was accompanied by numerous friends and cavaliers desirous of making their fortune. His adventurous spirit soon launched him into new enterprises. Pizarro and Almagro were prosecuting a brilliant career of conquest in South America. A. resolved not to intrude upon their territories.

He considered the province of Quito to be without the limits of these, and so, embarking with a force of 500 soldiers, 227 of whom were cavaliers, he landed at Bahia de los Caraques, near Cape San Francisco, whence he penetrated into the heart of the country, crossing the Andes by as bold and hazardous a march as it is possible to conceive. In the plain of Rio Bamba he was met by some of the troops of Pizarro, headed by Almagro; but instead of disputing by force of arms his right to the possession of the country in which he found himself, he agreed to retire, on receiving an indemnity for his arduous undertaking. He therefore retired to Honduras, and aided the colonists in establishing new settlements, amongst others, Gracias-a-Dios and San Juan de Puerto de Caballos. Meanwhile, Pizarro, loaded with wealth, went back to Spain in 1534, and misrepresented the conduct of A. to the emperor; but the latter following, vindicated himself so successfully, that he received the government of Honduras in addition to Guatemala. Again he embarked for the new world, and pursued his course of discovery and conquest; but in an affray with the Indians upon the coast of Michoacan, in 1541, he was accidentally killed by his horse falling upon him and crushing him. In the same year, an inundation, accompanied by a frightful tempest, overthrew the walls of the town of San Jago, when his wife and children all perished.

ALVAREZ, Don Jose, a Spanish sculptor, was born April 23, 1768, at Priego, in the province of Cordova. During youth he labored with his father, a stone mason; and when twenty years old, began to study drawing and sculpture in the academy at Granada. His early essays in sculpture secured for him the patronage of the Bishop of Cordova, and in 1794, he was received into the academy of San Fernando, where, in 1799, he gained the first prize in the first class. Subsequently, he gained the second prize for sculpture in the Institute of Paris, and in 1804, increased his celebrity by a plaster-model of Ganymede, which proved that he could rival Canova in gracefulness of style. He now attempted greater works in the more severe style, and prepared a model for a wounded Achilles, which was accidentally broken. Having removed to Rome, he was here employed by Napoleon to design bass-reliefs for the Quirinal Palace on Monte Cavallo; but on account of political changes, his works were not allowed to occupy the places for which they had been destined. In Rome, where he lived on terms of friendship with Canova and Thorwaldsen, he executed, among other works, his *Grupo Colosal de Zaragoza*, now in the Royal Museum of Madrid, representing a scene in the defence of Saragossa. This work alone is sufficient to establish A.'s fame. Clearness of design, dignified simplicity in execution, trueness to nature, and deep sentiment, mark the sculptures of A., who, next to nature and classical antiquity, studied the works of Michael Angelo. He died, in Madrid, November 26, 1827.

ALWUR, or MACHERY, a Rajpoot state of India, under the control of the governor-general's agent for the states of Rajpootana, but having a considerable measure of independence. It lies between N. lat. 27° 14′—28° 13′, and between E. long. 76° 14′—77° 15′. Its area is about 3000 sq. miles; its pop. (1872) is 778,596. The capital, Alwur, is a small ill-built town, surrounded by a wretched mud wall, situated at the base of a rocky range of quartz and slate, 1200 feet above the adjacent country, and at least 2100 feet above the sea, 94 miles west-north-west from Agra. The palace of the Rao Rajah is a curious square building, having its walls pierced with a great number of small windows, and covered with glaring and grotesque paintings. The revenue of the Rao Rajah is estimated at about £180,000. The military force of the

state amounts to about 3000 infantry and 4000 cavalry. The inhabitants, who are called Mewattis, are a rude and savage race. In former times, the Mewattis were a predatory tribe, and from the 13th to the 15th c., carried their raids even to the gates of Delhi.

AMADE'US (i. e. Love-God), a common name in the House of Savoy. The first who bore it was Count A., eldest son of Count Humbert, who lived about the commencement of the 11th c. His successors gradually enlarged their paternal dominions; but the first to make an important figure in history was A. V., who was born in 1249, succeeded his uncle Fillippo in 1285, and died in 1323. He acquired the dignity of a prince of the empire. He had a brother who resided for a long period in England, and while there, built the Savoy Palace in London.—His son, A. VI., the 'Green Count,' born in 1334, succeeded his father in 1343. He was a sagacious, moderate, and vigorous ruler, won various places from the Dauphin of France, became lord-paramount of Piedmont, and through the favor of the emperor Charles IV., obtained the viceregency over a great part of Upper Italy. His influence among the Italian states was very great. He died in 1383.—A. VIII., born in 1383, was at first under the guardianship of his grandmother, a woman of superior talents; but in 1398 he assumed the reins of government himself, and displayed a spirit of moderation, and, at the same time, a love of order which augured well for his people. The zeal with which he aided the policy of the Emperor Sigismund secured him the imperial favor, and the elevation of Savoy into a duchy (1416). On the extinction of its native dynasty, in 1418, Piedmont chose him for its ruler, as he was next of kin. But a religious melancholy taking possession of his mind, he (November 7, 1434) laid down his authority, and along with six of his knights, betook himself to a monastic hermitage which he had caused to be built on the shores of the Lake of Geneva. He was elected pope in 1439, when he assumed the name of Felix V.; but he resigned the papal chair in 1448, and died three years afterwards at Geneva.—A. IX., after governing for four years, handed over his authority to his wife Jolanthe, on account of ill health; but she used it very imprudently. While he lived, A. was a mere tool in the hands of grasping factions. He died in 1472.—The prince of this name who has most recently come under the notice of the civilized world, was elected king of Spain in December 1870, and abdicated the throne in February 1873. See AMADEUS in AM. SUPP.

A'MADIS, a much-used heroic name in chivalrie poetry. At the head of those heroes of romance, stands A. of Gaul, called the Lion Knight, from the device on his shield, and also Beltenebros, or the Darkly Beautiful. The other Amadises that figure in romance are represented as descendants more or less remote of A. of Gaul. He himself was what the Germans call a love-child of the fabulous King Perion of France and of Elisena, a princess of Bretagne. The relationship of several of the other Amadises to the princes and princesses of Colchis, Trebisond, Greece, and Cathay, that figure as their parents, is of the same unsanctioned kind. The romance which narrates the adventures of A. of Gaul is both the most ancient and the best of all the A. romances. It even found favor in the sight of Cervantes, who won immortal honor by overthrowing the long usurped dominion of this 'evil sect.' This one, however, has maintained its reputation even to the present day, not only because it was regarded by him as a literary curiosity, but also from its own merits, as the original production of a creative fancy.

The question which was early raised, and cannot yet be demonstratively settled, as to whether this romance was originally a Portuguese, a Spanish, or a French production, proves at least the absence in it of all national peculiarities, and the entire want of all national traditions connected with it; and hence the want also of a living historical background, which, in the case of all really national legends, is discernible through the purely epic structure. It may be asserted with certainty, both from internal and external evidence, that this romance is the pure subjective creation of the fancy of a single individual; and that it was composed at a time when the genuine epic style of chivalric writing was near its decline, consequently, not earlier than the 14th c. It is also apparent that this romance must have been originally written in prose, and intended to be read, and not to be recited. Lastly, it is not to be doubted that the author was well acquainted with the earlier legendary poetry, and has imitated it in many things, but has, nevertheless, struck out for himself a perfectly new path, in an opposite direction, which naturally tended to lead his less gifted imitators into a bottomless abyss, and at last brought about the extinction of the whole class. For these chilvaric romances—doubtless, unintentionally—became by degrees more and more of an ironical cast; and only a genius like Cervantes was wanting in order to complete their extinction, by making the comic element the fundamental tone, and exaggerating the incongruity inherent in such compositions.

The Spanish A. romances consist of fourteen books, of which the first four contain the history of A. of Gaul. Yet, according to the researches of the learned Clemencin, as stated in his *Commentary on Don Quixote* (Madrid, 1833), it can scarcely be doubted that this most ancient part was originally written in the Portuguese language, by the knight Vasco de Lobeira of Oporto, who died in 1403; and that it must have been composed between 1342 and 1367. The original manuscript is said to have been first in the possession of the Infant Alfonso of Portugal, the son of John I the founder of the House of Braganza, who died in 1461; and last, in that of the Duke of Aveiro, and to have been destroyed during the earthquake in Lisbon in 1755. At least, these first four books have only been preserved in the Spanish translation, which was made by Garcia Ordoñez de Montalvo, about 1460, and was first printed between 1492 and 1505. The same Montalvo added to it the fifth book, *Las Sergas [ergas*, i. e., actions or deeds] *de Esplandian, Hijo de Amadis de Gaula*. He began this book in 1485, but did not complete it till 1492. The books from the 6th to the 14th contain the Exploits and Adventures of Florisando, by Paez de Ribera; of Lisnarte of Greece, and of Perion of Gaul, by Juan Diaz; of A. of Greece, of Florisel of Nicea, and of Anaxarte, by Feliciano de Silva; of Rogel of Greece, and of Silves de la Selva, by the same; of Lepolemo, and of Leandro the Fair, by Pedro de Lujan; and lastly, of Penelva, by an anonymous Portuguese. The French translators and continuators, beginning with Nicolas de Herberay, Sieur des Essarts, who published the first eight books between 1540—1548, have increased this series of romances to twenty-four books. Gilbert, Sannier, Sieur de Duverdier, has written a conclusion, in seven large volumes, to all the adventures begun in the whole series of legends, which he has called *Le Roman des Romans*.

How popular and widely circulated these romances were in their day, may be proved by the many editions of single legends, by the translations of most of them into Italian, English, German, and even into Dutch, and also by the numerous chivalric romances written in imitation of them. As, nevertheless, a change came over the public taste, they almost all fell into oblivion, and indeed justly so, because of their want of intrinsic merit. They were transferred from the Temple of the Muses to the literary lumber-room, where now at best they only serve to feast the eyes of bibliomaniacs. A. of Gaul has been deservedly excepted from this fate, and has not only found readers in the present day, but has been in modern times translated, revised, and imitated. The Portuguese Gil Vicente, and the Spaniard Andrés Rei de Artieda, extracted from it the materials for two Spanish comedies. De Lubert and Count Tressan revived this romance in tasteful extracts; and as Bernardo Tasso formerly did in his *Amadigi*, so now Crenzé de Lesser and William Stewart Rose have extracted from it the materials for epic poems: *A. de Gaule, Poème faisant suite aux Chevaliers de la Table ronde* (Paris 1813), and *A. of Gaul*, a poem in three books (London, 1803). On the other hand, Wieland's *Neuer A.* has nothing in common with the more ancient Amadises, except the title. See Baret, *De l'Amadis de Gaule* (Par. 1873).

A'MADOU, a name given to *Polyporus igniarius* and *P. fomentarius*, fungi of the tribe or division *Hymenomycetes*, and formerly included in the genus *Boletus*. They grow upon old trees in Britain, and on the continent of Europe. The pileus is competely blended with the hymenium, which is pierced with thin-sided, rather angular, tubular, vertical passages—the whole fungus thus appearing as a leathery or fleshy mass; the under side of which is pierced by deep pores. *P. igniarius* is called Hard A., or Touchwood. *P. fomentarius* is called Soft A., or German Tinder. They are used as styptics for stanching slight wounds; and when steel and flint were in general use for striking fire, were much employed as tinder, being prepared for this purpose by boiling in a solution of nitre. The Soft A. is used for making small surgical pads, for which its elasticity peculiarly fits it. *P. fomentarius*, or a very similar species, is found in India, and used there as in Europe. It is also employed by the Laplanders and others for moxa (q. v.). It is sometimes made into razor-straps, and this use is likewise made of *P. betulinus*.—*P. officinalis*, the *Agaricon* of Dioscoride, which grows upon larch-trees in the south of Europe, is a drastic purgative, now rarely employed. *P. suaveolens*, which grows upon the stems of willows, and is easily recognized by its anise-like smell, was formerly employed in medicine, in cases of consumption, under the name of *Fungus*

Polyporus suaveolens.

salicis. All these species are very similar in appearance. Another species of the same genus, *P. destructor*, is one of the fungi known by the name of DRY ROT (q. v.).—The remarkably light wood of *Hernandia Guianensis*, a shrub of the natural order *Thymelæaceæ* (q. v.), is readily kindled by flint and steel, and is used in Guiana as A.

AMAI'N, a peculiar phrase applied by sailors to signify *at once* or *suddenly*; in such orders or directions as 'lower amain,' 'strike amain,' &c.

AMALEKITES, one of the most fierce and warlike of the Canaanitish nations. They dwelt 'in the land of the south' (Numbers, xiii. 29), that is, the land south of Palestine, or between Idumea and Egypt. From the very first, they manifested an uncompromising hostility to the Israelites, whose rear-guard they smote after the passage through the Red Sea. In consequence of this, they received no mercy at the hands of the Israelites, when the latter had established themselves in Palestine. Saul (1 Samuel, xv. 2) nearly annihilated them. Twenty years later, David, while dwelling amongst the Philistines, penetrated into their land, and made dreadful slaughter of them. After this, they made a last desperate reprisal, but were overtaken by David in the midst of their drinking and dancing; and 'from twilight, even unto the evening of the next day,' he smote them, 'and there escaped not a man of them, save 400 young men who rode upon camels and fled.' The descendants of these were finally extirpated in the days of Hezekiah, king of Judah, by the Simeonites.

AMA'LFI, a seaport on the Gulf of Salerno, on the W. coast of Southern Italy, contains above 5000 inhabitants; has a very ancient cathedral, and is the seat of a bishop. It is said to have been founded under Constantine the Great, and was long a powerful and independent state, having at one time a population of 50,000; and about the close of the 11th c., fell under the power of the Normans. The maratime laws of A. (*Tabula Amalphitana*) once prevailed throughout Italy. The unique manuscript of the pandects (q. v.) was discovered at A.; and Flavio Gioja, the inventor of the compass, and Masaniello, were born there.

AMA'LGAM is the term applied to that class of alloys (q. v.) in which one of the combining metals is mercury. On the nature of the union, it has been observed that 'on adding successive small quantities of silver to mercury, a great variety of fluid amalgams are apparently produced; but in reality, the chief, if not the sole compound is a solid A., which is merely diffused throughout the fluid mass.' The fluidity of an A. would thus seem to depend on there being an excess of mercury above what is necessary to form a definite compound. Mercury unites readily with gold and silver at the usual temperature. It has no disposition to unite with iron even when hot. A solid A. of tin is used to silver looking-glasses.

Amalgamation is employed on a small scale in some processes of gilding, the silver or other metal being overlaid with a film of gold A., and the mercury being then driven off by heat. But its most extensive use is in separating gold, and especially silver, from certain of their ores. The mercury dissolves the particles of the metal, and leaves the earthy particles; it is then easily separated from the gold or silver. This process, discovered in Mexico in 1557 by Bartolomé de Medina, is very extensively used in Mexico at the present time, and has lately been introduced with great success into the Californian and Australian gold-fields. The mode of application is to crush the quartz rock which serves as the matrix in which the small particles of gold are embedded; place the fragments in a barrel or revolving drum with mercury, and agitate for some time. The mercury attaches all the gold particles to itself; and in the apparatus, when fully agitated, there is found a semi-fluid mass, which is the mercury, appearing half congealed, and containing all the gold. It is only necessary to place this A. in a retort and apply heat, when the mercury sublimes over—and can be re-employed for further amalgamation—and leaves the gold in the body of the retort. This process is the only known method of separating the finer particles of gold from a mass of rock, and is always used by the gold-crushing companies. Indeed, it is now believed that this truly commercial mode of gold-seeking is the only one which, in a few years, will be had recourse to.

Several amalgams may be regarded as definite chemical compounds. Thus, when gold-leaf is placed in mercury, and the A. so produced filtered by being squeezed in a chamois-leather bag, the uncombined mercury oozes through the skin, but a definite A. of 2 of gold and 1 of mercury remains behind in the leather filter. Tin A. is employed in silvering looking-glasses, and is formed by laying a sheet of tin-foil on a table, covering it with mercury, and then placing, by a sliding movement, the sheet of glass over it. This A. contains 3 of mercury and 1 of tin; glass balls are silvered with an A. of 10 mercury, 1 tin, 1 lead, and 2 bismuth. A silver A. highly crystalline—and, from the clusters of crystals somewhat resembling a tree, called *Arbor Dianæ*, or Tree of Diana—is prepared from 3 parts of the strongest solution of nitrate of silver, 2 parts of solution of proto-nitrate of mercury added to an A. of 7 mercury and 1 silver. In a day or two, the arborescent appearance presents itself, and the crystals contain 65 per cent. mercury, and 35 silver. The A. used for frictional electric machines is made from 1 tin, 1 zinc, and 3 mercury, to which sand is afterwards added.

AMALIA, ANNA, Duchess of Saxe-Weimar, an amiable lady, and generous patron of literature, was born in 1739, and, during the latter part of the 18th c., was the center of the court of Weimar. Left a widow in the second year of her marriage (1758), her judicious rule, as guardian of her infant son, enabled the country to recover from the effects of the Seven Years' War; while her efforts were no less effectual in promoting the education of the people. She appointed Wieland tutor to her son, afterwards Duke, and attracted to Weimar such men as Herder, Goethe, Knebel, Böttiger, Musæus, Schiller; forming a galaxy of genius such as no single court, perhaps, was ever graced with. How much the fine qualities of head and heart possessed by the duchess herself contributed to this success, was shown by the fact that, when she resigned the government into the hands of her son in 1775, she continued to be surrounded by the same society. She has the high distinction of having honored and encouraged the greatest writers that Germany has produced. The battle of Jena is said to have broken her heart; she died (1807) six months after that event.

AMALIE, MARIE, the wife of Louis Philippe, king of the French, was the daughter of King Ferdinand I. (IV.) of the two Sicilies, and was born April 26, 1782. When she married Louis Philippe (then Duke of Orleans), he was a political exile, without a hope of ever rising to the throne of France. It was a marriage of personal choice on both sides, and was consequently happy. After Louis Philippe's elevation to the throne, the queen avoided interference in political affairs, and devoted her attention to plans of beneficence. In her domestic relations, her conduct was highly exemplary, and won the esteem of all parties; indeed, the only charge ever preferred against her, was her supposed excess of piety. She shared the fortune of her exiled husband, and was very respectfully received in England. Louis Philippe, shortly before his death (at Claremont, 1850), gave expression to the love and esteem with which he regarded his faithful wife. She died at Claremont in 1866.

AMANDE DE TERRE. See CYPERUS.

AMANI'TA, a genus of Fungi, nearly allied to *Agaricus*, but bursting from a *volva*. *A. muscaria*, which is pretty common in woods, especially of fir and beech, in Britain, is one of the most

Amanita Muscaria, in a young state.

Amanita Muscaria, full-grown, more reduced.

dangerous fungi. It is sometimes called FLY AGARIC, being used in Sweden and other countries to kill flies and bugs, for which purpose it is steeped in milk. The pileus or cap is of an orange-red color, with white warts, the gills white, and the stem bulbous. It grows to a considerable size. Notwithstanding its very poisonous nature, it is used by the Kamchatkadales to produce intoxication, and it imparts an intoxicating property to the urine of those who swallow it, of which they or others often avail themselves, when abundance of the fungus is not at hand.

AMARA'NTÉ (anc. *Ante Moranam*), a town of Portugal, in the province of Minho, on the Tamega, a branch of the Douro, 32 miles north-east from Oporto. The Tamega is crossed by a handsome stone bridge. The town is well built, but dull and decayed. A church, erected in the 16th c., is an interesting specimen of the Flamboyant style. A. was the scene of a fierce conflict between the French and the Portuguese in 1809, when the bridge was defended by the Portuguese for several days, and the French committed great barbarities. Pop. 2500.

A'MARANTH (*Amaranthus*), a genus of plants of the natural order *Amaranthaceæ*. This order contains nearly 300 known species, natives of tropical and temperate countries, but chiefly abounding within the tropics. They are herbs or shrubs, with simple

exstipulate leaves, and flowers in heads or spikes; the perianth usually colored, 3–5-partite, hypogynous, scarious, persistent, generally surrounded with small bracteæ; the stamens hypogynous, either 5, and opposite the segments of the perianth, or some multiple of 5, distinct or united into a tube, sometimes partly abortive; the anthers either 2-celled or 1-celled; the ovary single, superior, 1-celled, with 1 or few ovules, which hang from a free central cord; style single or absent; stigma simple or compound; fruit, a small membranous bag or utricle, or a caryopsis (q. v.), rarely baccate; seeds lense-shaped, externally crustaceous, embryo curved round the circumference; albumen farinaceous. —The genus *Amaranthus* has mostly monœcious flowers (although the order is generally hermaphrodite), with two or three stigmas, and a 1-celled, 1-seeded utricle, bursting all round transversely. Some of the species are naturally of singular form, and others assume singular but monstrous forms through cultivation.

Love-lies-bleeding (*Amaranthus caudatus*).

A. caudatus (Love-lies-bleeding), *A. cruentus*, *A. hypochondriacus* (Prince's Feather), and other species, are common annuals in our flower-gardens. The spikes of *A. caudatus* are sometimes several feet in length. The dry red bracts which surround the flower retain their freshness for a long time after being gathered; for which reason the plant has been employed by poets as an emblem of immortality.—The Globe A. (*Gomphrena globosa*) and the cockscomb (q. v.), well-known tender annuals, belong to the same natural order. The globe A. is much cultivated in Portugal and other Roman Catholic countries for adorning churches in winter. Its flowers, which are of a shining purple, retain their beauty and freshness for several years. No species of the order can be regarded as a true native of Britain, although *Amaranthus Blitum* is now found in waste places near London and elsewhere. *A. Blitum*, *A. oleraceus* (Chusan Han-tsi), and other species, are used as pot-herbs; but rarely in Britain. Wholesome mucilaginous qualities are very generally found in the leaves throughout the order. The seeds of *Amaranthus frumentaceus* (called Kiery) and of *A. anardhana* are gathered as corn-crops in India.—Medicinal properties are ascribed to some species of the order, particularly to *Gomphrena officinalis* and *macrocephala*, which have a high and probably exaggerated reputation in Brazil as cures for many diseases.

AMARAP U'RA, or UMMERAPOORA, now a city of the past, was, before 1853, the capital of Burmah, and was situated on the left bank of the Irrawaddy, 9 miles north-east from Ava, in lat. 21° 57′, long. 96° 7′. It was founded in 1783, and made the capital of the empire. In 1810 it was totally destroyed by fire, and in 1839 almost totally by an earthquake. In 1852–53, by order of the king, A. was finally deserted, and the capital of the country fixed at Mandalay. The population in 1810 was estimated at 170,000. Nothing remains of the old city but some rows of beautiful trees and a few ruined pagodas. In a temple between A. and Mandalay is a famous colossal bronze image of Gautama (Buddha).

AMARA-SINHA, a celebrated Hindu grammarian of great antiquity, who wrote a variety of works, only one of which has come down to us, the *Amara-Kosha*, or Thesaurus of Amara; sometimes called the *Trikanda*, i. e., the Tripartite. Regarding the author's life, little is known, nor is the precise period during which he flourished definitely ascertained. He is generally supposed to have been one of the 'nine gems' who adorned the throne of King Vikramaditya I. (56 B.C.). But Mr. Bentley (*Asiatic Researches*) places him as late as the 11th c. A.D., while Mr. Colebrooke assigns the close of the 5th as the most probable. He is known to have been a Buddhist; and it is universally believed that his writings perished during the fierce persecution to which that sect was subjected by the orthodox Brahmins, in the 3d, 4th, and 5th centuries. This tradition harmonizes with the earliest of the three ages in which he is said to have lived.

The *Amara-Kosha* is a Sanscrit vocabulary, divided into 3 books and 18 chapters, and containing in all about 10,000 words. The words are classed according to the nature of the things signified by them. Almost all the grammarians of Hindustan imitate, translate, or comment upon the work of A.

An excellent edition of the *Amara-Kosha*, with notes in English and an index, was published by Colebrooke, 1808 (reprinted 1829); the Sanscrit text at Calcutta in 1813; and in 1839, a French translation.

AMARI, MICHELE, an Italian historian and orientalist, was born at Palermo, July 7, 1806. At the age of sixteen, he entered a government office; and shortly after—his father being condemned to thirty years' imprisonment for a political crime—the duty of supporting his mother and the other members of his family devolved upon him. His straitened circumstances soured him; and he even meditated becoming a bandit, but was roused from his morbid wretchedness by falling passionately in love with an English lady. Although he did not win her hand, he secured a knowledge of the English language, the first result of which was a translation of Sir Walter Scott's *Marmion*, published at Palermo in 1832. A. soon became a political '*suspect*;' and although he had conducted himself during the tumult of 1837 with exemplary moderation, he was summarily transferred to a situation in Naples, where he remained four years, and where he pursued with the utmost diligence his historical investigations. In 1842 appeared his *La Guerra del Vespro Siciliano* (The War of the Sicilian Vespers), which has been often republished, and remains the masterpiece of its author. Its great merit arises from its having successfully combatted the common notion, that the terrible massacre so named was the result of a deep and ramified conspiracy on the part of the nobles. A. proves from a letter of Charles of Anjou himself, as well as from numerous other sources, that it was a popular or national outbreak, occasioned by the tyranny of the foreign rulers, that really brought about the deliverance of Sicily. The book was quickly prohibited, and, as a consequence, widely read. It was translated into German by Dr. Schröder of Hildesheim, and into English by Lord Ellesmere. A. was now ordered to Naples, but fled to France, where he gave himself up to the study of Arabic and modern Greek, and to the preparation of his *History of the Mussulmans in Sicily*. At the revolution of 1848, he returned to Palermo, where he had been appointed professor of public law, but shortly after his arrival was elected vice-president of the committee of war. He was next sent on a diplomatic mission by the provisional government to France and England. In 1849, he published at Paris *La Sicile et les Bourbons*, to show up the pretensions of the Neapolitan sovereign. After the Sicilian insurrection had been quelled, A. took up his residence in Paris, where he devoted himself to literary pursuits till 1860, when he returned to Italy. He was made senator next year, and in 1863–4 was Minister of Instruction. Other writings of A. are upon the language and history of the Arabs, in the *Revue Archéologique*, the *Journal Asiatique*, &c. He died 20th Sept., 1870, at Palermo.

AMARYLLI'DEÆ, or AMARYLLIDA'CEÆ, a natural order of Monocotyledonous plants, including many species distinguished by the beauty of their flowers. They are herbaceous plants, or when, as in the genera *Agave* and *Fourcroya*, they form woody stems, they have still the character of gigantic herbaceous plants rather than of shrubs. The greater part are bulbous-rooted. The leaves are sword-shaped, with parallel veins; the flowers have spathaceous bracts. The perianth is regular, 6-cleft, sometimes with a corona. The stamens are 6, arising from the perianth, sometimes cohering by their dilated bases; the anthers bursting inwardly. The ovary is inferior, 3-celled, with 1, 2, or many anatropal ovules; the style is single; the stigma, 3-lobed. The fruit is a 3-celled, 3-valved capsule, or a 1—3-seeded berry. The seed is albuminous, with an embryo nearly straight.—There are about 400 known species of this order, natives of tropical, or sub-tropical, and more sparingly, of temperate regions—particularly abundant at the Cape of Good Hope. A few species only are European. Many of them are much prized ornaments of our gardens and hothouses. Amongst these are different species of NARCISSUS (q. v.), AMARYLLIS (q. v.), CRINUM (q. v.), ALSTRŒMERIA (q. v.), NERINE, COBURGIA, BRUNSVIGIA, PANCRATIUM, FOURCROYA, &c. To this order belong the SNOWDROP (q. v.) and SNOWFLAKE (q. v.), and it includes also the AMERICAN ALOE (*Agave*, q. v.).

AMARY'LLIS, a genus of bulbous-rooted plants of the natural order *Amaryllideæ* (q. v.), having a simple 6-partite perianth, and containing a large number of species, natives of the warmer regions of the globe. Many of them have flowers of very great beauty. A species of this genus, *A. formosissima*, was brought to Europe from South America in the end of the 17th c., and has since been in common cultivation as a garden-flower. Its flowers are of a beautiful red color, exhibiting a play of golden gleams in the sunshine. They are scentless. *A. amabilis*, *A. Josephinæ*, and *A. vittata* are amongst the most admired bulbous-rooted plants. *A. Sarniensis* is one of the most hardy species, flowering freely in Guernsey, with a little protection during winter, and commonly called Guernsey Lily, although it is supposed to be a native of Japan. By artificial impregnation, a great number of hybrid forms have been produced in this genus.

Amaryllis formosissima.

AMA'SIA, AMASIEH, or AMASIAYAH (anc. *Amasia*), a town of Asia Minor, the principal town of the vilayet of Sivas, on the right bank of the Yeshil-Irmak, about 80 miles from the mouth of the river, and 200 miles south-west from Trebizond. It stands in a deep and narrow valley, and the river flows through a narrow channel, between precipitous rocky banks. The streets are narrow and crooked; the houses mostly of wood, although some are of stone, all covered with tiles. The river is crossed by three stone bridges, and one wooden bridge. One of the stone bridges is supposed to be Roman. The ancient town, the birthplace of Strabo, occupied both banks of the river, and the remains of the Acropolis crown a lofty rock on the side of the river opposite to the present town. There are numerous other interesting remains of antiquity, particularly the tombs of the kings of Pontus, whose capital A. was, excavated in the face of a steep rock, and some Saracenic buildings. Water is raised from the river by means of wheels driven by the river itself, for irrigation of the gardens and mulberry plantations. Much silk is produced in and around A.; also wine, cotton, corn, and madder. Silver, copper, and salt mines are wrought in the neighborhood. Silk and salt are the chief articles of export. A. is the seat of an Armenian bishop. Pop. 30,000, of whom about one-third are Christians.

AMA'SIS, a king of Egypt. Of humble origin, he rose to be general under Apries, the last king of the line of Psammetichus. Being sent to put down an insurrection, he joined the rebels, and was proclaimed king (569 B.C.). He cultivated the friendship of the Greeks, opened up to them the commerce of Egypt, previously confined to Naucratis, married a Greek wife, and took a bodyguard of Greeks into pay. Pythagoras and Solon are said to have visited him. For his alliance with Polycrates, and the singular reason for which Herodotus makes him break it off, see POLYCRATES. During his reign of 44 years, he greatly promoted the prosperity and adornment of Egypt. Immediately after his death, the country was conquered by Cambyses of Persia.

AMATITLA'N, a district of central America, near Guatemala city, embosomed in abrupt mountains of volcanic origin. It produces cochineal. There is a city A. (pop. 6000) and a lake in the district.

AMATRI'CÉ, a town of South Italy, in the province of Aquila or Abruzzo Ulteriore II., on the right bank of the Tronto, 21 miles north-by-west from Aquila. It was formerly a place of much greater importance than it is at present. It has five churches. The inhabitants are chiefly employed in agriculture and the manufacture of blankets. Pop. 2242.

AMAURO'SIS (Gr. *amauros*, obscure) is a blindness or obscurity of vision caused by disease of the optic nerve, and this cause may be situated either at the origin of the nerve in the brain, in some part of its course, or at its termination in the retina; and of course the degree of blindness will be in proportion to the extent these parts are involved by the disease. See OPTIC NERVE. A. may also depend upon causes remote from the organ of vision; the suppression of accustomed discharges from the body may lead to congestion of the vessels of the brain, and cause A.; and it may spring from very many slight causes, if a predisposition to the disease exists. This is occasionally hereditary. Beer mentions several cases in one family; for three successive generations, all the females who had not borne children became blind in middle age; the males showed a tendency to the disease, but did not become blind. A common cause is exposure to bright light or great heat and light, either natural or artificial, occupation upon minute objects, and employment of the eyes during the hours which ought to be devoted to sleep. In many instances, a single imprudent exposure of the eyes to the operation of some such cause, has been sufficient to extinguish the sensibility of the retina; but, in general it is from long-continued over-excitement of the organs of vision that they begin to fail, and at last become totally unable to continue their office. The heat of the sun, rage, continued stooping, and fevers or other causes, causing congestion, inflammation, or serous effusion in the head, cause A. Some poisonous substances cause A. suddenly, as belladonna, stramonium, and other narcotics given in large doses; and others, applied to the body every day in small quantities, have the same effect, but more slowly. Tobacco may be justly signalized as a poison of this sort, as also mercury and lead.

Exhaustion of the body and depressing mental affections also are causes of A. But we can seldom attribute its occurrence to the influence of any single remote cause, but to a number of circumstances which have been acting for a length of time upon one individual, either consecutively or together.

We recognize the presence of A. by the history of the case and the appearance of the eyes. The latter have generally a vacant unmeaning stare, dilated pupils, and do not converge towards an object, but appear to be looking steadfastly at something in the distance. The sclerotic or white of the eye is generally altered in color, and crossed by enlarged blood-vessels. The history of the case varies with the patient. Among the first symptoms are difficulty in calculating distances, as in threading a needle or pouring fluid into a glass; and sometimes there is occasional loss of sight in one eye (*amaurosis vaga*), confusion of vision—sometimes a part of the field of vision will be clear, and part obscured. There are also present spectra or *muscæ volitantes*, which sometimes are permanent, arising from the existence of insensible patches on the retina. Floating specks are merely coincident with the disease.

A. is treated by depletion in the robust, alteratives and tonics in the feeble, and by those remedies which act upon the nervous system, and counter-irritation by blisters or issues behind the ears, or in the neighborhood. Except in very recent cases, the prospect of recovery is slight.

AMAXI'CHI, the capital of the Ionian island of Santa Maura or Leucadia, is built on the edge of the shallow lagoons that separate the north-east part of the island from the mainland. The harbor constructed by the Anglo-Ionian government is protected by a mole, at the end of which is a light-house. It is fitted only for small-craft. A. derives its name from the Greek *amaxai*, 'cars,' which the Venetian garrison employed in bringing down the oil and wine from the inland districts to the point nearest the fort of Santa Maura, where, subsequently, houses began to be erected. The town has a very mean appearance; the buildings are partly of wood, on account of the frequent earthquakes. Slight shocks occur about once a month. Behind A. there is an old olive-wood, extending to the base of the neighboring hills, and checkered with cypresses and gardens. The town is the residence of a Greek archbishop, and has 15 churches. Pop. 5000. A. is now frequently called *Leukas*.

A'MAZON, MARANO'N, or ORELLA'NA, a river which, after traversing nearly the entire breadth of South America, enters the Atlantic between Brazil and Guiana, by a mouth of about 150 miles in width—a mouth which, though it admits the tide for nearly 500 miles, is yet so far from meeting our ordinary notion of an estuary that it repels, or at least overlays, the ocean to a distance of more than fifty leagues. With its various tributaries—the Napo, the Putumayo, the Yapura, and the Rio Negro from the north, and the Huallaga, the Yavari, the Jutay, the Jurua, the Coary, the Purus, the Madeira, the Tapajos, and the Xingo from the south—the A. drains 2,330,000 square miles, an area equal to two-thirds of Europe, and is estimated to afford an inland navigation of 50,000 miles, a line double the circumference of the globe. In every respect, then, the A. may well claim to be the largest of rivers, excepting only that, in volume of contents as distinguished from volume of discharge, the St. Lawrence, with its computed mass of 11,000 cubic miles, has been estimated to be equal to all the other bodies of fresh water on the earth's surface, from the A. downwards. With this exception, which—as the St. Lawrence is really a series of lakes—is rather apparent than real, the Amazon stands forth as the king of rivers, whether trunk be compared with trunk, or branches with branches, alike in essential features and in the area of the basin. Viewed as one grand system, the A., from its sources, from which the Pacific may be seen within a distance of 60 miles, to its embouchure, comprises a course of about 4000 miles; while, gathering its tribute from both sides of the equator along more than 20° of latitude, it presents, perhaps, between south and north, a longer line of natural communication than even between west and east. Reckoning from the western range of the Andes, the A. is but little better than a mountain-torrent, till it has burst through the gorges of the eastern range of the chain, where it is overhung by peaks that tower thousands of feet above its bed. But, within 300 miles from the Pacific—a journey of about 20 days for loaded mules—the branch called the Huallaga is practicable for steamers, while, after a run of 325 miles, the A. is navigable for vessels drawing 5 feet, growing deeper and deeper, and more and more available as it rolls its steadily swelling flood towards the ocean. Nor is this the remotest point of clear navigation from the sea, for the Maranon itself is estimated by Herndon to carry the clear navigation about one-fifth higher up, amounting in all to 3360 miles.

What an idea do these single threads afford of this matchless net-work of inland navigation! But it is not to its own basin alone, vast as that basin is, that the value of the A. is confined. The Rio Tapajos has its navigation separated only by a portage of 18 miles from that of an affluent of the Plata; the Rio Branco, the main tributary of the Rio Negro, has a water-communication which is only two hours distant from that of the Essequibo; while the Rio Negro itself is doubly connected with the Orinoco, receiving from it the navigable Cassiquiare (q. v.), and wanting only a canal over a portage of six hours to complete a still more useful bond of union, whose superior advantages will certainly one day lead to the necessary improvement. In addition to all this, the outlet of this mighty river, besides washing Cayenne, is itself, under nature's guidance, a feeder, as it were, of that highway of nations, the Gulf Stream. Thus, does the A., to say nothing more of its maritime relations, bring its inland navigation, mediately or immediately, to bear, Chili alone excepted, on every country in South America—Venezuela, Ecuador, New

Granada, Bolivia, Peru, Brazil, the Guinas, and the several Argentine Republics. This is not mere prospect; not only has the basin proper of the A. been more or less frequently traversed, but also the various joints that knit it to the other basins have been tested by experience. The grandest and most singular of them all, besides being explored by Humboldt, has been placed beyond a doubt by the denizens of the country. The barge-builders of San Carlos, at the entrance of the Cassiquiare, into the Rio Negro, have long sent vessels, not only down the Rio Negro to Para, on the Lower A., but likewise up the Cassiquiare to Angostura, on the Lower Orinoco; thus solving, in their own way, the problem which systematic geographers were elsewhere deriding as worse than a fable—as a sheer impossibility. It was not till 1867 that the navigation of the A, was thrown open, but now regular lines of steamers ply between its mouth and Yurimaguas on the Huallaga. The most important exports sent down the A. are india-rubber, cocoa, cotton, nuts, copaiba, palm-fibre, hides, sarsaparilla, farina, tonka beans, arnotto, and tobacco. Other productions of the countries watered by the A., countries well fitted to become the garden of the world, are coffee, sugar, maize, rice, indigo, grapes, bananas, cabinet-woods, building-timber, game, fish, and precious metals. Steam-boat navigation began on the A. in 1853. In that year, the Amazon Navigation Company, a Brazilian commercial association fostered by the government, sent its first steamer from Pará, the maritime emporium of the A., to Nauta, in Peru; and recently, the company had a capital of 2,200,000 dollars, and nine steamers, five of which ply exclusively in the A. waters; two below Pará and Loreto in Peru, distance 2100 miles; one on the Peruvian branch of the river, 288 miles; one from Pará to Obidos, 400 miles, one from Santarem to Faro. The Peruvian government has also a line of steamers on its reach of the A., and up the Huallaga.

The wonderful discoveries made by the late Professor Agassiz (1865—1866) in the *fauna* of the waters of the A. have proved what he himself calls 'a true revelation of science.' Their importance will be seen by contrast. The number of species of fish on the whole globe known to Linnæus about a century ago was 300; in 1840, Captain Wilkes collected only 600 species in a voyage round the world with three ships, in an expedition lasting four years; but Agassiz saw in five months on the A. alone 1300 species of fish, nearly 1000 of them new, and about 20 new genera. The *Vacca marina*, the largest fish inhabiting fresh waters, and the Acarà, which carries its young in its mouth, especially when there is danger, are denizens of the Amazon.—See *A Journey in Brazil*, by Agassiz (1868); *The River Amazon*, by W. H. Edwards; *Fifteen Thousand Miles on the A.*, by C. B. Brown; *Brazil, the Amazons, and the Coast*, by H. H. Smith (1880); *Between the A. and the Andes*, by Mrs. Mulhall (1882).

A'MAZONS, AMAZONES. According to a very ancient tradition, the A. were a nation of women, who suffered no men to remain among them, but marched to battle under the command of their queen, and formed for a long time a formidable state. They held occasional intercourse with the men of the neighboring states. If boys were born to them, they either sent them to their fathers, or killed them. But they brought up the girls for war, and burned off their right breasts, that they might not be prevented from bending the bow. From this custom, they received the name of A., that is, 'breastless.' Such is the ordinary tale; the origin of which is perhaps to be accounted for by supposing that vague reports, exaggerated and poetically embellished, had reached the Greeks of the peculiar way in which the women of various Caucasian districts lived, performing military duties which elsewhere devolved on husbands. Ebers and others insist that Greek imagination made the institution of armed priestesses, as found amongst various races, into nations of women warriors. In later times, however, the word Amazon has been supposed to have some connection with the Circassian word 'Maza,' signifying the moon, as if the myth of the A. had taken its origin in the worship of the moon, which prevailed on the borders of Asia. Three nations of A. have been mentioned by the ancients. 1. The Asiatic A., from whom the others branched off. These dwelt on the shores of the Black Sea, and among the mountains of the Caucasus, especially in the neighborhood of the modern Trebisond, on the river Thermodon (now Termeh). They are said to have at one time subdued the whole of Asia, and to have built Smyrna, Ephesus, Cumæ, and other cities. Their queen, Hippolyte, or, according to others, Antiope, was killed by Hercules, as the ninth of the labors imposed on him by Eurystheus consisted in taking from her the shoulder-belt bestowed on her by Mars. On one of their expeditions, the A. came to Attica, in the time of Theseus. They also marched under the command of their queen, Penthesilea, to assist Priam against the Greeks. They even appear upon the scene in the time of Alexander the Great, when their queen, Thalestris, paid him a visit, in order to become a mother by the conqueror of Asia. 2. The Scythian A., who, in after-times, married among the neighboring Scythians, and withdrew further into Sarmatia. 3. The African A., who, under the command of their queen, Myrina, subdued the Gorgons and Atlantes, marched through Egypt and Arabia, and founded their capital on the Lake Tritonis, but were then annihilated by Hercules. See Stricker, *Die Amazonen in Sage und Geschichte* (Berl. 1873).

AMBA'SSADOR is a title by which the highest order of diplomatic ministers is distinguished, and the person holding such a high commission may be defined to be an officer sent by one sovereign power to another to treat on affairs of state. In a less restricted sense, writers on public law employ the term to denote every kind of diplomatic minister or agent. The credentials, or letters of credence, of an A. are addressed directly by his own sovereign to the sovereign to whom he is sent, and with whom he has the privilege of personal communication. In the performance of all his diplomatic duties, an A. is understood to represent, not only the affairs, but the dignity and the power of his master; and by the law of nations, he has many important rights and privileges, the chief of which is exemption from the control of the municipal laws of the nation wherein he is to exercise his functions, an exemption that is not confined to the A. himself, but is extended to all his suite, including not only the persons employed by him in diplomatic services, but his wife, chaplain, and household generally. But there is a dispute among legal writers whether this exemption extends to *all crimes*, or whether it is limited to such offences as are *mala prohibita*, as coining, and not to those that are *mala in se*, as murder. The law of England appears to have formerly allowed the exemption in the restricted sense only; and in the year 1654, during the Protectorate of Cromwell, the Portuguese A. was tried, convicted, and executed, for an atrocious murder. But, now, according to the general practice of this country, as well as that of the rest of Europe, it is considered that the security of an A. in conducting the intercourse of nations, is of more importance than the punishment of a particular crime, and therefore few examples have happened in modern times where an A. has been punished for any offence. In regard to civil suits, it was at one time held and laid down by Sir Edward Coke that an A. to the English court was answerable for any contract which was good according to the law of nations. The full exemption of an A. from legal process in civil cases was first recognized by 7 Anne, c. 12, a statute whose history is thus related by Blackstone. 'In the reign of Queen Anne, an A. from Peter the Great, Czar of Muscovy, was actually arrested, and taken out of his coach in London, for a debt of £50, which he had there contracted. Instead of applying to be discharged upon his privilege, he gave bail to the action, and the next day complained to the queen. The persons who were concerned in the arrest were examined before the privy council (of which the Lord Chief-justice Holt was at the same time sworn a member), and seventeen were committed to prison, most of whom were prosecuted by information in the Court of Queen's Bench, at the suit of the Attorney-general; and at their trial before the Lord Chief-justice, were convicted of the facts by the jury; reserving the question of law, how far those facts were criminal, to be afterwards argued before the judges; which question was never determined. In the meantime, the Czar resented this affront very highly, and demanded that the sheriff of Middlesex, and all others concerned in the arrest, should be punished with instant death. But the queen (to the amazement of that despotic court) directed her secretary to inform him, *that she could inflict no punishment upon any the meanest of her subjects, unless warranted by the law of the land; and therefore was persuaded that he would not insist upon impossibilities.*

To satisfy, however the clamors of the foreign ministers, who made it a common cause, as well as to appease the wrath of Peter, a bill was brought into parliament, and afterwards passed into a law (the 7th Anne c. 12), to prevent and punish such outrageous insolence for the future; and with a copy of this act elegantly engrossed and illuminated, accompanied by a letter from the queen, an A. extraordinary was commissioned to appear at Moscow, who declared, *that though her majesty could not inflict such a punishment as was required, because of the defect in that particular of the former established constitutions of her kingdom, yet, with the unanimous consent of the parliament, she had caused a new act to be passed, to serve as a law for the future.* This *humiliating* step, says Blackstone, 'was accepted as a full satisfaction by the Czar; and the offenders, at his request, were discharged from all further prosecution.'

But although an A. is not amenable to any tribunal of the country he resides in, he cannot misconduct himself with impunity. He must respect the laws and customs of the country in which he is officially resident; and if he violates or offends these laws and customs, he may be complained of to the court or government which he represents; or if the offence is of a very serious nature, his recall may be demanded, or the sovereign to whom he has given such offence may dismiss him peremptorily, and further require that he be brought to trial in his own country. It hardly need be added, that if an A. is guilty of an offence which threatens the safety of the state, he ceases to enjoy the privileges of the exemption in question.

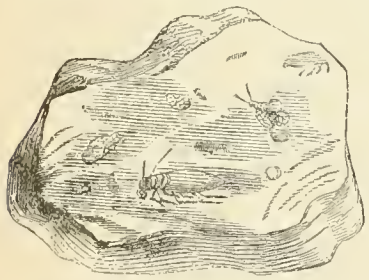
There are some other and inferior privileges which are very gen-

erally allowed to ambassadors: they are, for instance, permitted the free exercise of their religion; they are, in general, exempted from direct taxation, they have special letter-bags, and they are usually allowed to import their goods without paying any custom-house duties—a privilege, however, which, being liable to abuse, has sometimes been limited.

Ambassadors are of two kinds—first, those who reside regularly at the court to which they are accredited; and, secondly, those who are sent on special occasions, when they receive the designation of AMBASSADORS EXTRAORDINARY. The employment of permanent ambassadors originated in modern times. Her Majesty's diplomatic corps includes only five embassadors in the more restricted sense of the word, who are accredited to the courts of Vienna, Paris, St. Petersburg, Constantinople, and Berlin respectively. Inferior diplomatic agents receive the title of CHARGÉ D'AFFAIRES, MINISTER PLENIPOTENTIARY, or ENVOY (q. v.).

AMBA'TO, or ASIENTO D'AMBATO, a town of Ecuador, on the north-eastern slope of Chimborazo, 66 miles south from Quito, 8859 feet above the sea. It was destroyed in 1698 by an eruption of Cotopaxi, but was soon rebuilt, and became more flourishing than before. It carries on an active trade in grain, sugar, and cochineal, the products of the surrounding country. Pop. 12,000.

A'MBER, a substance analogous to the vegetable resins, and, in all probability, derived from an extinct coniferous tree, although now appearing, like coal, in connection with beds of which it is usually found, as a product of the mineral kingdom. It is usually of a pale-yellow color, sometimes reddish or brownish, is sometimes transparent, sometimes almost opaque. It occurs in round irregular lumps, grains, or drops; has a perfectly conchoidal fracture, is slightly brittle, emits an agreeable odor when rubbed, melts at 550° F., and burns with a bright flame and pleasant smell. It becomes negatively electric by friction, and possesses this property in a high degree—which, indeed, was first observed in it, and the term electricity is derived from *elektron*, the Greek name of A. The specific gravity of A. is 1·0—1·1. It is ultimately composed of carbon 79, hydrogen 10·5, and oxygen 10·5. An acid called succinic acid (named from the Lat. *succinum*, amber) is obtained from it. A. had formerly a high reputation as a medicine, but the virtues ascribed to it were almost entirely imaginary. An antispasmodic volatile oil is obtained from it by distillation. A. is employed in the arts, for the manufacture of many ornamental articles, and for the preparation of a kind of varnish. Great quantities are consumed in Mohammedan worship at Mecca, and it is in great demand throughout the east. It was obtained by the ancients from the coasts of the Baltic Sea, where it is still found, especially between Königsberg and Memel, in greater abundance than anywhere else in the world. It is there partly cast up by the sea, partly obtained by means of nets, and partly dug out of a bed of bituminous wood. It is found elsewhere also in coal, and occasionally in diluvial deposits, as in the gravel near London; but it is very rare in Britain. It is obtained in small quantities from the coasts of Sicily and the Adriatic, and is found in different parts of Europe, in Siberia, Greenland, &c. It sometimes encloses insects of species which no longer exist. Leaves have also been found enclosed in it. Specimens which contain insects or leaves being much valued, fictitious ones are often manufactured and imposed upon collectors. According to an ancient fable, A. is the tears of the sisters of Phaëthon, who, after his death, were changed into poplars. The ancients set an immense value upon it. Pieces of A. have occasionally been found of 12 or 13 lbs. weight, but such pieces are extremely rare.



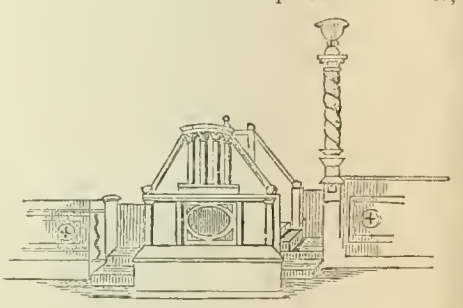
Amber, with enclosed insects.

A'MBER, a decayed city in the Rajpot state of Jeypoor, India, four miles north-by-east from Jeypoor, in 26° 59′ N. lat. 75° 58′ E. long. It is situated on the margin of a small lake, in a deep hollow among hills; and its temples, houses, and streets are scattered among numerous ravines opening on the lake. Comparatively few of its houses are now inhabited; but everywhere are to be seen ghastly Hindu ascetics, sitting amidst the tombs and ruined houses. On the slope of an adjacent hill is the vast and gorgeous palace of Amber, a building remarkable for its massiveness and solidity.

A'MBERG, the old capital of the Upper Palatinate in Bavaria, 35 miles east of Nürnberg, and 32 north of Ratisbon. It is situated on both sides of the Vilz, and is well built. Pop. (1880) 14,583. The ancient walls are now transformed into shady avenues. A. is the seat of the court of appeal for the district, possesses a library of 34,000 volumes, a lyceum, an agricultural and industrial school, a house of correction, an arsenal, &c. The principal products are firearms, earthenware, woollen cloths, ironmongery, and beer. A. has 14 breweries, a large cattle and swine market, a market for hops, and an important salt-trade. Many of the inhabitants are employed as miners in the neighboring mountains. The suburbs are adorned with beautiful gardens and shaded alleys.

A'MBERGRIS (i. e., gray amber), a fatty substance, of an ash-gray color, with yellow or reddish striæ, like those of marble, which is found in lumps of from half an ounce in weight to 100 lbs. and upwards, floating on the sea, or cast upon the sea-shore in different parts of the world, and is also taken by whale-fishers from the bowels of the spermaceti whale (*Physeter macrocephalus*). Much A. is obtained from the coasts of the Bahama Islands; it is also brought from different parts of the East Indies, and the coasts of Africa and Brazil. It is probable that all of it is produced by the spermaceti whale, and that it is a morbid secretion in the intestinal canal of that animal, derived from the bile. It is highly valued, upon account of its agreeable smell and is much used in perfumery. The price is about 20*s.* an ounce. It has been strongly recommended for medicinal uses, but is scarcely employed in Europe; although, in some parts of Asia and Africa, it is much used as a medicine, and also in cookery as a condiment. The specific gravity of A. is scarcely more than 0·9. It almost always contains black spots, which appear to be caused by the presence of beaks of the *Sepia octopodia*, the principal food of the spermaceti whale. It consists in great part (85 per cent.) of a peculiar brilliant white crystalline substance called *Ambrein*, which is obtained from it by treating it with alcohol.

A'MBO (Lat.), a kind of reading-desk or pulpit, which, in early churches, was placed in the choir. The Gospels and Epistles were read from the A., and sermons were sometimes preached from it, although the more usual practice in the primitive church was for the preacher to stand on the steps in front of the altar. The A. is still to be found in oriental churches, and specimens of it may be seen in Rome. The A. had two ascents—one from the east, and the other from the west. In the Roman churches, there were two ambos, one on each side of the choir, from one of which the Gospel was read, and from the other the Epistle. Where two such ambos were used, their construction was somewhat different. The name A. was also given to the analogium or reading-desk used in monastic choirs, which was usually in the form of an eagle.



Ambo, St. Clement's Church, Rome.

AMBOI'SE, a town on left bank of the Loire, in the department of Indre-et-Loire, France. It is 15 miles by railway east of Tours, and lies in a region so rich in vineyards that it has been called 'the Garden of France.' Its manufactures are unimportant. A. possesses a castle, in which several of the French kings have resided. Charles VIII. was born here. It was also the scene of his death. The town is memorable as the place in which the religious wars that devastated the kingdom during the 16th c. broke out, and where the word 'Huguenot' was first applied to the Protestant party. The castle of A. was much improved by Louis Philippe, and was the residence of the Arab chief, Abd-el-Kader during his captivity in France. Pop. (1876) 4475.

AMBOISE, GEORGE D', cardinal and prime-minister under Louis XII. of France, was born, 1460, at Chaumont-sur-Loire. When only fourteen years old, he was made Bishop of Montauban, and almoner to Louis XI., and, in 1493, was made Archbishop of Rouen. Initiated in early years into the intrigues of court, he soon, by his zealous services, secured the confidence of Louis of Orleans (Louis XII.), by whom he was made premier in 1498. From this time, A. became the prime mover in all the political affairs of France. By his advice, the king undertook the capture of Milan, which had such great influence on the fortunes of France. After the death of Pope Alexander VI., A. endeavored to raise himself to the papal see, and having failed, became the dangerous enemy of the succeeding popes, Pius III.—who occupied the papal chair only 27 days—and Julius II. To secure his own election, A. encouraged a schism between the French Church and the See of Rome, and convened a separate council, held first at Pisa, afterwards at Milan and Lyon; but his plans were frustrated by the failures of the French army in Italy. He died at Lyon, May 25, 1510. The Cardinal A. was a dexterous and experienced statesman; but was accused of avarice, vanity, and ambition, and it was said that his vast fortune of 11,000,000 livres had not been

accumulated by over-scrupulous means. His biography was writen by Montagnes (1631) and Legendre (Rouen, 1724).

AMBOY'NA, APON, or THAU, the most important of the Spice Islands belonging to the Dutch, lies S.W. from Ceram, and N.W. from Banda, in 127° 51′ 30″—128° 22′ 15″ E. long., and 3° 26′ 40″—3° 49′ S. lat. Area, 287 sq. m. The bay of A. runs into the island lengthways, forming two peninsulas, the northern called Hitu, and the southern, which is the smallest, Leitimor. A. is mountainous, the highest peaks being in Hitu. The climate is healthy—average temperature, 82° F.; lowest 72°. The east monsoon brings heavy rains and storms. There are many rapid streams, and the town of Amboyna is supplied with excellent water from three small rivers. Clove, sago, mango, and cocoa-nut trees are abundant, also fine timber for cabinet-work. The sago palm grows along the shores. The hills are covered with the cajeput or leucadendron, from the leaves of which a medicinal oil is extracted. The clove produce varies much, but the average of ten years is about 400,000 lbs. In a good year, a bearing tree gives about 5 lbs. Sweet potatoes, coffee, pepper, indigo, rice, and fruits are grown. Fish is plentiful, and on the banks of A. beautiful shells are found. Deer are numerous on Hitu. There are hogs and goats, a few sheep, monkeys, civet-cats, anteaters, crocodiles, snakes, &c. Buffaloes, horned cattle, and horses are imported. The natives are for the most part civilized, though still very superstitious. They speak a Malay dialect, and observe customs which indicate a Hindu origin. Daughters are a source of wealth, a payment of jewels, slaves, or clothing being exacted from the bridegroom. The *villagers* are set apart for the clove cultivation, and employed in feudal service during one half of the year. The *freemen* follow handicrafts, grow fruits and vegetables, fish, make fragrant oils, and trade. The trade, which is small, is chiefly carried on by Chinese and Arabs. Pop. 28,000, fully one half being Christians; the remainder, except 2000 heathen, Mohammedans. The Dutch took A. from the Portuguese in 1605.

AMBOYNA, the capital, is situated near the middle of the N.W. shore of Leitimor, on the bay of A., in 3° 41′ 40″ S. lat., and 128° 15′ E. long. A wooden pier, where ships lie in 20 fathoms, leads to the town through Fort Victoria, in which are two companies of infantry and half a company of artillery, making a force of 271 men and 23 officers. The town is built at the base of Mount Soya. The streets are wide and clean; many houses are shaded by nutmeg-trees. Principal buildings are two Protestant churches, an orphan house, hospital, &c. Europeans live south-west of the fort in low stone houses. There is a theater, and well-kept markets. The Netherlands Missionary Society has a training school for native teachers and ministers, with a printing establishment for lesson-books. The Reformed Church has 1800 members, 1300 being natives, with 2 ministers who superintend other churches. Pop. 10,500. Since 1854, A. has been a free port.

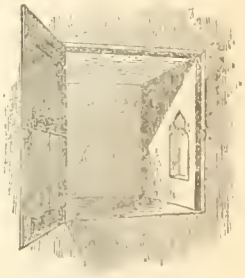
A'MBROSE, SAINT, one of the most celebrated of the ancient fathers of the church, was born about the year 340, probably at Treves, where his father, as Prefect of Gaul, was wont to reside. A. received a fortunate omen even in his cradle: a swarm of bees covered the slumbering boy; and the astonished nurse saw that the bees clustered round his mouth, without doing him any harm. His father, perhaps remembering a similar wonder related of Plato, foreboded from this a high destiny for A. He received an excellent education, and went with his brother Satyrus to Milan, in order to follow the legal profession. He soon distinguished himself so much, that, in 369, he was appointed, by Valentinian, Prefect of Upper Italy and Milan. In this office, his gentleness and wisdom won for him the esteem and love of the people, whose prosperity had been much injured by the troubles caused by Arianism. Accordingly, by both Arians and Catholics, he was unanimously called to be Bishop of Milan, in 374. A. long refused to accept this dignity, and even left the city; yet he soon returned, was baptized, as hitherto he had been only a catechumen, and was consecrated eight days afterwards. The anniversary of this event is still celebrated as a fête by the Catholic Church. As a bishop, A. won the universal reverence of all, by his mild and gentle, though, towards wickedness of every kind, severe and unbending character. Thus, he repulsed the Emperor Theodosius himself even from the door of the church, on account of his having caused the rebellious Thessalonians to be cruelly massacred by Rufinus, excommunicated him, and only restored him to the church after eight months of severe penance. A. died in 397. The best edition of his works, in which he followed in many things the Greek theological writers, is that published by the Benedictines (2 vols., Paris, 1686—1690). The hymn, *Te Deum Laudamus*, is usually ascribed to A., but it is proved to have been written 100 years later. The Ambrosian ritual has also received his name, only because A. had made some changes upon it, which are retained at the present day in the Milanese Church. A commentary on the epistles of Paul, which was formerly ascribed to A., was probably composed by the Roman deacon Hilarius, and is usually quoted as the Commentary of the Ambrosiaster. A. is the patron saint of Milan, and the Ambrosian library received its name in honor of him.

AMBROSIA, in Greek and Roman Mythology, is the name of the food of the gods, which conferred immortal youth and beauty. It was brought by doves to Jupiter, and was occasionally bestowed upon such human beings as were the peculiar favorites of the gods. A. was also used as a fragrant salve, which the goddesses employed to heighten their beauty; with which Jupiter himself anointed his locks; and which had the property of preserving bodies from corruption. Hindu mythology has also its *amrita* (from *a*, signifying 'without' or 'not,' and the Sanscrit root, allied to the Lat. *mort* and Greek *brot*), or liquor of immortality, that resulted from the churning of the ocean by the gods; and the gods of the Scandinavian pantheon were preserved in perpetual vigor by eating the apples guarded by Idun.

AMBRO'SIAN CHANT, the choral music of the early Christian Church, introduced from the eastern church into the western by St. Ambrose, Bishop of Milan, in the 4th c.; it was founded on the first four authentic modes of the ancient Greeks, and was sung antiphonally. It continued in use until the 6th c., when Pope Gregory the Great reformed the music of the church by introducing the Gregorian chant. There exists still another specimen of music by Ambrosius, which is now known only in the German-Lutheran Church by Luther's translation of the words, *Nun kommt der Heiden Heiland*; it is beyond a doubt 1400 years old, and remains to this day a beautiful specimen of melody, expressive of filial humility and submission. The A. C. continued to be still sung in the cathedral at Milan long after Gregory's reformation, and till this day, it is said, it may be heard there.

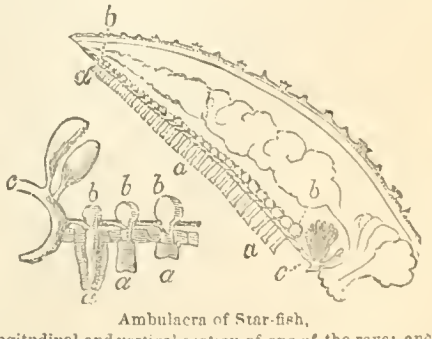
AMBROSIAN LIBRARY, a library in Milan, so named in honor of St. Ambrose, the patron saint of that city. It was established in 1609 by the Cardinal Archbishop Federigo Borromeo, who employed learned men to collect books both in Europe and Asia. This library was afterwards enriched by the acquisition of the MSS. of the Pinelli collection. Borromeo intended to establish, in connection with the library, a college of sixteen learned men, each having charge of a particular department, to make known the works in the library, and assist strangers in their researches. The want of funds limited the number of members of this college. The chief acting officer, or *prefetto*, and four assistants, are Doctores Bibliothecæ Ambrosianæ. The library contains 140,000 volumes of printed books, and 8000 MSS. Among the many rarities belonging to it, besides the Palimpsests and other as yet unedited MSS. discovered by Maio, Castiglione, and Mazzuchelli, it contains a 'Virgil,' in which Petrarch had written an account of his first meeting with Laura.

A'MBRY, AUMERY, ALMERY (supposed by some to be a corruption of Almonry), a niche in the wall of a church, shut in by a door; or a small cabinet of wood placed by the side of the altar, for the purpose of holding the vestments and utensils, such as the chalices, basins, cruets, &c., used for the service of the mass. In monastic buildings, ambries were used for various purposes, such as keeping plate, hanging towels for the monks to dry their hands with before dinner, and the like. In this sense, the term A. seems to have been applied to any kind of cupboard which was closed in and locked, and it is so used in Scotland at the present day.



Ambry, Rushden, Northamptonshire—14th century.

AMBULA'CRA (from the Latin *ambulare*, to walk), the name given to peculiar organs of locomotion with which star-fishes and



Ambulacra of Star-fish,

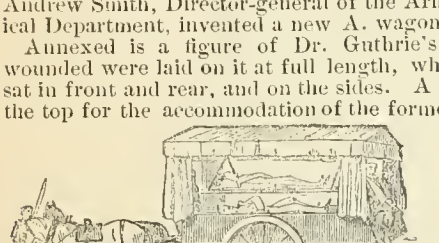
As seen in a longitudinal and vertical section of one of the rays; and three of them in a separate figure on a larger scale, in which they are shown in different conditions: *a, a, a*, tubular feet; *b, b, b*, internal vesicles; *c*, the organ which supplies the fluid with which they are filled.

other *Echinodermata* are furnished. They are fleshy, more or less

elongated, and terminated by suckers. They pass through orifices in the shell or other external integument of the animal, and are generally arranged in rows. Those of the *Echini*, or Sea-urchins, are long enough to extend beyond the point of the spines, and by means of them the animal is able to climb a perpendicular rock. They are tubular, and each has at its base a vesicle, filled with a fluid which, on the contraction of the vesicle, is forced into the tube, dilating it to its full extent, whilst, on the contraction of the tube, the fluid returns again into the vesicle. The fluid is not secreted by these vesicles, but provided for them by distinct secreting organs.

A'MBULANCE, a military term which is somewhat differently applied in different countries. In France, an A. is a portable hospital, one of which is attached to every division of an army in the field, and provided with all the requisites for the medical succor of sick or wounded troops. Such an A. is stationed at some spot removed from immediate danger; and soldiers are sedulously employed after a battle in seeking out those who have fallen, and conveying them to the A. Baron Larrey, during the great wars of the First Napoleon, brought this department of medical business to a high degree of efficiency, and set an example to the rest of Europe. When England engaged in war with Russia in 1854, the A. arrangements, like many others relating to the army, were in a very imperfect state. In the English army, A., strictly speaking, means a field hospital with all its wagons, litters, tents, cooking canteen, &c.; but sometimes the name is applied to a four-wheeled wagon or a two-wheeled cart fitted up for the reception of wounded men. When Lord Raglan was about to be sent out with the army, Dr. Guthrie, President of the College of Surgeons, devised a new form of A. cart; while Dr. Andrew Smith, Director-general of the Army and Ordnance Medical Department, invented a new A. wagon.

Annexed is a figure of Dr. Guthrie's A. cart. The badly wounded were laid on it at full length, while those slightly hurt sat in front and rear, and on the sides. A stretcher is slung from the top for the accommodation of the former. The back-board is let down for cases requiring amputation. The hospital chests are lashed underneath. Many of Smith's A. wagons and of Guthrie's A. carts were at once made and sent out to the East; but they were not at the proper place when most wanted. After the battle of the Alma, the English were almost entirely destitute of means for conveying their wounded down to the beach; but the French had for this purpose a large number of *cacolets*, suggested to them by their experience in Algeria. Each of these consists of two easy-chairs, slung in panniers across the back of a mule; and it is accordingly available along tracks where no wheel-carriage could pass. These cacolets have since been adopted in the English army, as well as improved, hand-litters, wheeled-litters or barrows, and ambulance wagons on a more modern model than those of Smith and Guthrie, but having the same general character. The American War, the wars of 1866 and 1870, and above all, the growth of volunteer aid societies under the influence of the Geneva Convention of 1866 (which gave to the wounded and their attendants the privileges of neutrality), have largely developed the ambulance equipments of every European army. Every international exhibition now contains an immense number of designs for the safe transport of the wounded. The most remarkable step taken in this direction has been the organization of railway ambulances. Trains of carriages either built for the purpose, or adapted from the ordinary rolling stock, can now be fitted up as moving hospitals, with their staff of surgeons and attendants; and by means of these railway ambulances the wounded can be safely and rapidly removed from the encumbered field hospitals to the permanent hospitals of the great cities of their own country. All the fittings for thus adapting railway trains to hospital purposes are now kept permanently in store in many of the countries of the continent.



Ambulance cart.

A'MBULATORY. A name occasionally given in architecture to the cloisters of a cathedral, college, or the like.

A'MBUSCADE is one of the manœuvres adopted in war. The original Italian *imboscata* ('concealed in a wood'), denotes the general nature of the A.; but the meaning is now much more extended, seeing that it applies to any attempt to attack an enemy by lying in wait and coming upon him unexpectedly. In former days, when soldiers fought hand to hand more frequently than at present, the A. was much resorted to; but the tactics of modern times render it less available. It was by an A. on the part of the revolted sepoys that so many British soldiers were killed and wounded in that adventure which was known, during the wars of the Indian mutiny, as the 'disaster at Arrah,' in July 1857. An A. is neither an 'attack' nor a 'surprise,' in military language; it is something more sudden and unexpected than either.—AMBUSH is another name for ambuscade.

AMELANCHIER, a genus of plants of the natural order *Rosaceæ* (q. v.), sub-order *Pomeæ*, distinguished by having five ovaries, each of which is divided into two cells, with one ovule in each cell, the ripe fruit including 3—5 carpels. It consists of a few species of small trees with deciduous simple leaves, abundant racemes of white flowers, and small fruit of the size of a pea, or a little larger, but soft, juicy, and agreeable. The common A. (*A. vulgaris*) is a native of the Alps, Pyrenees, &c. The other species are natives of North America. *A. botryapium* is sometimes called June-berry, from its fruit ripening in June, before that of any other tree or shrub; and *A. ovalis* produces a very pleasant fruit, which makes excellent puddings. The amelanchiers are planted in Britain merely as ornamental trees. They are very hardy.

AME'LIA (anc. *Ameria*), a town of Central Italy in the province of Perugia, 21 miles south-west of Spoleto. It is picturesquely situated on the mountains between the Nera and the Tiber, about seven miles from the junction of the two rivers. It is the seat of a bishop, and has a cathedral. Pop. of commune, 7024.

A'ME'N, a Hebrew word of asservation, is equivalent to 'Yea,' 'Truly,' and has been commonly adopted in the forms of Christian worship. In Jewish synagogues, the A. is pronounced by the congregation at the conclusion of the benediction given at parting. Among the early Christians, the prayer offered by the presbyter was concluded by the word A., uttered by the congregation. Mention is made of the practice in the 1st Epistle to the Corinthians (xiv. 16). Justin Martyr is the earliest of the fathers who alludes to the use of the response. 'In speaking of the sacrament, he says that, at the close of the benediction and prayer, all the assembly respond "A." According to Tertullian, none but the faithful were permitted to join in the response.' A somewhat noisy and irreverent practice prevailed in the celebration of the Lord's Supper until the 6th c., after which it was discontinued. 'Upon the reception both of the bread and of the wine, each person uttered a loud "A.;" and at the close of the consecration by the priest, all joined in *shouting* a loud "A."' The same custom was observed at baptism, where the sponsors and witnesses responded vehemently. In the Greek Church, the A. was pronounced after the name of each person of the Trinity; and at the close of the baptismal formula, the people responded. At the conclusion of prayer, it signifies (according to the English Church Catechism) *So be it;* after the repetition of the Creed, *So is it.*

AME'NDMENT is a term used both in judicial and parliamentary proceedings. In the former, it is a power of correction of any errors in actions, suits, or prosecutions, which has been greatly extended of late, and which has largely improved and simplified the administration of the law, both in England and in Scotland. In parliament, the word A. is used when it is intended to oppose, vary, or qualify a question or resolution; and in the case of bills, it is employed as a courteous method of dismissing the bill from any further consideration, by moving that instead of 'now,' it be read at the end of three months, six months, or any other term beyond the probable duration of the session. It is also competent to a member to move as an A. to the question a resolution declaratory of some principle adverse to that of the bill, provided it be strictly relevant, as was done successfully, in 1859, by Lord John Russell, when he moved and carried, as an A. to the motion for the second reading of the Reform Bill of Lord Derby's government, a resolution declaratory of a principle which the supporters of that measure considered to be subversive of it. See AMENDMENT in AM. SUPP.

AMENTA'CEÆ, according to some botanists, a natural order of dicotyledonous or exogenous plants, consisting entirely of trees and shrubs, whose flowers are unisexual, the male flowers, and very often also the female flowers, disposed in *amenta* or CATKINS (q. v.), and the perianth either wanting or incomplete. This order, which contains many well-known and important trees, is divided into a number of sub-orders, which by many have been erected into distinct orders, forming the *Amental Alliance* of Lindley. Under A. are ranked *Salicineæ* or *Salicaceæ* (see WILLOW), *Myriceæ* (see CANDLEBERRY MYRTLE), *Casuarinaceæ* (see CASUARINA), *Betulaceæ* (see BIRCH), *Altingiaceæ*, called also *Balsamaceæ*, but not to be confounded with *Balsaminaceæ*, or *Balsamineæ* (see LIQUIDAMBAR); by some also *Corylaceæ* or *Cupuliferæ* (q. v.), and *Plataneæ* (see PLANE), both of which Lindley excludes from his Amental Alliance, associating the former with *Juglandaceæ* (see WALNUT), as a distinct *alliance*, and referring the latter to the *Urtical Alliance*. See URTICACEÆ. On the other hand, he unites with the Amental Alliance the order *Elæagnaceæ*. See ELÆAGNUS.

AME'NTHES, an Egyptian mythological word equivalent in meaning to the Greek word *Hades*, the unseen world. Plutarch explained it as signifying 'the giving and taking,' an interpreta-

tion generally adopted, but erroneously. A. literally means 'the hiding' (-place understood). On Egyptian monuments we find the god Anubis leading to A. the souls which, in the form of birds, are escaping from the body through the mouth. He conducts them before the throne of Osiris, who sits as judge, with a council or jury of forty-two persons. The female deity, AMENT, represented on monuments in Upper Egypt, is merely a female form of Ammon, and her name has no connection with that of A.

AME'RICA, one of the four quarters of the globe; being smaller than Asia, but larger, perhaps, than both Europe and Africa taken together. It is the only one of the four main divisions of the land that is washed by all the four great oceans—the Northern, the Atlantic, the Southern, and the Pacific.

If Tierra del Fuego and Greenland are included—as ought to be done on geological grounds—A. occupies about 150° of long., and about 135° of lat. Speaking generally, its extreme length may be said to be on a meridian, and its extreme breadth on a parallel—facts, which, in the light of analogy, look more like a law than an accident. As the map will show, similar coincidences occur in South A. by itself; in Africa, in Europe, in Asia, and in Australia. As between Asia, and A., moreover, it deserves to be noticed that the meridional semicircles, along which run their respective lengths, form, with an interval of 180°, one and the same meridional circle.

Like the old continent, A. has been divided by nature into two peninsulas—Darien and Suez being the isthmuses, while South A. corresponds with Africa, and North A. with Asia and Europe. Even to this extent, however, the resemblance is by no means close. In the new world, the whole of the lower peninsula is to the south of the whole of the upper one, while Asia overlaps half the latitude, and more than half the magnitude, of Africa.

Of the northern half of A., the southern section, on account of essential differences in character and appearance, is in general contemplated by itself under the name of Central A.—the most convenient limit, perhaps, being a line drawn from the mouth of Rio Bravo del Norte to the lower end of peninsular California; and this line, besides its geographical propriety on both coasts, has the recommendation of marking, on the nearer coast, the international boundary of the United States and Mexico. *Central A.*, it is to be observed, has a political signification as well as a physical one, comprising, in the former sense, the comparatively small states between Mexico and New Granada—Guatemala, Honduras, San Salvador, Costa Rica, and Nicaragua.

Physically, however, these three subdivisions of A. may be regarded as one, being knit together on the west side by a backbone, as it were, of mountains, which, under various names and various aspects, stretches from the extreme south at Cape Horn to nearly the extreme north at the mouth of the Mackenzie. To this mountain-system we shall have occasion to refer under the distinct heads of ANDES, CORDILLERAS OF CENTRAL A., and ROCKY MOUNTAINS, restricting ourselves at present, in accordance with the general aim of this article, to such features of the entire chain as may incidentally come under our notice in connection with earthquakes, volcanoes, climate, or hydrography; and with regard to this article generally, the subject being A. as a whole, we shall, as seldom and as little as possible, anticipate details, which, even if anticipated here, must still be repeated under the respective heads of their proper localities.

In thus treating of A., we shall consider separately its *earthquakes and volcanoes*, its *climate*, its *hydrography*, its *history*—comprehending its *discovery* and its *colonization*, but excluding anything like the annals of any individual state—and, lastly, its *geology*, *botany*, and *zoology*.

The *earthquakes and volcanoes* of A. are to be found chiefly in the backbone of mountains already mentioned. In South A. they may be said to be exclusively so found, being confined to the Andes proper, that skirt the Pacific, and to the Venezuelan spur or branch of the main range. The same remark may be applied to Central A. But in North A., the energy which produces both classes of phenomena appears to have followed rather the coast, than the continuous chain which diverges gradually from it—earthquakes being often felt in the maritime towns of Upper California, and volcanoes having left their traces behind them on the islands of Alaska. The agency in question seems to have traveled from north to south along the coast, having exhausted itself in its more ancient seats; and this view derives support from the obvious formation of the Sandwich Islands, which are as nearly as possible parallel with the west coast of A., between Behring's Strait and the equator. On this interesting subject we quote from Sir George Simpson's *Overland Journey:* 'The whole group appears to have been thrown up from the deep by volcanic action advancing from the north-west to the south-east, and increasing in force as it advanced; so that, while island rose after island, each grew at once in height and in breadth according to the intensity of the power that heaved it upwards from the waters. Thus Bird Island, a barren rock taking its name from its only inhabitants, must be considered as the germ of the archipelago, as the first fruits of a submarine energy that was here only kindling its fires; while the other links in the chain, Kauai, Woahoo, Mowee, and Hawaii, not only differ, as I have just mentioned, at once in extent and in elevation, but also present, as they proceed, less and less evidence of antiquity in their gradually diminishing proportions of land capable of cultivation—a proof the more conclusive, inasmuch as the soil of the whole group undeniably consists of the successive gifts of years and ages and centuries. Moreover, the visible laboratories of the subterranean fire, which are scattered over the archipelago, confirm the same view: the craters are all extinct, excepting on Hawaii; and even on Hawaii, Mouna Loa, the most south-easterly of its three great safety-valves, alone bears living testimony to the creative impulse that has called the whole chain into existence, and bears it, too, only through its lateral volcano of Kilauea, which, besides itself looking to the east, appears, by the gradual advance of subsidiary outlets down its eastern declivities, to be rolling the hidden sources of its strength—peradventure there to forge fresh islands—under the bed of the ocean.'

Climate.—In comparing A. with the older continent, we must contrast not east and west with each other, but west with west, and east with east—neither Newfoundland with England, nor British Columbia with Kamtchatka, but Kamtchatka with Newfoundland, and England with British Columbia. Such a comparison shows that the difference lies not, as is often assumed, between the two continents, but between the opposite shores of either continent within itself. For instance, at Nain, in Labrador, the mean temperature is 7° F. below freezing; while at Sitka, in Alaska, it is 12° above freezing. This difference of 19° between the east and west coasts of the New World, is only a very little less than the difference between the east coast of the New, and the west coast of the Old; for the temperature of Gottenburg, in Sweden, is only 21° higher than that of Nain. It is to be remarked, however, that this difference between the opposite coasts of the two continents diminishes as we proceed southwards. New York is only 7° colder than Naples; and Florida has the same temperature as Cairo.

In illustration of the contrast between the east and west coasts of A., we are told, by the traveler already cited, that, at the mouth of the Columbia River, the first half of December presented one deluge of rain after another from the south-east, this weather winding up on the 16th of the month with a storm of thunder and lightning; 'while, to mark the difference of climate between the two sides of the continent, the good folks of Montreal, though occupying a lower parallel than ourselves, were sleighing it merrily through the clearest and driest of atmosphere.' Nor is the difference, according to the same authority, less palpable in the old continent than in the new. 'To place in the most striking light the contrast in point of climate between the opposite shores of the old continent, Kamtchatka and the British Isles may be said, with sufficient accuracy for this purpose, to lie in the same latitudes, and to present the same area, and even to occupy the same position with respect to proximity of water;' and yet, while the British Isles, with some foreign aid, feed above 35,000,000 inhabitants, Kamtchatka, with the help of extraneous supplies, can barely prevent its population of 6000 souls from starving.

But whatever influences may be common to the climate of both continents, the climate of A. is subject to two peculiar influences—that continent's prolongation southward, and its backbone of mountains. With respect to the former point, A. advances at least 20° further southward than Africa—fully more than half the interval between the latter and antarctic ice; so that the southern breezes which, in summer, bring freshness and delight to the Cape of Good Hope, waft cold and misery to Cape Horn. Two of Cook's people, on his first voyage, were frozen to death in Tierra del Fuego towards the end of January—in a month corresponding with our July, and in a latitude the same as that of Edinburgh. The backbone of mountains, again, that other point which peculiarly influences the climate of A., does its work in two ways. Throughout almost its entire course, its height arrests the passage of the clouds and rains. Within and about the tropics, these are borne from the east by the trades; in the more temperate regions, they are brought from the west by the prevailing counter-currents of air. But in either case, the windward slope of the mountain barrier is a fertile garden, the leeward slope a barren desert. In the more central plateaus, again, of Quito and Mexico, the various terraces present as many climates, and bring together, under the same parallel, all the temperatures and energies of nature.

But there exist, more particularly in North A., peculiarities of climate which cannot, perhaps, be referred to any known cause. On the opposite sides, for instance, of the great water-shed between the Gulf of Mexico and Hudson's Bay, antagonistic results are said to show themselves in winter. On the northern side, the climate is understood to improve as one advances westward, the Saskatchewan, though in a considerably higher latitude, opening earlier in spring than the St. Lawrence; whereas, on the southern side, ice forms in New Orleans, at the mouth of the Mississippi, strong enough to bear half-grown boys, a thing wholly unprecedented on the corresponding parallel of the Atlantic shore. Even in summer,

at least on the northern side of the water-shed in question, something of a similar change of climate has been observed, for maize, which, in Quebec, is a precarious crop, even on the international line of 45°, regularly ripens, in Red River Settlement, which, besides 5° more of latitude, is at least 1000 feet higher above the level of the sea.

With respect to that portion of A. which is best known, a popular misapprehension generally prevails as to the steadiness of its climate in any given season of the year. The Canadian summer, for instance, is supposed to be an unbroken period of tropical heat; and the Canadian winter to be, in its turn, an unbroken period of hyperborean cold. Now, in both directions, this is a great mistake. The summer of British A. is often tropical, and its winter often hyperborean, the extreme ranges of the thermometer, according to the experience of credible informants in localities to the south of London, sometimes being, in one and the same year, 104° F. above zero, and 52° below it. But this difference of 156°, which is measured probably by an interval of six months, is far less remarkable than the differences which a few days may bring forth. The highest range occurred within four days after parlor-fires had been given up; and the lowest fell on a day which, a year or so before, had been marked by a powerful thaw. In the city of Montreal itself, 36 hours, or less, have sometimes exhibited a difference, up or down, of 60° F. in winter; and even in summer, whether in Quebec or in the north-west, one can seldom reckon on any other month than July as free from night-frosts. In this respect, the Canadian climate may be taken as a sample of North A. in general, extreme ranges of temperature, as prevailing respectively in summer and winter, being naturally attended by more or less considerable vicissitudes in each individual season.

In the tropical regions, however, of A., whether Central or Southern, a singular uniformity of temperature does exist on each of the various terraces of the mountain chain. The same parallel, as has been already mentioned, presents at once the torrid, the temperate, and the frigid zones. Such a view of the matter, however, is, to a certain extent, deceptive, for in not one of the three cases are the vicissitudes of the respective zones, properly so called, found to show themselves. Each level is said to be so steady in its temperature as to enfeeble and enervate the inhabitants through the monotony even of that which is in itself good; and in such cases, the salutary prescription is to ascend or to descend, for a time, from one terrace to another.

Hydrography.—With the backbone of mountains as the principal water-shed of A., the rivers on opposite sides of the continent are still more different than the climates. Excepting in Central A., the difference in question is enormous. Even in North A., where it is less than in South A., the contrast is sufficiently striking. On the west side of the Rocky Mountains, the only streams worthy of notice in such a summary as this are the Colorado, which flows into the head of the Gulf of California; the Sacramento, which enters the harbor of San Francisco; and the Columbia, which empties itself into the open ocean—three rivers which, if compared with the waters of the opposite coast, are, in practical value, inferior singly to the Hudson, and collectively to the Rio Bravo del Norte. On the east side, however, there exist rivers to which the Rio Bravo del Norte and the Hudson are but as brooks. To begin with the extreme north: the Mackenzie, besides draining a large basin on its own side of the Rocky Mountains, draws from beyond them two of its principal feeders, the Peace and the Liarde, burying itself, however, under the perennial ices of the Arctic Ocean.

Passing, without further notice, the Coppermine and the Fish River, of both which the interest is purely historical in connection with arctic discovery, we come to the Nelson, which brings down to Hudson's Bay the Winnipeg and the Red River, two streams bordering respectively on the headwaters of the St. Lawrence and the Mississippi, and also the two branches of the Saskatchewan, which all but touch the sources of the Columbia and the Missouri. Next in order is that long alternation of mighty river and mightier lake—that reservoir of half the life-blood of the earth—which, under the name of the St. Lawrence, gradually becomes a sea. South of the St. Lawrence, along the coast, we meet the Atlantic streams of New Brunswick and the United States, all of them valuable beyond their magnitude, and most of them connected, more or less closely, with the Alleghanies—the St. John, the Penobscot, the Connecticut, the Hudson, the Delaware, the Susquehanna, and the Potomac. Round into the Gulf of Mexico, and we reach, besides many second-rate rivers in either direction, perchance the most important stream on the face of the globe—a stream which, after uniting the Mississippi and the Missouri under the name of the former, receives on the right the Arkansas and the Red River, and on the left the Ohio, enriched, as it is, with the tributes of the Wabash and the Tennessee.

In South A., again, the difference between east and west is still more remarkable. On the West, the Guayaquil, the only stream worth mentioning, is not to be compared even with the rivers that flow from the subordinate ranges of Brazil or Guiana; while, on the east, the Andes send down, besides the Magdalena flowing into the Caribbean Sea, the Orinoco, the Amazon, and the Plata, into the open ocean across the almost entire breadth of the continent—three networks of inland navigation, which, under the head of the Amazon (q. v.), we have already shown to be virtually one, and, beyond that, to be virtually linked with the Essequibo of British Guiana.

Nor will the disparity between the two coasts of the continent be less striking, if the harbors are considered as well as rivers, the external outlets as well as internal channels. On the Pacific, South A. possesses to the north of Chili, only two ports entitled to the name, Panama and the Guayaquil already mentioned; while, on the same coast, North A., along a line of 3000 miles up to British Columbia, presents only five safe and convenient havens—Acapulco, Mazatlan, Magdalena Bay, San Diego, and San Francisco. But the Atlantic side presents a contrast to which no language can do justice. To take the divisions as they come: Newfoundland has its St. John's, Cape Breton its Louisburg, Nova Scotia its Halifax, New Brunswick its St. Andrews, Maine its Portland, New Hampshire its Portsmouth, Massachusetts its Boston, Connecticut its New Haven, Rhode Island its Newport, and so on. Nor is this all. While fully a third part of the rivers of Europe and Asia are lost to the commerce of the world at large in the frozen seas of the north, or in such land-locked pools as the Aral and the Caspian, all the considerable rivers of A., with the Mackenzie as the only exception, are, more or less, channels of communication between the open ocean and the interior.

To take the three grandest examples—The Amazon, with a basin estimated to contain 1,500,000 square miles, is navigable for steam-vessels up every one of its main branches, nearly to the eastern foot of the Andes; thus comprising several available lines of 2500 miles each, and presenting, as a whole, a network of such lines to the amount of at least ten times that length. The Mississippi, again, navigable as it is at once to the Alleghanies and to the Rocky Mountains, and between them, more to the north, as far as the falls of St. Anthony has been computed to afford to the steam-vessel an uninterrupted career of 36,000 miles. But perhaps the St. Lawrence, if less extensive, is more marvelous still. Owing to British improvements of its channel, New York and Pennsylvania have virtually a sea-board on their inland shores; while Ohio, Indiana, and Illinois, accessible to ships from the Gulf of St. Lawrence, by the lakes, and from the Gulf of Mexico by the Mississippi, far eclipse, in the heart of a continent, the peculiar boast of ancient Corinth as the mart of two seas.

To append a few subordinate examples: nearly all the considerable rivers along the coast between the St. Lawrence and the Mississippi possess far more than an average value, in proportion to their lengths, as arteries of internal communication. The Atlantic slope of the Alleghanies, in particular, presents, as a whole, perhaps twice as many facilities in this way as any other region of equal extent on the face of the earth—facilities, too, which have been not less zealously and successfully improved than those of the St. Lawrence. The Hudson has been, at vast expense, and with indomitable energy, connected with the basin of the St. Lawrence at three points—on Lake Erie, on Lake Ontario, and on Lake Champlain; and the Susquehanna has been in like manner connected with the basin of the Mississippi by a canal which terminates at Pittsburg on the Ohio.

But in one part of A., still smaller streams than these last are entitled to particular attention. We allude to those streams, five in number, which promised to vie with each other in connecting together the Pacific and the Atlantic Oceans.

The five rivers in question form parts of three different routes. The Atrato of the Atlantic side co-operates with the San Juan of the opposite coast a little below the Isthmus of Darien; the San Juan of the Caribbean Sea, with the lake of Nicaragua, and with the smaller lake of Leon more to the westward; and, lastly, the Coatzacoalcos of the gulf of Mexico, with the Tehuantepec of the bay of its own name.

To begin with the *first* route: the Atrato and the San Juan flow, in contrary directions, through the slightly undulating country into which the Andes gradually subside as they approach the Isthmus. Their head-waters are said to be near to each other, the Atrato being already navigable for small vessels, and the San Juan manifestly a considerable stream, entering the sea by several mouths, after a course of 150 miles. With such streams separated by such a country, a ship-channel between the two oceans does not by any means appear to be impracticable. Next, as to the *second* route, which, as well as the third, is already in actual use as a place of transit: the San Juan itself, about 100 miles long, is navigable throughout by boats of 10 tons, and for some distance by much larger vessels. Lake Nicaragua, again, measuring 140 miles by 40, is fifteen fathoms deep. At its west end it receives the Tipitapa from Lake Leon, which, with a length of 35 miles, and a breadth of 15, is only 28 feet higher than itself, or 156 above the level of the Pacific.

Two schemes have been agitated with respect to the more west-

SOUTH AMERICA
British Miles
0 100 200 300 400 500 600 700 800
Geographical Miles
0 100 200 300 400 500 600 700 800
Railways shown thus
NORTH ATLANTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
SOUTH
CENTRAL AMERICA
CARIBBEAN SEA
VENEZUELA
UNITED STATES OF COLOMBIA
ECUADOR
PERU
BRAZIL
BOLIVIA
PARAGUAY
URUGUAY
CHILE
ARGENTINE REPUBLIC
Matto Grosso
Para
Bahia or San Salvador
RIO DE JANEIRO
Parana
Pernambuco or Recife
Maranhao or San Luis
Mouth of the Amazon or Maranon
Falls of the Madeira
Falls of the Madeira
Falls of the Paraguay
Falls of the Paraguay
Falls of the Parana
Falls of the Parana
Falls of the Uruguay
Falls of the Uruguay
Falls of the Tocantins
Falls of the Tocantins
Falls of the Sao Francisco
Falls of the Sao Francisco
Falls of the Paraiba
Falls of the Paraiba
Falls of the Jacuy
Falls of the Jacuy
Falls of the Tiete
Falls of the Tiete
Falls of the Pilcomayo
Falls of the Pilcomayo
Falls of the Mamore
Falls of the Mamore
Falls of the Beni
Falls of the Beni
Falls of the Madre de Dios
Falls of the Madre de Dios
Falls of the Guapore
Falls of the Guapore
Falls of the Itenez
Falls of the Itenez
Falls of the Rio Negro
Falls of the Rio Negro
Falls of the Orinoco
Falls of the Orinoco
Falls of the Caroni
Falls of the Caroni
Falls of the Cuyuni
Falls of the Cuyuni
Falls of the Essequibo
Falls of the Essequibo
Falls of the Demerara
Falls of the Demerara
Falls of the Berbice
Falls of the Berbice
Falls of the Corentyne
Falls of the Corentyne
Falls of the Surinam
Falls of the Surinam
Falls of the Maroni
Falls of the Maroni
Falls of the Oyapock
Falls of the Oyapock
Falls of the Araguay
Falls of the Araguay
Falls of the Xingu
Falls of the Xingu
Falls of the Tapajos
Falls of the Tapajos
Falls of the Madeira
Falls of the Madeira
Falls of the Purus
Falls of the Purus
Falls of the Ucayali
Falls of the Ucayali
Falls of the Pilcomayo
Falls of the Pilcomayo
Falls of the Bermejo
Falls of the Bermejo
Falls of the Salado
Falls of the Salado
Falls of the Colorado
Falls of the Colorado
Falls of the Negro
Falls of the Negro
Falls of the Chubut
Falls of the Chubut
Falls of the Santa Cruz
Falls of the Santa Cruz
Falls of the Gallegos
Falls of the Gallegos
Falls of the Chico
Falls of the Chico
Falls of the Deseado
Falls of the Deseado
Falls of the Chupat
Falls of the Chupat
Falls of the Coyle
Falls of the Coyle
Falls of the Rio Grande
Falls of the Rio Grande
Falls of the Rio Grande do Sul
Falls of the Rio Grande do Sul
Falls of the Jacuy
Falls of the Jacuy
Falls of the Tiete
Falls of the Tiete
Falls of the Paraiba
Falls of the Paraiba
Falls of the Sao Francisco
Falls of the Sao Francisco
Falls of the Tocantins
Falls of the Tocantins
Falls of the Uruguay
Falls of the Uruguay
Falls of the Parana
Falls of the Parana
Falls of the Paraguay
Falls of the Paraguay
Falls of the Pilcomayo
Falls of the Pilcomayo
Falls of the Tapajos
Falls of the Tapajos
Falls of the Xingu
Falls of the Xingu
Falls of the Araguay
Falls of the Araguay
Falls of the Oyapock
Falls of the Oyapock
Falls of the Maroni
Falls of the Maroni
Falls of the Surinam
Falls of the Surinam
Falls of the Corentyne
Falls of the Corentyne
Falls of the Essequibo
Falls of the Essequibo
Falls of the Demerara
Falls of the Demerara
Falls of the Berbice
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Falls of the Beni
Falls of the Mamore
Falls of the Mamore
Falls of the Pilcomayo
Falls of the Pilcomayo

erly portion of the route—one scheme proposing to avail itself of Lake Leon, and the other to carry the ship-canal at once from Lake Nicaragua. The last-mentioned route found most favor in the United States. Lastly, as to the *third* route, where the land is only 130 miles wide: the Coatzacoalcos nearly connects with the Tehuantepec, which gives name to the isthmus. (Across the isthmus of Tehuantepec a scheme has been formed of making a ship-railway to transport ships bodily from sea to sea.)

In spite of their several recommendations, the Interoceanic Canal Congress held at Paris in 1879, rejected these and other proposed routes, and approved of one running from Limon to Panama (nearly parallel to the railway), on the ground of its requiring neither locks nor tunnels. A company was floated for utilizing this route by M. Lesseps, the famous promoter of the Suez Canal, which separates Africa from Asia; the shares were rapidly taken up, and work on the new canal was begun in 1881. The estimated cost was £33,000,000.

Of the *Lakes* of A. a brief notice will be sufficient. In North A., besides the vast reservoirs of the St. Lawrence, a line drawn north-west from the center of Lake Superior, appears, on the face of the map, to intersect a kindred series—Lake Winnipeg, Lake Athabasca, Great Slave Lake, and Great Bear Lake—the first of the four being connected with the Nelson, and the remaining three with the Mackenzie. It may not be out of place to observe, that the general direction indicated is pretty nearly parallel with the Pacific coast, just as the general direction of the St. Lawrence from the great bend at the head of Lake Erie is pretty nearly parallel with the Atlantic shores. As to the secondary lakes of North-west A., their name is legion, almost every stream, whether large or small, expanding itself here and there vastly beyond its average width, and being, as it were, a St. Lawrence in miniature. One lake, or rather pond, is too singular to be overlooked. On the Athabasca Pass of the Rocky Mountains, where the road, little better than a succession of glaciers, runs through a region of perpetual snow, a small body of water, named by the Hudson's Bay Company's voyageurs as the 'Committee's Punch-bowl,' sends its tribute from one end to the Columbia, and from the other to the Mackenzie. To proceed southward along the continent, Central A. abounds in lakes. The Leon and the Nicaragua have been already noticed. But such bodies of water are perhaps most numerous on the table-land of Mexico, or as it is termed, the plateau of Anahuac. The largest of these is Chapala, estimated to contain 1300 square miles—an area which, however insignificant in comparison with the great lakes of the north, is more than equivalent to a circle of 40 miles in diameter. Many of these reservoirs of the table-land have no outlet. Such is the case with the various lakes of the valley of Mexico, enclosed as they are by mountains at a height of 7471 feet above the sea-level. Of the same description, too, is the Lake of Titicaca, decidedly the largest in South A. Raised by the table-land of Peru and Bolivia to a height of 12,846 feet, it yet has no outlet to the sea; for the Desaguadero, which empties it, loses itself in the apparently land-locked Lake Uros to the southward. Of this great body of water, the magnitude is not so well ascertained as its altitude. Besides such round numbers as 16,000 and 5000 square miles, which are never meant to be accurate, one is perplexed to meet statements so minute, and yet so discordant, as 4032 and 2225 square miles. But even the lowest estimate is more than equivalent to a square of 47 miles a side—an area which, with a depth ranging up to 120 fathoms, exceeds, perhaps, anything to be found to the south of the basin of the St. Lawrence.

The vast advantage in point of fluvial communication possessed by the new world over the old, has already been adverted to. There is, however, a hydrographical feature in which one of the grand divisions of the eastern continent is decidedly superior to A. The coast-line of Europe, in proportion to extent of surface, is incomparably longer than even the northern half of the western continent. This is at once apparent on glancing at the two maps. It is surely a suggestive fact, that the two portions of the earth which are best fitted for human intercourse, are also hydrographically so connected as to be beyond comparison the most accessible to each other. The dividing sea, besides being itself physically by far the narrower of the two intercontinental oceans, is virtually narrowed still more by its winds and its currents. Along a belt of about 30° on either side of the equator, the easterly trade with its attendant current wafts the voyager westward from Africa; while above that belt, the reaction, strengthened and accelerated by the peculiar formation of the Carribbean Sea and the Gulf of Mexico, is ready to carry him round again to Europe, under the double pressure of the Florida stream and its generally prevailing breezes from the south-west. Nor yet can the hydrographical relations of A. with Asia be denied their proportion of significance and influence, linked as the two continents are by Behring's Strait, and twice bridged as is their ocean, first by the Aleutian Isles—a continuation of the Kuriles and Japan—and then by the Polynesian clusters, that series of offshoots, as it were, from the Indian Archipelago.

History.—We propose to glance at this under the three heads of Aboriginal Ages, Discovery, and Colonization.

As to the *Aboriginal Ages*, there arises a question, too interesting to be overlooked, and yet too doubtful to be solved, as to the origin of the native tribes and peoples of A. Without prejudicing the question (which will be considered under INDIANS) whether the aboriginal inhabitants of A. are to be considered, in an ethnological point of view, as substantially of one stock, it appears highly probable that they did not all spring from one and the same primeval band of adventurers; in other words, that different colonies, voluntary or involuntary, must have reached the new continent at different times. This view, to say nothing of the direct testimony of local traditions, seems to be in itself more than probable, when we consider that, through the length and breadth of the universal ocean, even the most insignificant specks of land had each received, at least, one influx of human wanderers. But, beyond such probabilities, and such traditions, the view in question is strengthened by facts, which it is difficult otherwise to explain—by diversities of language, by different degrees, or kinds, of civilization, and, above all, by monuments, architectural or otherwise, of defunct races of bygone days. On this supposition, whence came the successive shoals of invaders? To this question no direct answer can be given. We can only scan the various routes by which, previously to what we call the discovery of A., the old world was most likely to people the American continent.

To begin with the natural routes on the side of the Pacific—Behring's Strait, the Aleutian Isles, and the Polynesian Archipelagoes—we can hardly conceive anything but barbarism having been conducted to A. by any one of them. The country which stretches back from Behring's Strait to the Kolyma, may be asserted to be, without exception, the most inhospitable portion even of Siberia; and, moreover, the strait itself has more probably been a channel of migration from America than from Asia, the Tchuktchi of the latter regarding themselves rather as a branch, than as the stem, of the Tchuktchi of the former. With respect, again, both to the Aleutian Isles and the Polyesian Archipelagoes, the successive stepping-stones in either series, instead of being presumed to have been so many halts for Asiatic Columbuses and Magellans, must rather be viewed as each a mother-country to a new colony, as each a point of departure for a fresh swarm. Thus would the ever-aggravating blight of isolation—exemplified even in the old world among the Laplanders, the Kamtchadales, and the Hottentots—prepare at each remove a deeper and deeper barbarism to land at last on the western shores of A. Further, if civilization, as certainly appears to have been the case, ever did find its way to A., it must have come directly and immediately from the old world, and that under circumstances and conditions of by no means a favorable character. In remote times, such accidental, or, to speak more correctly, unintentional visits of Europeans and Asiatics may have occurred, as we know to have actually taken place in more modern days. Japanese junks have repeatedly been driven, by stress of weather, across the Pacific to the new world; and again, on the Atlantic, the easterly trades, within eight years after Columbus's earliest voyage, wafted the unconscious Portuguese to Brazil during their second voyage to India—the very first, in fact, which they had attempted by steering clear of the headlands of Africa. Such incidents, however frequently they might have happened, were much more likely to civilize existing communities than to found new ones; and it is at least a curious fact, that the only aboriginal nations which could be regarded as in any sense civilized at the date of the Spanish conquest, pointed in their traditions to such events as we have endeavored to describe. Mexico and Peru had each its Cecrops, or semi-divine civilizer—the former referring him to the east across the Atlantic, and the latter to the west, across the Pacific. How far such hypotheses may account for the admitted facts, we are not left altogether to conjecture. Isolated individuals of our own nation have enabled us to bring the light of the present to bear on the past. When we consider what William Adams achieved in Japan, two hundred years ago, and what John Young and James Brook have, more recently, effected in the Sandwich Islands and in Borneo, we can perhaps the more easily understand certain undeniable traces and traditions of aboriginal civilization.

Discovery.—Whatever may have been the kind and degree of aboriginal civilization, A. was not destined to be the perpetual inheritance of the red man. New actors were to appear on the scene, before whom the old possessors were in a great measure to pass away.

Previously to the times of Columbus, Europeans had certainly visited A. The Scandinavians, after having colonized Iceland in 875 A.D., and Greenland in 983, had, by the year 1000, discovered A. as far down as 41° 30′ N. lat., a point near to New Bedford, in the state of Massachusetts. These Scandinavians afterwards settled in the neighborhood—the mother-country, most probably through the intervention of Iceland and Greenland, maintaining an intercourse with the colony down to the 14th c. But these enterprises do not appear to have left any special impress on the

character or prospects of the new continent, being more akin, perhaps, to similar incidents of yet earlier ages, than to the long-meditated and well-matured scheme of the illustrious Genoese. Subsequently to the Scandinavian discovery, and previous to that of Columbus, A. is believed by some to have been visited by a Welsh prince. In Cardoc's *Historie of Cambria* it is stated that Madoc, son of Owen Gwynnedd, prince of Wales, set sail westward in 1170 with a small fleet, and after a voyage of several weeks, landed in a region totally different both in its inhabitants and productions from Europe. Madoc is supposed to have reached the coast of Virginia. Neither this, however, if true, nor the earlier Scandinavian expeditions, can be said even to have formed a connecting-link between the A. of the red man and the A. of his white brother. Even if the north-men had possessed resources worthy of their heroic courage, the old world was not yet ripe for the appropriation of the new.

At the end of the 15th c., however, science and politics were alike strengthening Europe for its task. The mariner's compass and the astrolabe had facilitated long voyages out of sight of land; while, in almost every country of Christendom, various causes were consolidating government, and promoting the growth of population—a position which derives, perhaps, its best illustration from the fact that the capture of Granada—the last foothold of the Moslem in Spain—preceded by only a few months the discovery of A.

Columbus (q. v.) set out on his great enterprise to discover A. under the patronage of the crown of Spain, on Friday, the 3rd of August, 1492; at which date, properly speaking, begins the deeply interesting history of A. Had the Atlantic been broader, or had not the easterly trades wafted Columbus almost on a parallel from the Canaries to the Bahamas, he must have failed in his bold attempt; and, in fact, those same easterly trades, assisted by a still nearer approach of the two continents, speedily proved their own value in this respect by carrying the Portuguese, without their own consent, to the shores of Brazil. Nay, Columbus's discovery of A., if not so accidental, was quite as unintentional as that of the Portuguese. It was towards the East that his hopes directed his western course, hopes whose supposed fulfilment still lives in the misapplication to the new world of the terms Indian and Indies.

Much of our subsequent knowledge of America has been owing to the same desire of reaching the E. Indies that led to its discovery. The gorgeous East was the aim alike of Davis, Baffin, and Hudson at the north, and of Magellan, Schouten, and Lemaire at the south, to say nothing of the earlier enterprise of Balboa on the Isthmus of Darien; while, under a similar impulse, the French of Canada were ascending lake after lake as nature's ready-made highway to the same goal. Even to more recent times may these remarks be applied. While the eastern coasts of Africa, and the upper shores of Asia, as not bearing on the grand question of oriental traffic, were comparatively neglected and forgotten, our own Cook and Vancouver, in quest of a passage between the two oceans, surveyed every nook and cranny of A. from Columbia River to Behring's Strait. Nor yet have the aspirations of Columbus and his noble band of successors and imitators been altogether disappointed. That same continent which, in their case, barred a westward advance along nearly the whole interval between the arctic and antarctic circles, has to us already become, or is gradually becoming, more than a substitute for the ocean which it was found so extensively to displace. By means of the railway across the Isthmus of Panama, the Caribbean Sea, whether for passengers or for goods, is brought near to the Pacific by a route nearly parallel to the line of the canal promoted by M. Lesseps. Nor is it merely across the narrow span of Central America that art has conquered the barriers of nature. In 1869, continuous railway connection was established between New York and San Francisco, and it became possible, apart from accidental delays, to travel from the commercial capital on the east coast of the vast domains of the Union to the chief city on the Pacific shore in six days and eleven or twelve hours. Numerous railroads of the east and south connect with the Union Pacific Railroad at Omaha in Nebraska; and from Ogden in Utah to the Pacific the connection is made by the Central Pacific Railroad. From New York to San Francisco by the shortest route is about 3400 miles. Just finished, or in progress, are the Southern Pacific, from Galveston to San Francisco; the Northern Pacific, from St. Paul to Burrard Inlet; and the Canada Pacific.

Through Columbus's discovery of the new world, colonization, which, since the early ages of Greece, had slumbered for 2000 years, received an impetus, which, after building up empires in the West, was to build up others in an East richer far than that which was so long the loadstar of European navigators—an east where, almost without a metaphor, the grass was to be wool, and the stones to be gold.

The first-fruits of Columbus's enterprise were the Bahamas, Watling's Island probably being the spot where he landed on the 11th of October 1492. Without attempting, in so summary a sketch as this, to distinguish the results of each of his four voyages from each other, it may be sufficient to state that this great man, besides Hispaniola, or St. Domingo, Cuba, Jamaica, and others of the Antilles, discovered and explored Central A. from Honduras southward along the coast of Veragua, and South A. from the mouths of the Orinoco westward, as far as Margarita. It was on this last-mentioned scene of his operations that he was followed by Hojeda, whose pilot, Amerigo Vespucci (q. v.) has been allowed to wrest from Columbus the glory of giving his name to the new world.

Within twenty years after Columbus's first discovery, Ponce de Leon discovered Florida; and, what was certainly of far more consequence, he ascertained that, through the strait which separated that peninsula from the Bahamas, there constantly ran a strong current to the north-east. In 1513, again, just one year later, Vasco Nunez de Balboa crossed the Isthmus of Darien to the Great South Sea, or, as it was afterwards named, the Pacific Ocean. About thirteen years before this last event, almost immediately after Columbus's own continental explorations, the interval left between his most southerly point from Honduras, and his most westerly point from the Orinoco, was, in a great measure, filled up by the voyage of Bastidas. To the south, again, of the Orinoco, Pinzon and Solis sailed along the continent down to 40° S. lat., between the years 1500 and 1514. The former, after anticipating, by a few months, the Portuguese on the shores of Brazil, had seen the Amazon; and the latter, sent out for the express purpose of entering, if possible, Balboa's Great South Sea, found his way into the La Plata or Plate, being there slain by the neighboring natives. Moreover, to return to the northward, by the year 1519, different navigators had between them completed the examination of the Gulf of Mexico. Within twenty-seven years, therefore, after Columbus's first departure from Spain, the eastern shores of South and Central A. had been almost continuously explored by the Spaniards down to within 15° of the southern extremity of the continent.

Nor had other nations been idle in the north. The Cabots, on behalf of England, had discovered Newfoundland, and portions of the adjacent continent, in 1497. In 1500, the Portuguese, under the Cortereals, sailed along the coast of Labrador nearly up to Hudson's Bay, having, it is supposed, entered the Gulf of St. Lawrence, long known among them as the Gulf of the Two Brothers. Thus gradually there grew up the opinion, since proved to have been the true and sound one, that any practicable passage between the two oceans must be looked for towards the south of the Plate. Accordingly, in 1519, Magellan, a Portuguese in the service of Spain, undertook the voyage in which was discovered the strait that bears his name—a voyage which furnished the first instance of the circumnavigation of the globe. Thus there remained little to be done unless in the extreme north and the extreme south. In the extreme south, Schouten, a Dutch navigator, discovered, in 1610, the passage round Cape Horn; while, six years thereafter, Lemaire, a mariner of the same nation, passed through the strait of his own name between Staten Land and Tierra del Fuego. Towards the north, again, the French and English divided the labors and honors of the enterprise between them. Scarcely had Magellan's companions—for he had himself been killed—returned to Europe, when Verazzano, under the auspices of Francis I. of France, sailed along what are now the Atlantic shores of the United States, thereby connecting the discoveries of the Cabots with those of Ponce de Leon; and again, about ten years later, Jacques Cartier, in the service also of the same prince, explored the gulf and river of St. Lawrence, penetrating as far to the westward as the island of Montreal. In the extreme north, however, the English may be said to have been without a rival. It is unnecessary, in this summary sketch, to do more than mention names which tell their own story on every map—Davis, Baffin, Lancaster, and Hudson. (See these Heads.)

To pass now to the western coast of A. The conquerors of Mexico and Peru effected, in a few years, more perhaps than they left behind them for future ages to effect, ranging along the coast from the southern extremity of Chili to the peninsula and Gulf of California. Beyond Lower California, the only direction in which there was much to do, the English Drake, whose voyage took place in 1578, divided with the Spaniards the credit of having discovered Upper California. For nearly two centuries, excepting the half-fabulous voyages of Fonte and Fuca, the Spaniards and the English alike slumbered over their task; and it was not till towards the close of the last century, that Cook and Vancouver co-operated with Spanish and American navigators in dispelling the mystery that had so long hung over the north-west coast of A.

To advert to *inland* discoveries: As early as 1537, within six years after the landing of Pizarro in Peru, and within two after the founding of Buenos Ayres, the Spaniards met each other on the eastern borders of Peru, from the opposite shores of the continent; and, in 1540, within three years more, they sent forth that eastward expedition which ended in Orellana's exploration of the Amazon, from its source to its mouth. In the northern half of the continent, similar enterprises were of a much later date. It

was in 1682 that the French first descended the Mississippi; it was in 1771 that Hearne traversed the wilderness from Hudson's Bay to the mouth of the Coppermine; and it was respectively in 1789 and 1793 that Alexander Mackenzie reached the mouth of the river that bears his name, and passed through what is now British Columbia, to the shores of the Pacific Ocean.

Colonization.—Among the European powers that colonized A., the most prominint were Spain, Portugal, France, and England.

Spain, of course, took the lead, having, with few exceptions, accomplished its task before any rival state had entered on its share of the work. In one respect, its colonies differed from all others on the new continent. Spain alone came in contact with civilization, such as it was among the aborigines; and, accordingly, in the cases of Mexico and Peru, colonization required to be preceded by something like regular war and formal conquest. But, notwithstanding this peculiar obstacle, the colonies of Spain grew at first with a rapidity which, perhaps, has scarcely found its parallel even in the somewhat congenial case of Australia. As an illustration of this—for the statemant needs no proof—it was colonial resources that armed Cortes and Pizarro for their respective enterprises. Without the direct and immediate aid, in either instance, of the old country, Cuba, within twenty-seven years after the first discovery, equipped the conquerors of Mexico; while the town of Panama, only twelve years later, sent forth the adventurers that were to subjugate Peru. So unexampled a degree of vigor and vitality continued to advance in Spain's transatlantic possessions, precisely while they were so organized and conducted as to afford scope to individual ambition. Never, perhaps, was this scope sufficiently free and full, for, even from the beginning, government often embarrassed and blighted the fairest scheme by its jealous and suspicious interference. But, for a time, it generally found its account in tolerating the unrestricted liberty, or license, of its instruments. It was, therefore, only after law and order were established, and the original actors had disappeared from the scene, that the authorities of the mother-country stereotyped, as it were, their despotism along the length and breadth of every colony. From that moment, vigor and vitality were succeeded by stagnation and torpor. Still, with such elements of prosperity on every side—above the earth and below it—material interests could not fail to flourish.

But the soul had fled; the body alone remained behind. Under these circumstances, Spain, though continuing to claim the entire continent to the north, more especially on the Pacific, did very little to enforce its pretensions. To this remark, New Mexico and Upper California were the only exceptions. It was not before 1594 that New Mexico was at all occupied; and it was not till a century later that the province, after ten years of bush-fighting, was finally subdued; while it was only in 1767 that the Franciscans, on behalf of Spain, took possession of Upper California. But Spain never abandoned the hope of extending its dominions towards the north-west coast. As late as 1790, that power, while restoring Nootka Sound, and acknowledging England's right of planting other settlements, took the precaution, useless as it proved, of expressly reserving a similar right to itself; and it was only in 1819, nearly thirty years later, that Spain formally ceded to the United States all its claims to the coast above the parallel of 42°. See further under the separate head of AMERICA, SPANISH.

The efforts of Portugal, in the cause of American colonization, were at first less energetic than those of Spain. In fact, Portugal, which had doubled the Cape of Good Hope in the year 1497, was so zealously engaged in the East as to allow an age to elapse before sending any colony to Brazil. The discovery of the country took place in 1500; but its colonization only in 1531, or rather 1548. Within 32 years thereafter, in 1580, Brazil, at the same time as Portugal itself, was annexed to the Spanish monarchy, soon afterwards falling, in this its new character, partly into the hands of the revolted Hollanders. In 1640, Brazil, as well as Portugal, threw off the Spanish yoke with the help of the Dutch settlers. But the continued presence of the latter retarded the progress of the colony. It was only after their expulsion, that the Portuguese, who had lost nearly everything in India, turned their attention more largely to Brazil. It accordingly became the most flourishing colony, as such, to the south of the English settlements; and, as the refuge of the House of Braganza from French domination, it received, about fifty years ago, an impetus which has rendered it, as an independent state, the most flourishing power of Southern A.

France, as the claimant to the basins of the St. Lawrence and the Mississippi, may be said rather to have pitched camps than to have planted colonies, in those vast possessions. She regarded A. chiefly as a supplementary battle-field for England and herself. Every French settlement was but an inert part of a political machine, powerful, indeed, but unwieldy, expensive, and unproductive. The government was everything, and the individual subject was nothing. Hence, neither Louisiana nor Canada at all realized our idea of a colony. In corroboration of this may be cited two authentic and official facts. As an encouragement to marriage, rewards and exemptions were held out to the parents of three children; and the erection of a dwelling on a lot of less than forty arpents (about thirty-two acres) was prohibited by a royal ordinance. In 1762, France gave up Canada to England, and, as an indirect concession also to the same power, transferred Louisiana to Spain—events which, singularly enough, did much to facilitate France's grand scheme, the separation from England of her old colonies.

England, the most energetic and successful of all in the work of colonization, was the last in the field among the four powers already mentioned. Among her continental colonies, to say nothing of Newfoundland, Virginia, the oldest, was established in 1607, just four years after the union of the crowns; and Georgia, the youngest, as late as 1733. With these two exceptions, the remaining eleven were, one and all, founded during that period of civil and religious troubles, which, in the mother-country's own history, sent one Stuart to the scaffold, and drove another into exile. In 1620, Massachusetts was occupied by the Puritan fathers; in 1623 and 1631 respectively, New Hampshire and Connecticut were first settled; in 1634, Maryland was granted to Lord Baltimore, a Roman Catholic nobleman; in 1636, Rhode Island became a refuge from the sectarian intolerance of Massachusetts; in 1653, North Carolina became an offshoot from Virginia; in 1664, New York, New Jersey, and Delaware were taken from the Dutch; in 1670, South Carolina was established; and in 1682, Pennsylvania was granted to William Penn, the Quaker, continuing to be a proprietary government down to the Revolution. In nearly all these cases, the civil and religious liberties for which chiefly the colonists expatriated themselves, were secured by liberal, nay, virtually republican charters. Subject only to the appointment of a governor on the part of the crown, every colony was practically a state within itself; and it is a suggestive fact that the very earliest assertion of legislative superiority on the part of the mother-country was 7 and 8 Will. III. c. 22, which, however, only operated negatively by forbidding every colony to make laws repugnant to those of England. With such aspirations and such institutions, the enterprising inhabitants of a new home could not fail to prosper; while their prosperity was rendered more solid and permanent by the comparative poverty of a region where steady industry, in agriculture or in the fisheries, was, as it were, a necessary of life. Under these circumstances, the germs of political independence were at work long before the year 1765; and it is not merely a probability, but a fact, that the expulsion of the dreaded power of France from Canada and Louisiana, in 1762, was closely connected with the troubles which so soon began.

The colonization of the West Indies, Guiana included, will be seen at a glance in the appended table of American Governments.

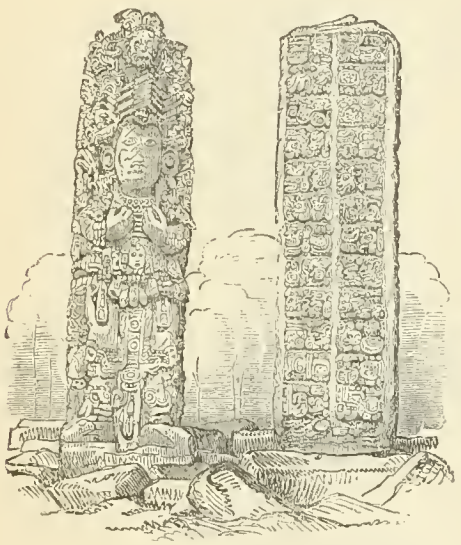
It may be added in conclusion, that the whole of A. is now in the hands of European races, excepting only the aboriginal Araucania to the south of Chili, and the African republic of Hayti, otherwise known as Hispaniola or St. Domingo, the oldest among the colonies of Spain.

American Antiquities.—The architectural remains, to which we have already alluded in connection with a general estimate of aboriginal civilization, are to be found in each of the grand divisions of the new continent. To begin from the north. That portion of the United States which lies between the Appalachians and the Rocky Mountains, presents in three groups at once the oldest and the rudest monuments of bygone times: the first group extending from the sources of the Alleghany to the waters of the Missouri; the second occupying the Mississippi Valley, vaguely so defined; and the third stretching from South Carolina to Texas.

These several groups, apparently with very little difference among themselves, consist of numberless mounds, and circumvallations of earth and stone—1500 of the latter, and 10,000 of the former, being said to stud Ohio alone. The erections themselves range from 5 to 30 feet in height; while the areas enclosed—generally of some symmetrical figure, such as circle or ellipse, rectangular parallelogram or regular polygon—vary from twenty to forty acres, though among a few of greater extent, one in Arkansas is stated to embrace a square mile. The circumvallations, moreover, seem generally to contain the mounds; and sometimes a smaller circumvallation is surrounded by a larger one. Whether these colossal structures were intended for worship or for defence, it is impossible to decide; more probably, however, they were of a military character, provided, as they ordinarily were, with cisterns for water. But, whatever their origin, they derive interest from the analogous fact, that, within the same territorial limits, have been dug up vases of earthenware or copper in elegant forms, pipe-bowls decorated with human heads of the type of the existing aborigines, or with those of birds, &c., domestic utensils, personal ornaments, hatchets of stone, and, lastly, weapons of copper or mica, or shell or obsidian.—The architectural remains of Central and South A. are at once of more modern origin and more elaborate character, and may be roughly compared with the cyclopean ruins in Italy and Greece. Uniformly in the pyramidal style—a style likely enough to be indigenous in a region of earthquakes—they are composed of blocks generally huge, and sometimes enormous; those in

the walls of Tiahuanaco in Bolivia being equivalent to cubes of about 16 feet each way. Between those of South A. and Central A., however, there are diversities as well as resemblances. Those of South A., situated, as they are, within the native limits of Peru, and referred, as they must be, to its closing era under the Incas, cannot reach back beyond the Spanish conquest more than 300 or 400 years: the principal ruins are those of Tiahuanco, already mentioned; of a temple on an island in Lake Titicaca; of another edifice of the kind at Pachacamac, not far from Lima; and of the palaces and mausoleums of the royal race. Those of Central A., again, are reckoned to be considerably more ancient, reaching five or six centuries further back, and being partly the work of the Aztecs, whom the Spaniards conquered, and partly of the Toltecs, whom the Aztecs had themselves supplanted. Nor is the fact altogether without significance, that, in the two more southerly divisions of the continent, those mysterious records of the past are generally superior in development in proportion as they are anterior in age; those of Central A., as a whole, surpassing those of South A.; and, again, within Central A. itself, the earlier specimens of Oaxaca, Guatemala, and Yucatan, eclipsing the later ones of Mexico Proper.

While attempting, in the light of these remains, to appreciate aboriginal civilization, we cannot fail to be struck rather with their magnitude than with their beauty, rather with the evidence of despotism in the ruler than with traces of skill in the subject—Stone-



Front and back of a stone idol found at Copan, in Central America.

henge affording us infinitely more of a parallel than Windsor Castle or Westminster Hall. Nor does the sculpture, so often subsidiary to the architecture, lead to a more favorable inference, being generally rude and clumsy, and sometimes grotesque and hideous. The only safe conclusion is this, that, in the new world as in the old, there were different degrees of civilization; some of them confessedly higher than one could have expected in the utter absence of the useful metals, and the almost utter absence of beasts of burden. Nor has even this conclusion any necessary bearing on the better organized communities at large. Stray visitors of a higher type might have produced all the phenomena—visitors precisely such as appear to have figured in the traditions both of Mexico and Peru.

Geology.—The geology of the new world presents some remarkable contrasts to that of the districts in the old world which have supplied the types of geological classification. None of these is more striking than the enormous extent of country which one formation occupies, and that without interruption. It has long been noticed that the rock-structure of islands is more varied than that of continents; and thus it is that the inhabitants of the British Isles have been to some extent compelled to become acquainted with geology. A journey of a few hours presents to the traveler rocks which, as regards both their mineral and fossil contents, are widely different. In A., on the other hand, one may travel for days over beds belonging to a single epoch. American strata often stretch from the Atlantic west beyond the Mississippi. They have, on the whole, been subjected to few disturbing agencies; as is evidenced by the absence of any true mountain-range, except the Appalachians, east of the Rocky Mountains. The rocks of Britain, from their disposition and variety, have been, so to speak, the 'primer' and 'pocket manual' of this science, and will always continue to be the '*vade mecum*' of the geologist; but should he desire to peruse the large 'folios' that contain the stony records of our earth's history, in their order and natural vastness, he must betake himself to the new world.

It is not many years since attention was first directed to American geology, but during the short time that has intervened, its progress has been very remarkable. This has resulted from the appointment of a geological staff in connection with nearly every province of the United States, from the vigorous operations of the Canadian survey under Sir W. E. Logan, and from the observations of arctic explorers, whose frequent visits to these regions in search of the ill-fated Franklin have supplied data for the exposition of their natural history. Humboldt, though the first, is yet the most important of South American observers. The numerous facts recorded by him have been confirmed and added to by recent travelers. Data have been thus supplied to form an approximate estimate of the geological structure of this portion of the American continent.

The names of North American observers are almost past reckoning, yet the various systems may be said to have been chiefly laid open by four sets of observers—Morton for the Cretaceous, Conrad for the Tertiary, Hall and the New York geologists for the Palæozoic, and the Professors Rogers for the Carboniferous strata and the Appalachians.

In the following rapid sketch of this subject, we can do nothing more than glance at the various formations, and must refer for details to the articles under the different divisions of A.

The oldest strata are a range of CRYSTALLINE ROCKS which, in North A., occupy an area that extends from the northern shores of Lake Superior, and the banks of the St. Lawrence, north-west to the Arctic Ocean, and lies between the line of minor lakes (Slave, Winnipeg, &c.) and Hudson's Bay. The average width of this area is about 200 miles, and its length from Lake Superior to its termination on the shores of the Arctic Sea is more than 1500 miles. The rocks are chiefly gneiss, with granite and trap. They form a flat plateau, very little elevated above the surrounding country, and only in the Copper Mountains rising to the altitude of hills, the highest of which is 800 feet above the sea-level. In this immense plain we have an example of the great characteristic of American geology—the tranquil operation of an upheaving force, exerted over a wide area, with limited and regulated intensity, and constancy of direction. This series of rock stretches over nearly the whole of the eastern portion of South A., extending from the northern shores to the mouth of the La Plata, being, however, hidden in the valley of the Amazon by its alluvial deposits. The same rocks form the western slopes of the Andes and Rocky Mountains, and the plains of Russian A. In the central district, in which we first traced them, they dip east and west under the Silurian strata. They are themselves free from superincumbent beds, showing that even in the Silurian age they formed dry land; and ever since, although subject, like the rest of the world, to great oscillation, it has apparently held its place with wonderful stability, for it is now, as probably then, not far above the level of the sea.

On either side of this tract there exists, as we have said, a SILURIAN district. That on the eastern side, reaching to Hudson's Bay, has a low and uniformly swampy aspect; the strata are hid by superficial deposits, chiefly boulder clay or drift, large boulders from which are scattered along the shore. The Silurian rocks under which the crystalline strata dip on their western limits, cover a large extent of the North American continent. They have been traced from Canada and New England, bounding the southern limits of the azoic rocks along the line of the great lakes, and extending in a broad band of some 200 miles parallel to the more ancient formation, probably till they reach the Arctic Ocean. These rocks are only slightly developed in Southern A., on the eastern slopes of the Andes.

The Silurians have been divided into *Lower* and *Upper*, and each of these contains three periods. Beginning with the Lower, we have first the

Potsdam Period, comprising beds of slate and sandstone, and containing fossils representative of the three great divisions of the animal kingdom—Mollusca, Articulates, and Radiates. Next follows the

Trenton Period, a period of limestones indicating a sea of greater depth, and teeming with life, for some beds are composed entirely of shells and corals.

Another change, and rocks of a clayey and shaly structure are deposited, containing numberless zoophytes and other fossils, and forming the *Hudson Period*.

The Upper Silurian division also comprises three epochs: *The Medina and Clinton*, composed of sandstones and shales; then *The Niagara and Onondaga*, with limestones and saline rocks; and, lastly, *The Lower Helderberg Period*, a richly fossiliferous series of limestone rocks.

The Silurian beds on their southern and western borders dip under the DEVONIAN rocks, which are developed to a large extent north of lat. 72° N., where they appear to rest upon the azoic

CENTRAL AMERICA
Railways represented thus
0 10 20 30 40 50 75 100 150
Geographical Miles 60 One Degree
0 10 20 30 40 50 75 100 150
English Miles 69 One Degree
Longitude West 86 from Greenwich
GULF OF CAMPEACHY
YUCATAN
CARIBBEAN SEA
NORTH PACIFIC OCEAN
GUATEMALA
HONDURAS
SALVADOR
NICARAGUA
COSTA RICA
BAY OF HONDURAS
BIGHT OF PAPAGAYO
GULF OF NICOYA
GULF OF PANAMA
PANAMA BAY
BRITISH HONDURAS
BELIZE
Rivas or Nicaragua
The level of the Caribbean Sea at Chagres is 8 ft. 8 in higher than the level of the Pacific Ocean at Panama at low water

rocks. They have been divided into five periods : *Oriskany, Upper Helderberg, Hamilton, Chemung, and Catskill.*

Vast beds of conglomerate overlie the Devonian rocks, and form the basis of the CARBONIFEROUS strata. This formation covers large districts in New Jersey and Pennsylvania, and in the Ohio and Mississippi valleys, with an enormous thickness of limestone, shale, and other beds, which still continue parallel to the previous. At the close of the carboniferous epoch, the whole character of North A. was altered by the formation of its mountain systems. No hill higher than Cooper Mountain seems to have existed at this time, although the land occupied much the same area, and had a similar outline as at present. The Professors Rogers, having with perfect success unravelled the contortions of the Appalachians, have shown that the Silurian, Devonian, and Carboniferous strata, which were originally laid out in horizontal layers, were afterwards pressed on to the north-westward, and folded up till the folds were of mountain height. To similar causes do the Rocky Mountains and the Andes owe their origin —only the directions of the forces are different.

The Appalachian fires have long been extinguished; they have, however, left traces of their former violence in the highly metamorphosed Silurian and Carboniferous rocks of New York and Pennsylvania, which were long supposed to be primary granite, &c. The igneous agency, which at first raised the western range, is still active at intervals throughout its course.

There seems to have been a rest in the deposition of sedimentary strata at this time. The only activity was that of the earthquake and the volcano. Two whole formations—the Permian and Triassic—have no place in the rock-structure of A. The first renewed signs of life are discovered in the sandstones which occupy the valleys on the eastern side of the Appalachians. In these beds, which belong to the OOLITIC period, occur the tracks of birds and reptiles, discovered and described by Professor Hitchcock.

In the CRETACEOUS beds which follow, evidence is given that the Mexican Gulf extended far up the Missouri Valley, and sufficiently deep to cover Texas and Nebraska with the beds which belong to this formation.

The TERTIARY formation is developed as a band of about 60 miles, forming the southern extremity of North A., and stretching from North Carolina to the peninsula of Yucatan, leaving the coast-line only at the delta of the Mississippi. This formation occupies a large amount of the surface of South A. From Patagonia to Venezuela it can be traced occupying the space intervening between the base of the Andes and the azoic rocks of Brazil and Guiana. The older Silurian and Carboniferous deposits are not found in the positions they occupy in the northern continent; the gneiss, &c., dip directly under the tertiaries.—The valleys of the Amazon and the La Plata, and the mouth of the Mississippi, contain extensive *Alluvial* deposits.

There only remain two post-tertiary beds, which, however, are of considerable importance—viz., the *Boulder Clay*, and the *River Terraces or Loess*,, containing the remains of the mastodon and of the elephant. The boulder clay occurs in the country north of lat. 40° N., and in Patagonia in South A. Its characteristics are the same as that in the old world—a stiff clay, containing boulders of all sizes, some being as much as one or two thousand tons weight. The origin of this remarkable deposit is ascribed to the former prevalence of vast glaciers over the north and south parts of America.

The pampas of Southern A. are covered with a deposit of clay and sand, containing the bones of the megatherium and mylodon, genera allied to the sloths, and of the glyptodon, a huge armadillo. For details, see ANDES, APPALACHIANS, ROCKY MOUNTAINS.

Botany.—On the discovery of A., Europeans regarded with astonishment its vegetable and animal productions, so different from all that they had ever seen before. The difference between the productions of the old and new worlds is least remarkable in the most northern regions. Around the north pole, a region having a flora and fauna which may properly be designated arctic, includes portions of the three continents of Europe, Asia, and A.; and many productions are common to these three continents throughout this region, whilst those which are peculiar to one, are generally represented in the others by a species nearly allied. In A. this region extends to the Northern shores of Lake Superior. The polar bear haunts the arctic regions of the old and new worlds alike; and further south, in both, the beaver builds his dam, and is pursued for his skin. Pine and birch are the chief trees of all the most northern forests, and struggle on, dwarfed and stunted, towards the regions of perpetual snow; whilst the berries of different species of *Rubus* and *Vaccinium* (bilberry, &c.) are the last fruits which the soil offers to man during the brief summer of the north—alike to the Laplander and the Esquimaux.

More to the south, the flora and fauna of A. become more decidedly different from those of the old world; yet the difference consists not so much in the appearance of new families as in new species, replacing, so to speak, those of Europe and of Asia. The forests consist chiefly, as in these continents, of pines, oaks, birches, and willows; but the pines, and oak, and birches, and willows, are not the same as those which cover the plains and mountains eastward of the Atlantic. The same remark applies to poplars, elms, planes, maples, hazels, and other kinds of trees, and to plants of humbler growth, as roses, brambles, strawberries, bilberries, &c., the pasture grasses, and the common flowers and weeds, although umbelliferous and cruciferous plants are comparatively rare. Not unfrequently, also, forms occur more completely different from those of the other quarters of the world, and these become more numerous as we proceed southward; although the magnolias, which form so admirable a feature of the flora of the Southern Alleghanies and other southern parts of North A., have recently been found equally to characterize that of the east of Asia and of the Himalaya Mountains, where magnificent species of rhododendron have also been discovered, rivaling or excelling those which are natives of the United States, and very different from the dwarf shrubs which represent the same genus on the mountains of Europe.

It is remarkable that no true species of heath is found in A., although many shrubs of the same family occur, but none of them so strongly exhibiting the *social* character, or covering great tracts, as the heaths do in Europe. Where the climate begins to assume a tropical character, however, A. is distinguished by the abundance of the *Cacti* (the prickly pear and its allies), which are found on its plains, often forming the greater part of their vegetation. The species of this order, so far as is yet known, are exclusively American, although some of them have been introduced into the warmer parts of the old world, and are now very common in the south of Europe and elsewhere. The mountains of Mexico are, to a large extent, clothed with oaks and pines, most of them, however, different not only from those of the eastern continents, but even from those of the more northern parts of A. The flora of tropical A. resembles that of Asia and Africa in its palms, although these also are with few exceptions different in species; and the species are more abundant than in any other part of the world. It appears, indeed, that palm-forests like those of South A. scarcely exist elsewhere. The forests of the hottest parts of South A. produce also many remarkable trees of other kinds, among which may be mentioned the trees of the order *Lecythidaceæ* (q. v.), one of them known as the cannon-ball tree, and all of them producing huge fruits, with thick hard shells, which are often used for domestic purposes; whilst within the shell of a particular species are packed together the well-known Brazil Nuts (q. v.) of our shops. In the waters of the same region has recently been discovered the *Victoria Regia*, the most magnificent of water-lilies, and for the growth of which, hot-houses containing ponds of water have been erected in our own country. The forests of this part of A. are so dense and full of underwood, and the trees so bound together by *lianas* or twining plants, that they are in many places impenetrable, and the animals which inhabit them either find their way among the branches, or by narrow paths, which they keep open by constant use. The treeless plains of South A., like those of North A., have, in general, much of a grassy vegetation. Part of the elevated regions of the Cordillera, within the torrid zone, is remarkably characterized by the presence of *Cinchonæ*, which form its principal botanical feature, and yield the celebrated Peruvian bark. In still more elevated regions, *Escallonieæ* and *Calceolariæ* give a novel aspect to a vegetation otherwise very similar to that of Europe in its general character, and containing saxifrages, gentians, and many other plants of genera common in the old world. The flora of Chili presents also some interesting points of resemblance to that of New Holland and New Zealand. An *Araucaria*, now not unfrequent in our pleasure-grounds, appears as a representative of the pines; and its seeds afford a large part of the food of the natives of the district in which it abounds. Towards the Strait of Magellan, vegetation again assumes forms more similar to those of Europe. The forests consist in great part of peculiar species of beech. Barberries, different from those of other parts of the world, but very nearly resembling them, are particularly abundant; and with them occur brambles, saxifrages, gentians, primroses, &c. There are also vegetable productions very different and peculiar, as the Winter's bark, which has obtained some reputation as a medicine. From this region are derived not a few of the fuchsias now so familiar an ornament of gardens, greenhouses, and cottage windows in Britain, and which are exclusively American.

Maize is one of the most important of the botanical productions of A. It is the only cultivated grain of American origin; it was in cultivation before the discovery of A. by Europeans, by whom, however, its value was soon recognized, and it has now become an important crop in the climates suitable for it in all quarters of the world. The other grains have all been introduced into A. by Europeans, with the sugar-cane, the banana and plantain, coffee, cotton, flax, and many other plants now generally cultivated both in the tropical and temperate regions. The yam is regarded as amongst its native productions, common to its tropical regions

with those of other quarters of the world. Tobacco is a native production of A., the cultivation and use of which extended from it to the old world, and rapidly became prevalent among a great part of mankind. (It is indeed supposed by some that there is a species of tobacco indigenous to the furthest east; but this, and the question of its use there before it was made known from A., are still involved in uncertainty.) But of all the vegetable productions of A., the potato is the most important and useful. We owe to it also the Jerusalem artichoke; and it produces several other plants, valuable for their roots and tubers, as the arracacha, the melloco, &c., the use of which has scarcely yet extended beyond their native regions. With them may be mentioned the quinoa, which is not a grain (the seed of a grass), but the seed of a species of *Chenopodium*, or goosefoot, resembling the seeds of the cereal grasses in its qualities, and extensively cultivated on the high table-lands of Chili and Peru. Tapioca, arrow-root, cocoa, vanilla, pimenta or Jamaica pepper, and Cayenne pepper, are among the native productions of the tropical parts of A. The Agave (q. v.) or American aloe, valuable both for its fibre and its juice, has now become common in the warm parts of Europe, and in similar climates in other quarters of the globe. The pine-apple is a native of tropical A., although now naturalized, or nearly so, in other tropical regions. Tropical A. and the West Indies produce also many other fine fruits, among which are the guava, different species of anona or custard-apple, and of granadilla or passion-flower.—The forests of North A. yield much valuable timber, chiefly consisting of different kinds of oak and pine. The black walnut and hickory of the United States are also much esteemed. The West Indies and neighboring parts of the mainland yield mahogany; and from the same regions comes logwood, one of the most useful of dyewoods. The tropical forests of South A. produce many valuable timber-trees, of which perhaps the most deserving of notice are the Greenheart (q. v.) or Bibiri, and the Mora. Brazil wood and Pernambuco wood are among their dyewoods. One of the most remarkable productions of this region is the Cow-tree (q. v.) the juice of which possesses many properties in common with milk, and is used instead of it. The milky juice of some other trees of tropical A. thickens into caoutchouc.—Different parts of South A. produce *Maté* (q. v.) or Paraguay Tea, a species of holly, the leaves of which possess properties similar to those of tea and coffee, and afford a beverage which is extensively used, although not yet an article of export to other parts of the world; and the Coca (q. v.), a shrub of which the leaf has been, from a remote period, employed by the Indians as a narcotic.

Political Divisions.—The following are the chief political divisions of America, each of which will be described in its proper place. In North A., strictly so called, are British A. as commonly understood, the United States, and part of Mexico. In Central A. are the remainder of Mexico, Central A., in its political sense, comprising Guatemala, San Salvador, Honduras, Nicaragua, and Costa Rica; and, lastly, a small portion of the United States of Colombia. In South A. are the rest of Colombia; thence along the Pacific are Ecuador, Peru, Chili, and aboriginal Araucania; while round by Patagonia and Tierra del Fuego, the Atlantic washes Buenos Ayres, Uruguay, Brazil, Guiana, and Venezuela—the interior being occupied by Bolivia, Paraguay, and the Argentine Confederation. Finally, the West Indies consist of the Bahamas, the Greater Antilles, and the Lesser Antilles.

The annexed tables are compiled from the *Almanach de Gotha* (1881), the *Statistical Abstract* for the British Colonies and other possessions, the Census of the United States (1880), and the like.

1. *Governments of North America.*

Governments.	*Area in Square Miles.*	*Population.*	*Capitals.*
Danish America (Greenland)	46,740	9,825	Lichtenfels.
French Possessions (St. Pierre and Miquelon)	81	4,915	S. Pierre.
British North America:			
1. The Dominion of Canada, comprising the provinces of			Ottawa.
Quebec or Canada East	193,355	1,359,027	Quebec.
Ontario or Canada West	107,780	1,923,228	Toronto.
Nova Scotia	21,731	440,572	Halifax.
New Brunswick	27,322	321,233	Fredericton.
Manitoba	13,960	65,954	Winnipeg.
British Columbia	356,000	49,459	New Westmin.
North-west Territory &c.	2,483,000	56,446	Battleford.
Prince Edward Island	2,173	108,891	Charlotte T'n.
2. Newfoundland	40,200	161,374	St. John's.
3. Bermudas	19	13,956	Hamilton.
U. S. of Amer. (including tribal Indians)	3,603,884	50,442,066	Washington.
Mexico	768,490	9,577,279	Mexico.
San Salvador	9,594	554,785	San Salvador.
Nicaragua	49,500	300,000	Managua.
Honduras	39,600	350,000	Comayagua.
Guatemala	41,830	1,252 497	Guatemala.
Costa Rica	26,000	185,000	San José.
Total	7,831,268	67,176,507	

2. *West Indian Governments.*

Governments.	*Area in Square Miles.*	*Population*	*Capitals.*
Hayti. } Dominica, } San Domingo	9,500 21,300	572,000 136,500	Port au Prince. San Domingo.
Spanish—			
Cuba	47,500	1,400,00	Havana.
Porto Rico	3,720	625,000	San Juan.
British—			
Jamaica	6,400	506,154	Spanish Town.
Trinidad	1,754	109,638	Port of Spain.
Barbadoes	166	162,042	Bridgetown.
Grenada	133	38,423	St. George's.
St. Vincent	131	35,688	Kingston.
Tobago	97	17,054	Scarboro'.
St. Lucia	250	31,610	Castries.
Antigua	170	35,157	St. John's.
Montserrat	47	8,693	Plymouth.
St. Christopher and Anguilla	103	30,942	Basseterre.
Nevis	50	11,735	Charlestown.
Virgin Islands	57	6,651	
Dominica	200	27,178	Rosseau.
Bahamas and Turk's Island	3,440	43,885	Nassau.
French—			
Guadaloupe, &c.	736	163,600	Basseterre.
Martinique	381	156,799	St. Pierre.
St. Bartholomew's [Swedish till 1878]	8	2,898	Gustavia.
Dutch—			
St. Martin's [S. side] Curaçao, &c.	452	39,150	Wilhelmstadt.
Danish—			
Santa Cruz, &c.	73	22,760	Christianstadt.
St. Thomas	23	14,007	
St. John's	21	1,054	
Total	96,772	4,198,618	

3. *Governments of South America.*

Governments.	*Area in Square Miles.*	*Population.*	*Capitals.*
Venezuela	417,000	1,784,194	Caracas.
United States of Colombia	332,000	2,910,329	Santa Fe de
Ecuador	200,000	1,308,082	Quito. [Bogota
Peru	528,800	2,500,000	Lima.
Bolivia	520,000	2,000,000	Chuquisaca.
Argentine Confederation	1,238,600	1,877,490	Buenos Ayres.
Uruguay	72,700	450,000	Monte Video.
Paraguay	57,300	221,079	Asunçion.
Chili	132,609	2,068,447	Santiago.
Brazil	3,275,326	9,700,187	Rio de Janeiro.
Patagonia	364 864	24,000	
Guiana—British	76,000	193,491	Georgetown.
Guiana—Dutch	49,795	200,000	Paramaribo.
Guiana—French	18,500	24,171	Cayenne.
Falkland Islands	7,600	811	Port Louis.
Total	7,411,097	27,262,281	
Grand Total of America	15,6[illegible]3,385	87,535,092	

Zoology.—In the animal kingdom, as in the vegetable, all seemed strange and new to Europeans when they first set foot in America. Yet here also the difference from the productions of Europe is not so great as in South Africa or Australia. In North A., many of the animals, as of the plants, of Europe are represented by others of the same genera or families. A few are common to the old and the new world; and in some which are now regarded as specifically different, the difference is not so great as readily to attract the notice of unscientific observers. North A. has its elk and its deers, its oxen (the bison, called buffalo in the United States, and the musk-ox), its sheep (the Rocky Mountain sheep), its beavers, hares, squirrels (some of them much sought after for their fur), mice, rats, weasels, bats, porcupines, bears, badgers, foxes, wolves, and several species of feline animals, among which are the puma and the lynx. The jaguar, more powerful and dangerous than any other of the feline animals of the new world, and the only very formidable beast of prey which it produces, inhabits the tropical forests of South A. The warm parts of South A. produce the great tapir, peccaries, sloths, ant-eaters, armadilloes, &c.; but the elephant, rhinoceros, hippopotamus, and boar of the old world, have no more nearly allied representatives. The lama and its congeners, among which is the alpacca, are peculiar to South A., inhabiting the Andes of Chili and Peru. Of the animals of the old world, the most nearly allied to them is the camel, which is entirely wanting in the new; as was also the horse (with all its congeners), until it was introduced by Europeans—a sight of wonder and of terror to the Mexicans and Peruvians who first found themselves opposed to Spanish cavalry, but now thoroughly naturalized, and roaming in vast multitudes on the South American plains. The dog existed in A. before the days of Columbus; it existed in different varieties as a domesticated animal, and the same difficulty arises concerning the origin of the domesticated varieties as when those of the old world alone are considered. The Chinchilla, so valuable for its fur, is a small quadruped, peculiar

NORTH AMERICA
British Miles
0 100 200 300 400 500 600 700 800
Geographical Miles
0 100 200 300 400 500 600 700 800
Longitude West 120 110 100 90 80 of Greenwich
ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
GREENLAND
ALASKA
ASIA
DOMINION OF CANADA
BRITISH COLUMBIA
UNITED STATES
MEXICO
GULF OF MEXICO
CARIBBEAN SEA
WEST INDIES
CUBA
CENTRAL AMERICA
SOUTH AMERICA
Baffin Land
Hudson Bay
Labrador
Newfoundland
Nova Scotia
Halifax
Montreal
Ottawa
Toronto
Quebec
Winnipeg
Vancouver
San Francisco
Chicago
New York
Philadelphia
Washington
Charleston
Havana
Mexico
Yucatan
Honduras
Guatemala
Nicaragua
Costa Rica
Panama
Bahama Islands
Jamaica
Haiti or Domingo

to the north of Chili. The opossums of North A. were the first known of marsupial quadrupeds—i. e., those which have a pouch for their young—and are described as objects of great curiosity by the earlier writers on the new world and its productions. Monkeys are numerous in the warm parts of the new world as well as of the old, and of many species; but they are not only of different species from those of Asia and Africa; they form a different section of the monkey family. There are no apes resembling the orang-outang or chimpanzee, and baboons; but all of the American monkeys have long tails, and many of them prehensile tails, the latter peculiarity being found in none of those of the old world. The absence of cheek-pouches is another character of the American monkeys.

Among the birds of A. are eagles and others of the same family, vultures (among which is the great condor of the Andes), owls, ravens, crows, herons, thrushes of many kinds (of which the mocking-bird may be mentioned as a species particularly interesting), finches, sparrows, buntings, warblers, wrens, larks, &c. Few, however, are identical in species with those of Europe or of Asia. Few things in the natural history of North A. are more remarkable than its multitudinous flocks of pigeons. There are numerous species of grouse and partridge. Of the large gallinaceous birds, the first place in importance must be assigned to the turkey, now so common in a domesticated state in Europe, although in a wild state it has almost disappeared from great part of its native regions. Alectors and curassoes are large gallinaceous birds of Mexico, Guiana, and other warm parts of A. Parrots abound in the tropical forests, and although only one species extends northward into the United States, yet in South A., birds of this family range to the southern extremity of the continent. Humming-birds are peculiar to A., and are found not only in its tropical but in its temperate regions, of numerous species, and many of them of dazzling beauty, passing like bees from flower to flower, and often constituting a characteristic feature of the scenes in which they abound. Toucans and aracaris are among the other kinds of birds peculiar to A., and are found in South A. alone. Swans, geese, and ducks, with other waterfowl of many kinds, exist in great numbers in North A., and in the warmer parts the brilliant colors of the flamingo enliven some of the coasts.

Serpents are numerous. Among them are boas, remarkable for their great size. Rattlesnakes, the most venomous and dreaded of the serpent tribe, are peculiar to A. Alligators abound in the rivers of the tropical and sub-tropical regions. Turtles are caught in great numbers in the West Indian seas, and fresh-water turtles abound in some of the tropical rivers. The bull-frog is a native of the United States, remarkable for the loud noise which it makes, and which those who have been accustomed to it from their childhood learn to associate with all that is pleasant in nature. The lakes and rivers of A. abound in fish, of which many are of the salmon family, the common salmon itself being found as far south as 41° N. lat., and some are of the sturgeon family. The cod-fisheries of the Bank of Newfoundland and of the coasts of Nova Scotia are unequalled in productiveness; and herrings, and other species of the herring family, are taken in great numbers in the same seas.

Some parts of A. are grievously infested by mosquitoes and other insect tribes, the vast numbers of which are extremely annoying, so that some places on the banks of tropical rivers are rendered almost uninhabitable. Ants and termites, or white ants, are very abundant in some parts of South A. Many species of wild bees are found in the forests of Brazil, some of them very productive of honey; but the common hive-bee was unknown in A. till it was introduced from Europe. It has now become naturalized, and is found in the forests far beyond the settlements of white men. The cochineal insect of the opuntia is a native of Mexico and Central A., and the plant on which it feeds has long been cultivated there and in the West Indies for its sake.

AMERICA, BRITISH. From the small beginnings specified in the general article above, British A., in the proper sense of the words, is now, in mere extent, at least equal to the American republic, and vastly superior to any other state in the western hemisphere—occupying, as it does, a breadth of about 90° of long, and stretching, with more or less interruption over a length of 120°. Besides touching, actually or virtually, every considerable power on the continent, England, in the new world as in the old, commands nearly every turning-point in navigation and commerce. In co-operation with Ireland, Newfoundland has linked together the two continents by submarine telegraph. Again, with the gulf and river of St. Lawrence as its main artery, British A., in its ordinary acceptation, comprising Nova Scotia, New Brunswick, Prince Edward Island, and the Canadas, confederated in one 'Dominion,' has received from nature an advantage in respect of the western trade which even the energy of Pennsylvania and New York cannot counterbalance; Halifax, the Bermudas, and the Bahamas, are so many guardians of the gulf-stream, freighted as it is with the exports of half a continent. Jamaica forms the first link of a chain which girds the Caribbean Sea; Trinidad fronts the Orinoco, which is connected by the Cassiquiare with the Amazon; Western Guiana also, as already mentioned under another head, finds, up the Essequibo, its own communication with the 'King of Waters;' and, lastly, on the Atlantic side, the Falklands, with their Port Egmont, flank alike the river Plate and the Strait of Magellan. Round, again, in the Pacific, British A. exerts an influence, which is perhaps relatively greater. At the upper extremity of a coast which is, as a whole, singularly deficient in harbors, British Columbia, with its breastwork of islands from Vancouver's upwards, and its succession of indentations, bids fair, more especially with its inexhaustible supplies of magnificent timber, to form an admirable base of operations for sustaining the maritime greatness of Britain.

AMERICA, RUSSIAN, the name long given to what is now a territory of the United States, called *Alaska*, and which was purchased from the Russian government in 1867 for 7,200,000 dollars. It forms the north-western extremity of the American continent, and is bounded N. by the Arctic Ocean, E. by British America, W. and S. by the Pacific. It was discovered by a Russian expedition conducted by Behring (q. v.), which sailed from Kamtchatka in 1741. It is little better than a vast hunting-ground, and was long held by the Imperial Fur Company, which differed but little from the imperial government itself. Its only town, or rather village, worthy of the name, is New Archangel (now called Sitka), on the island of Sitka. The most noticeable points in geography are Cape Prince of Wales, on Behring's Strait; Kotzebue's Sound, Norton's Sound, peninsula of Alaska, Cook's Inlet, and Mount St. Elias.

AMERICA, SPANISH. Spanish A. is now shrunk into Porto Rico and Cuba, and belongs rather to history than to geography. Yet for many years it embraced absolutely the entire continent. Its decay was caused by the colonists becoming mere hunters after the precious metals, instead of agriculturists, and by the exclusion of all but natives of the mother country from public employment.

AME'RICANISMS are words and phrases current in the United States of America, and not current in England. These peculiarities are much more prominent in conversation than in writing; indeed, in the American writers that are usually considered classical, it is difficult to detect anything of the kind. The number of absolutely new words introduced into the English language in America is remarkably small. As an instance may be mentioned *caucus*, for a secret political assembly. This is a corruption of *calk-house*, a calker's shed in Boston, where the patriots before the revolution had usually held their meetings. The term *Yankee* (an Indian corruption of the French *Anglais*) is another. The great body of A. consists in giving an unusual sense to existing words: as *clever*, in the sense of amiable, and *smart* for clever; *wagon* for a very light kind of carriage; *book-store* for bookseller's shop; *wilted* for withered; *creek* for a small river, instead of a small arm of the sea.

The several divisions of the Union have their characteristic peculiarities. Thus, in the New England States—Yankeeland proper—*ugly* is used for ill-natured; *friends* for relations (so used also in Scotland); and *guess* for a great variety of things—to think, presume, suppose, &c. This use of *guess* is confined to New England; the inhabitants of New York and of the Middle States generally employ *expect* in the same way; while those of the Southern States *reckon;* and those of the Western States *calculate*. Several words current in the Middle States are of Dutch origin, as *loafer* for a vagabond, from the Dutch *looper*, to run; and *boss* for a head workman or employer. The Southern States have fewer peculiarities than any of the other divisions. In the Western States, again, there is hardly any recognized standard of speech, and in some districts 'it would hardly be an exaggeration to say that every prominent person has his own private vocabulary.' The verb *to fix* is made to do duty for expressing every conceivable kind of action. The vague use of this word is common all over the Union, but in the West the abuse is carried to the extreme. *Help*, in the sense of servant, is common to the West and to New England, but is nearly unknown in the Middle States. The well-known phrase *go a-head* is a coinage of the West; it is sufficiently expressive of the leading characteristic of the American people. *Posted-up* in a subject, for 'well informed,' is one of a class of metaphors indicative of the prominence of mercantile pursuits.

The tendency to the use of slang is excessive in America, especially in the Western States. 'Every State, every city has its own flash vocabulary; but it is in the political world that this tendency to cant phrases most develops itself. Every new party, every new modification of an old party, is bound to have at least one new name, either assumed by itself, or attached to it by its opponents.'

A variety of causes have been enumerated to account for the existence of those deviations from standard English, such as, the influence of the Indian languages; the various tongues spoken by settlers from Europe other than English; the original provincial peculiarities of portions of the English settlers, &c. For instance, Dr. M. Shele de Vere, whose work, *The English of the New World* (1873), is the best on the subject, states that the largest number of

so-called Americanisms are good old English words which have become obsolete or provincial in the mother-country. But even supposing the language of the United States were at this moment in every respect identical with that of England, and to be henceforth unaffected by the importation of foreign elements, the complete identity could not be expected to continue long.

Not only do new circumstances and wants make new terms necessary, and modify the application of old, but those changes of structure which constitute the organic growth of every living tongue, are evolved more or less rapidly according to the industrial and political activity of those that speak it. To complain, then, that the English language in America, or in any of the British Colonies, should exhibit deviations from the standard of the mother-country is as unreasonable as to complain that an animal should exhibit changes in its coats or its habits when removed from one climate to another. Though it is certainly desirable that the language of the various sections of the Anglo-Saxon race should be substantially one, yet the general adoption of a new term or mode of expression by a great community may be presumed to have a cause deeper than any that can be controlled by criticism.

As the Americans of Anglo-Saxon origin do not exceed one-third of the whole population of the United States, it seems wonderful that the English language should have held its ground so well—that it should not have been completely corrupted, or even in some places extruded by other tongues. Yet there is apparently no danger of this. The original Dutch of New York has disappeared, with the exception of a very few stray words; and although French is still spoken in one-half of the city of New Orleans, it has been preserved at the expense of the speakers isolating themselves and losing their due influence. The proximity of the German-speaking population that still holds out in Pennsylvania, &c., has no sensible effect upon the language of their English-speaking neighbors; while, on the other hand, the influence of the English is reducing the language of the Germans to a corrupt patois, swarming with English words.—See *The English Language in America*, in the Cambridge Essays for 1855; Bartlett's *Dictionary of Americanisms* (1858).

AMERICAN POLITICAL PARTIES. See Political Parties in the United States, in Am. Supp.

AMERIGO VESPUCCI, a naval astronomer, from whom America accidentally received its name, was born at Florence, March 9, 1451. His father was a notary. The education of A. was intrusted to his uncle, Giorgio Antonio Vespucci, a monk and apparently a man of superior enlightenment. The youth made but indifferent progress in his Latin grammar, though he showed great aptitude and liking for natural philosophy, astronomy, and geography—at that period, favorite objects of study, on account of their commercial importance. It is not precisely ascertained when he first went to Spain. We find him there, however, in 1486, engaged in mercantile pursuits.

He was at the head of a large Florentine firm in Seville, in 1496, when Columbus was making preparations for a second voyage to the new world. The success of the great discoverer inflamed A., with a passion for discovery, and having abandoned 'business,' he sailed from Cadiz on the 20th May 1499, in the expedition commanded by Admiral Hojeda, and, after a voyage of thirty-seven days, arrived at that portion of the continent of America now called Cumana, explored the Bay of Paria, lying between the isle of Trinidad and the mainland, and some hundreds of miles along the coast. He returned in the autumn of the same year, but commenced a second voyage under Admiral Pinzon in December, which resulted in the discovery of a crowd of small islands on the south of the Gulf of Mexico. He was now allured by promises into the service of Emanuel, king of Portugal, and undertook two other voyages with Portuguese ships; the first on the 10th of May 1501, and the second on the 10th of May 1503. His purpose was to sail westward, in hopes of discovering a passage to Malacca, the extreme point of discovery in the east. He lost one of his ships; and it was only after encountering great perils that the other five found refuge in All Saints' Bay, on the coast of Brazil. The monarch gave orders that some remains of the ship *Victoria*, in which A. made his last voyage, should be suspended in the cathedral of Lisbon, but fulfilled none of the promises which he had made. A. consequently returned to Spain, and in the year 1508 succeeded in obtaining the office of pilot-major. He died at Seville on the 22d of February 1512.

The character of A. V. has been covered with a great deal of unmerited obloquy. He has been accused of endeavoring to claim the honor of discoveries which he never made, and has been commonly regarded as an unprincipled adventurer. Humboldt, however, has successfully vindicated him from such aspersions. He had a very considerable knowledge of various branches of science, and it was on account of his superior attainments in these that he was selected to accompany the expeditions as naval astronomer. He was a prompt and skilful inspector of the commissariat while under his control; vigorous, practical, and severe in his demands for increased knowledge on the part of the naval functionaries under him; an earnest navigator and close friend of Columbus in the last years of the great admiral's life. How America came to receive its name from him is not quite clear; but it is certain, from Humboldt's investigation, that A. himself had nothing to do with it. The name of the new world probably came from Germany. A selection from A.'s narrative of his American voyages found its way into that country. Martin Waldseemüller of Freiburg in Baden translated it for a bookseller of St. Diez in Lorraine. As the first account of the wonderful discovery, it was greedily devoured. Edition after edition was printed off, and, according to Humboldt, it was Waldseemüller who proposed that the new world should be called America in honor of the author. Afterwards, this name was generally employed by geographical writers, and even the Spaniards and Portuguese adopted it.

A'MERSFOORT, an ancient town in the Netherlands, province of Utrecht, on the Eem, which flows into the Zuiderzee, has a large trade in grain. Tobacco is grown in the district, and cotton and woollen goods, leather, soap, beer, &c., are manufactured. The church of St. Joris was completed in 1248. A. has a Jansenist college and court of justice. Here the statesman Oldenbarneveld, and the architect of the palace in Amsterdam, Jacob van Campen, were born. The railway from Amsterdam by Utrecht to Zwolle passes A., and a direct line between it and the former city is being constructed. Pop. (1879) 13,704.

A'METHYST, a variety of quartz (q. v.), differing from common quartz and rock-crystal chiefly in its beautiful violet-blue or purplish violet color—well known as *amethystine*—which is owing to the presence of a little peroxide of iron or of manganese. It is one of the most esteemed varieties of quartz, and is much employed for seals, rings, &c., although, being comparatively abundant, it is much inferior in price to the true gems. An amethystine tinge is frequently to be observed in specimens of quartz which yet are not perfect A. The tinge is often very faint, and is frequently confined to the summits or edges of the crystals. The finest specimens of A. are brought from India, Ceylon, and Brazil. It is, however, a common mineral in Europe, and occurs in many parts of Scotland. It frequently occurs lining the interior of balls or geodes of agate, and in veins and cavities in greenstone and other rocks. The ancients imagine it to possess the property of preventing intoxication, and persons much addicted to drinking therefore wore it on their necks. The name is derived from a Greek word which signifies *unintoxicated*.—Not to be confounded with this mineral is that sometimes called the *oriental A.*, which is a variety of spinel (q. v.) having an amethystine color, and is a very valuable gem.—False amethysts made of glass or *paste* are very common, and in general very coarse; but a very perfect imitation can be, and sometimes is made.

A'MHERST, a sea-port of Tenasserim, on the E. shore of the Bay of Bengal, in lat. 16° 4′ N., and long. 97° 40′ E., at the entrance of the Martaban or Saluen. In 1826, the province having been newly ceded by the Burmese A., was founded, after a special survey of all the available sites, as the commercial capital, being named after the then governor-general of India, and proclaimed to be an asylum for the neighboring Peguers, still subject to Burmah; but policy, prestige, and foresight alike have in some measure failed; for the harbor, otherwise commodious enough, labors under two serious defects—difficulty of access, and exposure to the south-west monsoon. Even in trade, A. has been distanced by Moulmein, selected at first merely to be the military station of the territory. It is of no commercial importance except as a pilot-station and occasional port of call.—The *district* of A. has an area of 15,144 square miles, and a pop. of (1872) 235,738.

A'MHERSTBURG, a town on the river Detroit, which empties Lake St. Clair into Lake Erie. It is one of the oldest settlements in Upper Canada, being named from Lord Amherst, who, by the capture of Montreal in 1760, completed what General Wolfe had begun at Quebec in 1759. It occupies the south-west extremity of the province, the turning-point of climate and character to the basin of the St. Lawrence, the spot where its waters after having gained southing from the 50th to the 42d parallel, suddenly assume a direction which carries them back to their original latitude above the island of Anticosti. Pop. (1871) 1936. A large business is done here in timber.

A'MIDES are a group of organic compounds, derived, under certain conditions, from ammonia (NH_3, or NHHH), by the exchange of one or more atoms of hydrogen for a corresponding number of atoms of a metal, or a compound radical. The first of these compounds that was discovered was that in which *one* atom of hydrogen was replaced by one of potassium (NHHK, or NH_2K), the resulting product being regarded as a compound of NH_3 (*amidogen*) with potassium, and being termed amide of potassium. At present, the term *amide* is restricted to the case in which one or more atoms of hydrogen are replaced by an *acid* radical, and the amides are called primary, secondary, or tertiary, according as

one, two, or all three of the atoms of hydrogen are replaced by the acid radical. The primary amides may be obtained in various ways, of which we shall mention two; (1.) If we heat an ammoniacal salt, two atoms of water are given off, and the amide corresponding to the acid is left; thus, acetate of ammonia ($NH_4O.C_4H_3O_3$) — water (H_2O_2) = acetamide $\{C_4H_3(NH_2)O_2\}$, which, expressed typically, is

$$\left.\begin{matrix} C_4H_3O_2 \\ H \\ H \end{matrix}\right\} N,$$

where $C_4H_3O_2$ is the radical of acetic acid. (2.) If an anhydride is submitted to the action of ammonia, there are simultaneously formed an amide and an ammoniacal salt. Thus, valerianic or valeric anhydride $(C_{10}H_9O_3)_2$+ammonia $(NA_3)_2$= valerate of ammonia $(NH_4O.C_{10}H_9O_4)$ + valeramide $\{C_{10}H_9(NH_2)O_2\}$, which expressed typically, is

$$\left.\begin{matrix} C_{10}H_9O_2 \\ H \\ H \end{matrix}\right\} N,$$

where, $C_{10}H_9O_2$ is the acid radical of valeric acid. The amides are, for the most part, capable of being obtained in a crystalline form, and are fusible volatile bodies. For a description of the more complicated forms of amides, and for a history of their general properties, the reader is referred to the article 'Amides' in Watt's *Dictionary of Chemistry*, and to the chapter on Amides in the 2d edition (1867) of Naquet's *Principes de Chimie*, vol. ii. pp. 344—368. If, in place of an *acid radical*, a *base radical* replaces one or more atoms of hydrogen in ammonia, a class of compounds, termed *amines*, is formed, whose composition is noticed in the article ORGANIC BASES.

AMI'DOGEN is a substance procured by the action of the metal potassium on dry gaseous ammonia. The latter contains one atom of nitrogen to three atoms of hydrogen (NH_3), whilst A. contains one to two (NH_2). A. forms a very important class of organic compounds called *amides*, and gives rise to a number of substances closely allied to the alkaloids, many of which, indeed, may be regarded as natural amides.

AMIENS, an ancient city in the plain of Picardy, and capital of the department of Somme; it is the seat of a bishop and of a court of justice, and has a citadel and fortifications. It possesses a college, an academy, a theological seminary, an industrial school, a school of medicine, a public library, a picture-gallery, a botanical garden, and several literary and scientific institutions. Among its public buildings, the cathedral is a noble edifice, built in 1220, and esteemed a masterpiece, of Gothic architecture. Peter the Hermit was born here. A. has considerable manufactures of velvet, silk, woollen, and cotton goods, ribbons, and carpets. But the place owes its celebrity chiefly to the 'Peace of A.,' a treaty signed in this city, March 27, 1802, by Joseph Bonaparte, the Marquis of Cornwallis, Azara, and Schimmelpenninck, and intended to settle the disputed points between England, France, Spain, and Holland. By this treaty, England retained possession of Ceylon and Trinidad, and an open port at the Cape of Good Hope; France received back her colonies; the republic of the Seven Islands was recognized; Malta was restored to the order of the Knights of St. John; Spain and Holland regained their colonies, with the exception of Trinidad and Ceylon; the French were to quit Rome, Naples, and Elba; and Turkey was restored to its integrity. These terms were not received with satisfaction by the English, and war was declared against Bonaparte in 1803. In the Franco-Prussian war of 1870, A. was taken by the German General Manteuffel, an event which contributed to the fall of Paris. Pop. (1881) 73,630.

AMLETH, or HAMLETH, Prince of Jütland, is said to have lived in the 2d c. B.C. According to Saxo-Grammaticus, he was the son of Horvendill and Gerutha; and after the murder of his father by his uncle Fengo, who married Gertha, he feigned himself a fool, to save his own life. Saxo relates a number of little things regarding A., which are a curious medley of sharp and lively observation, and apparent madness. We are told that, on one occasion, when he visited his mother, suspecting that he was watched, he commenced to crow like a cock and dance idiotically about the apartment, until he discovered, hidden in a heap of straw, a spy, in the person of one of Fengo's courtiers, whom he immediately stabbed; he then so terrified his mother by his reproaches, that she promised to aid him in his intended revenge on his father's murderer, and, according to the old chronicler, really did so. Scandinavian traditions confirm the existence of a prince of this name. A field is still pointed out in Jütland with a tomb bearing the name of A. In the vicinity of Elsinore is shown the spot where the father of A. was assassinated. Saxo himself does not mention the manner or circumstances of his death; but his French translator says that he was murdered at a banquet. Most of the recent historians of Denmark consider the history of A. fabulous, but Müller thinks there is a substratum of fact in the old myth. It is the source of Shakspeare's tragedy of *Hamlet*, and thus possesses a perennial interest for all the civilized world.

A'MLWCH, a town of Anglesey, North Wales, on the north coast of the island, 14 miles northwest from Beaumaris. It stands on a rising ground close to the sea, and consists of one principal street, with diverging streets and lanes. It is a busy but rather dirty town, deriving its importance and wealth almost entirely from the rich copper mines in its vicinity, the mines of the Parys Mountain. Copper-smelting is carried on in A., and contributes not a little to make the town unpleasant. A harbor has been formed by excavation out of the solid slate rock, at the expense of the mining companies, and is capable of receiving vessels of 600 tons burden. It is protected by a breakwater. A branch of the Chester and Holyhead Railway terminates at Almwch. A. is associated with Beaumaris, Holyhead, and Llangefni, in returning one member to parliament. Pop. (1871) 2968.

AMMANA'TE, BARTOLEME'O, architect and sculptor, born at Florence in 1511, died in 1592. He was at first a pupil of Baccio Bandinelli, and afterwards of Sansovino at Venice. In 1550, he married Laura Battiferri of Urbino, a lady celebrated for her poetical gifts. Pope Julius III. employed him in the decoration of the Capitol, and Cosmo de Medici appointed him his architect. His principal works are, the statues which adorn the tomb of Sannazar at Naples, the tomb of Cardinal de Monti at Rome, the bridge of the Trinity and several fountains at Florence. He also completed the Pitti Palace, commenced by Brunelleschi, and ornamented the court with three orders of columns, which were subsequently imitated by J. de Brosse in the palace of the Luxembourg at Paris. In the collection of architectural designs in the Florence Gallery, there is one by A. His works have all a certain grandeur of character, derived, probably, from his early admiration of Michael Angelo, but are somewhat marred by a quaint mannerism. His bronzes are executed with great delicacy.

AMMERGAU. See OBER-AMMERGAU and MYSTERIES.

AMMIA'NUS MARCELLI'NUS, a Roman historian of the 4th c., was present in several campaigns in Gaul, Germany, and the east, and afterwards lived at Rome, devoted to literature. Though a Greek by birth, he wrote in Latin a history of the Roman empire from 91 to 378 A. D., in 31 books, of which 13, containing the years from 91 to 352, are lost. This work, which commenced with the accession of Nerva, may be regarded as a continuation of Tacitus, and though the portions remaining have many faults of style, they are valuable on account of the author's love of truth, his careful descriptions of countries, and events from personal observation, and especially his remarks on Germany. After his time, Latin ceased to be employed by any Roman writer in the composition of secular history. The best edition of A. M. is that by Wagner and Erfurdt, in 3 vols. (Leip. 1808.)

AMMON, an Egyptian deity, styled Amun on hieroglyphic monuments, was compared by the Greeks with their supreme deity Zeus. The sacred name of Thebes, A.'s city ('*No-Ammon*' in the Old Testament), was therefore translated into Greek by Diospolis. In the temples of this town, his peculiar residence, A. is represented as sitting on a throne, holding the symbols of life and power, and wearing a crown with a peculiar ornament of two feathers, and a band falling behind and hanging down to his feet. He was especially the god of Thebes; though his temples are found in other places, as at Meroë, and over the whole of Nubia and Libya. The name Amun signifies the hidden, unrevealed deity, and, in Egyptian mythology, he held the highest place. His undefined character may serve to explain how other deities were identified with A. After the eighteenth dynasty, we find in hieroglyphics the name Amun-Ra frequently inscribed, indicating a blending of A. with the sun-god RA. Similarly, the representation of A. with a ram's head shows the blending of him with Kneph. The worship of A. spread at an early period to Greece, and afterwards to Rome, where he was identified with Zeus and Jupiter. Temples for his worship were erected in Thebes (Bœotia), Sparta, Megalopolis, and other places.

AMMON CHRIS. FRED., a German theologian, born January 16, 1766, died May 21, 1850, is chiefly known by his work on the *Development of Christianity as a Universal Religion* (4 vols., Leip. 1833—1840), in which he argues in favor of such liberal development of doctrine as may keep theology in harmony with the progress of science. A. was a leader of the Rationalist school. He was a man of extensive learning, united with great industry and earnestness, and was generally respected in Saxony, where he resided.—His second son, FREDERICK AUGUSTUS A. (born 1799, died 1861), is well known in Germany as the writer of several works on practical medicine and surgery.

AMMO'NIA, Hartshorn, or the Volatile Alkali, was one of the few substances known to the chemistry of the ancients; being referred to by Pliny under the name of *vehement odor*, which he evolved by mixing lime with nitrum (probably sal ammoniac). It derives its name A. from its being obtained from sal ammoniac, which was first procured by heating camels' dung in Libya, near the temple of Jupiter Ammon. The atmosphere contains a

minute quantity of A., amounting to 210—237 parts in 10,000,000,000 parts of air, which is equal to 1 volume of A. in 28,000,000 of air. It is likewise present in rain-water in variable proportion. The supply of A. to the atmosphere is its evolution during the putrefaction of animal and vegetable substances, during the vinous fermentation, and the combustion of coal. It is likewise present in respired air, and is therefore a product of the daily wear and tear of the animal system. The principal source of A. at the present time is the destructive distillation of coal, as in gas-making.

The materials which pass over from the retort are partly uncondensable and truly gaseous, and these are carried to our gas-jets, and burned; but in other parts they are condensable, and are received during the purification of the gas, as a mixed tarry and watery liquid. On allowing this liquid to settle, the water portion, contalning A., can be separated, and hydrochloric acid being added to it, there is formed a compound of A. and hydrochloric acid, called chloride of ammonium, which can be obtained dry, by evaporating the solution down in shallow vessels. Pure A. is manufactured from this impure chloride of ammonium by mixing it with its own weight of slaked lime in a retort, and applying a gentle heat, when the A. as a gas passes over, and is received in a vessel containing water. The solubility of A. in water is very great, 1 volume of water dissolving 670 volumes of ammoniacal gas, increasing in bulk, and forming a liquid (*liquor ammoniæ* of the chemist, and hartshorn of the shops), which is lighter than water, its density being 875. The solution of A. is transparent, colorless, and strongly alkaline. In taste it is acrid caustic, and in odor very pungent. Applied to the skin in a concentrated form, it blisters. Exposed to the air, the A. escapes, and the solution thus gets weaker, and, reduced to —40° F., it freezes. As generally obtained, even in the gaseous condition, it is in combination with the elements of 1 atom of water, and contains 1 of nitrogen, 4 hydrogen, and 1 oxygen (NH_4O). Dry A. can be procured by passing the vapor of A., as ordinarily obtained, over fused chloride of calcium, when the water is abstracted, and true gaseous A. is left, having the composition 1 nitrogen, and 3 hydrogen (NH_3). Gaseous A. can be liquefied under pressure and cold, and then yields a colorless, clear mobile liquid, with the characteristic odor and other properties of A. much intensified. A. combines with acids to form a class of salts which are of considerable importance. Thus the crystallized sulphate of A. (HO,NH_4OSO_3) is very extensively used as a top-dressing by farmers, and is also mixed with manure when an increase of ammoniacal matter is desirable. The chloride of ammonium is also employed in agriculture; likewise largely by the Russian peasantry, as a condiment for flavoring food in place of common salt.

In medicine, the gaseous A. has been rarely used. The solution of A. is employed as a means of rousing the respiratory and vascular systems; and of the speedy alleviation of spasm. It is also used as a local irritant and antacid. It is serviceable in dyspeptic complaints with paternatural acidity of stomach and flatulence; to produce local irritation or destruction of certain parts, and to render comparatively harmless the bites of poisonous animals, such as serpents and insects.

AMMONIUM is a hypothetical metal, which is said to consist of 1 volume of nitrogen with 4 of hydrogen. It has never been produced in an isolated state; but a singular amalgam of A. and mercury may be formed, by subjecting a globule of mercury, surrounded by a little water of ammonia, to the action of the galvanic current: when the galvanic agency ceases, this amalgam is decomposed into mercury, ammonia and water. A. may likewise be prepared by acting on an amalgam of sodium and mercury with a solution of chloride of A. A portion of mercury is slightly heated in a porcelain vessel, and pieces of sodium introduced, when the sodium and mercury combine, and form an amalgam of sodium and mercury, which is a semi-solid substance, and scarcely occupies more space than the bulk of the mercury employed. If this be introduced into a vessel containing a strong or saturated solution of chloride of A. (NH_4Cl), the chlorine combines with the sodium (Na) of the amalgam, forming chloride of sodium (NaCl), and the A. unites with the mercury, forming the amalgam of A. and mercury. As the change referred to proceeds, the amalgam increases in size many times, and forms a spongy mass of the consistence of butter, which rises through the saline solution and floats on the surface. The amalgam of A. and mercury very readily decomposes, and hence the difficulty of determining its exact composition.

AMMONI'ACUM, or AMMO'NIAC, a gum resin, used in medicine on account of its stimulant and discutient qualities, is obtained from *Dorema A.*, a plant of the natural order *Umbelliferæ*, a native of Persia—a perennial, about seven feet high, with large doubly pinnate leaves. The leaves are about two feet long. The whole plant is abundantly pervaded by a milky juice, which oozes out upon the slightest puncture, and which hardens, and becomes A. The A. exudes from punctures made by an insect, which appears in great numbers at the time when the plant has attained perfection. Much of it is sent to India, and it is generally imported into Britain from Bombay, although sometimes from the Levant. It occurs in commerce either in tears, or in masses formed of them, but mixed with impurities. It is whitish, becoming yellow by exposure to the atmosphere, is softened by the heat of the hand, and has a peculiar heavy unpleasant smell, and a nauseous taste, at first mucilaginous and bitter, afterwards acrid. It is not fusible, but burns with white crepitating flame, little smoke, and strong smell.—It was for some time erroneously supposed to be the produce of a species of *Heracleum*, the seeds of which were found enclosed in it.—A similar substance is obtained from *Ferula Tingitana*, an umbelliferous plant, growing on light sandy soils in the north of Africa; and is said also to be obtained from *F. Orientalis*, a native of Asia Minor and of Greece. Both these plants have branched stems, and very compound leaves, somewhat resembling fennel. It would seem that the A. of the ancients was the gum resin of the Ferula, which has a more faint odor and less powerful medicinal properties than that of the Dorema.

A'MMONITES, a Semitic race of people, living on the edge of the Syrian Desert; the descendants of Ben-ammi, the son of Lot (Gen. xix. 38). They inhabited the country lying to the north of Moab, between the rivers Arnon and Jabbok, i. e. the desert country east of Gad. Their chief city was Rabbath-Ammon, to which the Greeks afterwards gave the name of Philadelphia. The Israelites were often at war with them and their other Bedouin confederates. Jephthah defeated them with great slaughter. They were also overcome by Saul, David, Uzziah, and Jotham; but after the fall of the kingdom of Israel (720 B.C.), spread themselves in the districts of Judæa on the east of the Jordan. In 582 they were subdued by the Babylonians. After the captivity, they recommenced their feuds with the Jews, but were conquered by Judas Maccabæus. The intermarriages of Jews with the A., which had been frequent, were prohibited by Nehemiah. The chief deity worshiped by the A. was named Milcom, who in his character seems to have resembled Moloch. Justin Martyr affirms that in his time the A. were still numerous.

AMMONI'TES, a genus of fossil shells, nearly allied to the recent genus *Nautilus*, being, like it, chambered and spiral. The molluscous inhabitant, appears to have lodged in the last and largest chamber of the shell, the spaces left behind as it increased in size

Ammonites:
1. Ammonites obtusus; 2. Section of Ammonites obtusus, showing the interior chambers and siphuncle; 3. Ammonites nodosus.

being successively converted into air-chambers, and all connected by a tube (*siphuncle*), so that the animal could at pleasure ascend or descend in the sea; while the transverse plates dividing the chambers gave strength to the whole structure without great increase of weight. A. have long been popularly called *Cornua Ammonis*, from a fancied resemblance to the horns on sculptured heads of Jupiter Ammon. They are found throughout the entire series of fossiliferous rocks from the transition strata to the chalk. They abound in the cretaceous and oolitic groups. Particular kinds distinguish particular formations, a circumstance which renders them of particular interest and importance to the geologist. The number of species is very great, considerably above two hundred; and several genera have been constituted, as *Baculites*, *Hamites*, *Scaphites*, *Turrilites*, forming with *Ammonites*, the family of *Ammonitidæ*. A. are of very different sizes, from a very small size, to two, or even three or four feet in diameter. The larger ones were in former times ignorantly mistaken for petrified snakes; and impositions have been practised upon collectors by adding to specimens nicely carved snakes' heads; whilst the general absence of the heads was popularly accounted for by a legend of a saint decapitating the snakes, and turning them into stone.

AMMO'NIUM, now known as the oasis of Siwah, in the Libyan Desert, was in ancient times celebrated on account of the oracle of Ammon, the unfortunate expedition of Cambyses, and the subsequent journeys of Alexander the Great and Cato. Besides the temple of Jupiter, placed in the center of a grove of palms, the ruins of which still exist, and which contained an image of the god, composed of smaragdus and other gems, A. was remarkable for the palace of its ancient kings, surrounded by a triple wall, in the very heart of the oasis, and for its 'Well of the Sun,' of which the waters were coldest at noonday, and warmest at midnight. Here

the Emperor Justinian built a Christian church. The length of the oasis is 15 miles, by 12 broad; it is about 150 miles distant from the Mediterranean, and is situated in lat. 29° N., and in long. 26° E

AMMO'NIUS SACCAS, a Greek philosopher, founder of the Neoplatonic School, is said to have been in his earlier days a porter in Alexandria. His parents were Christian, but he himself is said to have abandoned his early religion, in which he had been instructed by Clemens Alexandrinus, and to have devoted himself to the study of heathen philosophy under Athenagoras; although both Eusebius and St. Jerome deny that he ever formally apostatized from the Christian faith. His great endeavor was to harmonize, through a comprehensive electicism, the various philosophical theories which prevailed in the Roman world, especially those of Aristotle and Plato. He also labored to amalgamate with these the doctrines of the Magi and Brahmans; but instead of boldly announcing the result as his own, he claimed for his system the highest antiquity. His most distinguished pupils were Longinus, Herennius, Origen, and Plotinus, the last of whom, by far the most subtle and profound of the Neoplatonists, always expressed the highest respect for his master. A. died at Alexandria, 241 A.D. He left no writings behind him.

A. is the name of several learned men in the latter periods of Greek history; such as A., the master of Plutarch, who lived during the reign of the Emperor Adrian, and, like A. Saccas, taught a species of electicism in philosophy; A., the Christian philosopher of the 3d c., who wrote a *Harmony of the Gospels*; A., son of Hermeas, a Peripatetic philosopher of the 5th c., and disciple of Proclus; A., the famous surgeon of Alexandria, who lived in the time of Ptolemy Philadelphus; and A., the Grammarian, who was at first high-priest in an Egyptian temple, sacred to the god Apis, and afterwards (389 A.D.) became teacher at Constantinople, where he had the church historian Socrates for his pupil.

AMMO'PHILA, a genus of Grasses, closely allied to Arundo (see REED), and distinguished by a spike-like panicle, and by the *glumes* being nearly equal, keeled, longer than the *paleæ* of the single floret, and surrounded at the base by a tuft of hairs.—*A. arundinacea*, formerly called *Arundo arenaria*—a grass about 2—3 feet high, with rigid bluish leaves, the edges of which are rolled in, and very creeping roots—is frequent on the sandy sea-shores of Britain and the continent of Europe. It is sometimes called SEA REED or SAND REED, and sometimes MATT GRASS, the culms being wrought into foot-mats, coverings for stairs, &c., in the manufacture of which many families residing along the coast of Ireland are employed most of the year. It is also called *Marum*, *Marrum*, or *Marram*, by which name it is designated in laws both English and Scottish, by which the destruction of it was prohibited under severe penalties, because of its great utility in fixing the shifting sand. In Holland and in Norfolk, it is extensively employed—along with the Sea LYME GRASS (q. v.)—in preserving the banks of sand which prevent the inroads of the sea. It is of little value as food for cattle, although they eat the very young leaves. The fibre has been used instead of flax, but is too short.

AMMUNI'TION. Sometimes this name is given to cannon and mortars, as well as to the projectiles and explosive substances employed with them; but more usually A. is considered to apply to the latter—such as shot, shell, gunpowder, cartridges, fuses, wads, grenades. Muskets, swords, bayonets, and other small-arms are sometimes, but improperly, included under this term. The Royal Laboratory at Woolwich is the place where A. is chiefly prepared for the British army and navy. The cannon-balls may be cast at some of the great iron-foundries in the north; the shells may be cast or forged in the shell-factory at Woolwich; the muskets may be made at Birmingham, and the rifles at Enfield; the bullets at the shot-factories; the gunpowder at Waltham-Abbey—and so on; but the 'making up' of the A. is mostly conducted at the establishment above mentioned. Bags of serge, in enormous number, are cut out and made, and filled to form the cartridges for large ordnance. Bags or tubes of paper are made and filled to constitute blank cartridges for small-arms; while the ball-cartridges are enclosed in thin copper cylinders. The tubes and combustibles for war-rockets and fuses are also manufactured. The cartridges for small-arms (rifles, muskets, carbines, and pistols) are made in millions; since it is on those that the main offensive operations of an army depend. It has been calculated by the Woolwich authorities, that a British army of 60,000 men, comprising a fair average of infantry, cavalry, artillery, and engineers, ought to be provided with no less than 18,000,000 ball-cartridges for small-arms, for six months' operations. These would require 1000 A. wagons, and 3600 horses, to convey them all at once. It is therefore deemed better that, under any such circumstances, there should be established *entrepôts* for supplying the troops from time to time. The wagons constructed for this kind of service will carry 20,000 rounds of small-arm A. each; the cartridges are packed in boxes, and the wagons are drawn by four horses each. Several wagons are organized into an 'equipment,' under the charge of a detachment of artillery; and there are several such equipments for an army of the magnitude above mentioned—one for each division of infantry, a small portion for the cavalry, and the rest in reserve. It has been laid down that an army of 60,000 men ought to have 2,680,000 cartridges *with them*, besides those in reserve; and that the conveyance of such a quantity, with a few forges and stores, would require 150 A. wagons, 830 men, and 704 horses. The equipment would return to the entrepôt for a new supply when needed. In the Peninsular War, and at Waterloo, the English used two-horse carts, carrying about 10,000 rounds of small-arm A. each; but a superior kind of wagon has been since introduced. In the field an infantry soldier usually carries about 60 rounds, put in compartments in his pouch. When the word A. is used in connection with artillery matters, the 'fixed' A. comprises the loaded shells, cartridges, and carcasses; whereas the 'unfixed' are the unfilled case-shot, grape-shot, and shell. During peace, the Woolwich Laboratory serves out little less than a million lbs. of gunpowder annually, in A. for the army and navy, for purposes of exercising, saluting, &c.

The chief kinds of A. will be found briefly described under their proper headings.

A'MNESTY signifies an act of pardon or oblivion, and the effect of it is, that the crimes and offences against the state, specified in the act, are so obliterated that they can never again be charged against the guilty parties. The A. may be either absolute, or qualified with exceptions. Instances of the latter are to be found in ancient and modern history: thus, Thrasybulus, when he overthrew the oligarchy in Athens, caused an A. to be proclaimed, from the operation of which the Thirty Tyrants, who had formed the oligarchy, and some few persons who had acted under them, were excluded. Again, Bonaparte, on his return from Elba in 1815, issued a decree, which was published at Lyon, declaring an A., from the benefits of which he excepted thirteen persons whom he named. And in our own country, the historical reader will be able to recall the act of indemnity passed upon the restoration of Charles II., by which the persons actually concerned in his father's execution, were, as a class, excluded from the A. See AMNESTY in AM. SUPP.

A'MNION is the membrane which immediately invests the embryo, appearing very early in the development of the latter, and adhering closely to it. As gestation proceeds, this membrane secretes from its inner surface a fluid which separates it from the fœtus. This fluid, the liquor amnii, consists of water, with albumen, salt of soda, and extractive matters in solution; it has a specific gravity of 1008. It supplies nutriment to the fœtus, preserves around it an agreeable temperature, and when gestation is completed, by projecting the membrane through the os uteri, is the primary agent in opening the way for the fœtus. At this time, the A. is thin and transparent, slightly flocculent on the side next its enveloping membrane, the chorion, but smooth on the surface next the fœtus. Within it, the latter is suspended in the fluid which not only serves the purposes just mentioned, but protects it from injury. For further particulars, see EMBRYO, and for many curious superstitions connected with the subject, see CAUL.

AMŒBA is the name of the lowest class of Infusoria (q. v.). The animal is a jelly-like mass, without definite shape, nearly uniform in texture, but having a pulsating vesicle. The A. feeds by closing around its prey, enfolding it in its own substance, and then digesting it, any undigested portion being finally protruded. See PROTEUS.

AMO'L, a town of Persia, in the province of Mazanderan, on the Heraz, a river which flows into the Caspian Sea; 76 miles north-east from Teheran. The town is unwalled, but has good bazaars, and is a place of considerable prosperity and wealth. The river, which is powerful and rapid, is crossed by a bridge of twelve arches. Extensive ruins indicate the former importance of Amol. Its most notable building is the mausoleum of Seyed Quam-u-deen, king of Sari and Amol, who died in 1378. In the suburbs are a grand palace, which once belonged to Shah Abbas, and three towers, said to have been temples of the ancient Guebres, or fire-worshipers. The inhabitants of A. cultivate rice and cotton, or are employed in the iron forges and cannon-foundries of the district. The pop. in winter, when greatest, is estimated at 35,000 or 40,000; in summer, many of the inhabitants retire to summer residences in the mountains, which approach within about five or six miles of the town on the south.

AMO'MUM, a genus of plants of the natural order *Scitamineæ* (q. v.) or *Zingiberaceæ* distinguished by perennial stems; the flowers in close heads resembling cones. It contains a number of species, natives of tropical countries (chiefly in the East), of which several yield CARDAMOMS (q.v.), and several GRAINS OF PARADISE (q.v.). The genus A. formerly included species now forming the genus *Zingiber* (see GINGER), &c.

AMOO'R, or AMUR, a river formed by the junction (about

lat. 53° N., and long. 120° E.) of the Shilka and the Argoun, which both come from the south-west—the former rising in Russian Siberia, near the head-waters of the Yenisei; and the latter in Chinese Tatary, not far from the sandy plateau of Kobi. From this starting-post, the A. presents, on its right, a tolerably symmetrical curve, which, after receiving, at its most southerly point, the Songari from beyond the Wall of China, besides other considerable feeders on both sides of either segment, enters, on nearly its original parallel, the Gulf of Saghalien, about a degree below the Sea of Okhotsk, properly so called, great additions have been made to our knowledge of this large and important river within the last few years. It has been ascertained that its basin comprehends about 766,000 square miles, and that its course has a length of about 2500 miles. Steamboats of light draught ascend it as high as Ust Strelka, at the junction of the Shilka; and that river is navigable for boats to the foot of the Yablonoi range in Eastern Siberia, part of which lies in the basin of the A. The Russians, after conquering Siberia in the 16th c., turned their attention immediately to the advantages which the possession of this river offered. The territory and the people had always been in the possession of China—the people sometimes tributaries, at other times conquerors. From as early as 1636, Russian adventurers made excursions into the Chinese territories of the Lower A. In 1666, they built a fort at Albazin, and succeeded in navigating from that fort to the mouth of the river. In 1685, the fort was taken and destroyed by the Chinese, but was retaken promptly by the Russians, who, however, abandoned it and the whole of the A. to the Chinese. But Russian writers did not cease to keep alive in the minds of their fellow-subjects that the lower A. belonged to them; and the fur-hunters of Siberia, encouraged by government, continued to pursue their vocation on Chinese ground. In 1854–1856, two military expeditions were conducted by Count Muravieff, who twice descended the A. from the mouth of the Shilka, unopposed by the Chinese. This was during the Crimean war. On the arrival of news of peace, the Russians were left to strengthen their positions at the mouth and other parts of the A. In 1857, Count Putiatin endeavored in vain to obtain from China concessions on the river in favor of Russia. In 1858, the war between the former country and Great Britain and France induced China to agree to the treaty of Tientsin, by which the boundaries of Russia and China were defined. Several towns were, as the result, estalished by the former of these two powers on the left bank of the A., of which the largest are Khabarooka and Sofyensk; and an A. trading company was established.

In 1860, after the occupation of Pekin by the British and French, in less than a month after Lord Elgin and Baron Gros had affixed their signatures to the peace conventions at Pekin, General Ignatieff secured the signature of Prince Kung to a treaty, by which Russia acquired the broad and wide territory comprised between the river A. and the mouth of the Tumên, extending ten degrees of latitude nearer the temperate regions, and running from the shore of the North Pacific eastward to the banks of the river Usuri, a principal affluent of the A. An enormous advantage to Russia of this acquisition of territory was the fact, that it conferred on that country the advantage of harbors on the Pacific in a comparatively temperate latitude, where navigation is impeded by ice for at most three or four months a year. The bay of Passiett, to the south of this region, lying at a point where the Russian, Chinese, and Corean frontiers adjoin each other, possesses a large trading town and a military station. Sixty or seventy miles north is situated the important harbor of Vladivostok ('Rule of the East'), or Port May, which, in 1872, was placed in telegraphic communication with Europe by the China submarine cable, and is now the capital of the Amoor provinces. The island of Saghalien (q. v.), lying immediately north of the Japan group, along a portion of the coast of Asiatic Russia, and formerly possessed partly by that government and partly by Japan, was recently taken entire possession of by the unscrupulous aggressive power which has so stealthily and silently acquired the adjacent A. provinces.

A'MORITES, a powerful nation of Canaan, extending on both sides of the Jordan. They were vanquished by the Hebrews under Moses, and their lands beyond the Jordan were distributed among the tribes of Gad, Reuben, and Manasseh. Their two most famous kings were Sihon, king of Heshbon, and Og, king of Bashan. Og was the last of the giants, or at least of that gigantic race, the Rephaim. In Duet. iii. 11, his iron bedstead is mentioned as measuring 13½ feet in length; but the whole of this verse, with the exception of the first clause, is considered by some an interpolation. The Rabbins hold this bedstead to have been Og's cradle, and affirm that his full-grown stature was 120 feet! Joshua subdued, but did not wholly exterminate, the Amorites in Canaan. The residue of this people became tributary under Solomon. (Gen. x. 15–20; xv. 19–21; Numb. xiii. 29; xxi. 13; Deut. xx. 16; xii. 31; Joshua, ix.)

AMORO'SO, in Music, affectionately, tenderly.

AMO'RPHA. See INDIGO.

AMORPHOPHALLUS. See ARUM.

AMO'RPHOUS (Gr., *a*, priv., *morphe*, form), shapeless. In chemistry, the term A. is used to describe the uncrystallized, in opposition to the crystallized, condition of bodies. There are substances which, in certain conditions, are capable of crystallization, but in other conditions remain A. Thus, pure sugar contains carbon, which appears as an A. substance after the sugar has been burned in a platina crucible. The same substance, carbon, appears in its crystallized form in the diamond.

A'MOS, the Hebrew prophet, was a herdsman of Tekoa, in the neighborhood of Bethlehem, and also a dresser of sycamore trees. During the reigns of Uzziah in Judah, Jeroboam in Israel (about 784 B.C.), he came forward to denounce the idolatry then prevalent. His prophetical writings contain, in the first six chapters, denunciations of the Divine displeasure against several states, particularly that of Israel, on account of the worship of idols. The three remaining chapters contain his symbolical visions of the approaching overthrow of the kingdom of Israel, and lastly, a promise of restoration. The style of A., remarkable for its clearness and picturesque vigor, abounds with images taken from rural and pastoral life. The canonicity of the book of Amos is well attested both by Jewish and Christian authorities.

AMOY', a seaport town of China, in a small island of the same name, in the province of Fu-kien, on the sea-coast, lat. 24° 10′ N., long. 118° E. It is an important commercial emporium of the East, and contains a population estimated at 250,000. It is divided into an outer and inner town, and has an outer and inner harbor, the entrance to the former of which, as well as the inner town itself, is fortified. A. has been celebrated as a trading town for more than a thousand years, and was one of the earliest seats of European commerce in China. The Portuguese had establishments here in the 16th. and the Dutch in the 17th centuries. In 1841, it was taken by the British; by the treaty of Nanking, a British consul and British subjects were permitted to reside there. The trade is now open to all nations. The chief imports are rice, cotton-twist, British long cloths, beans, peas, &c.; the exports are tea, sugar, paper, grass-cloths, gold-leaf, &c. In 1877, the value of the imports was £1,104,200; the exports being £953,000. About 1000 vessels, exclusive of Chinese junks, entered and cleared the port. Smuggling is carried on extensively. A. was pillaged by the Tae-ping rebels.

AMPERE, ANDRÉ MARIE, a distinguished mathematician and naturalist, was born at Lyon, January 20, 1775. The death of his father, who fell under the guillotine in 1793, made a deep and melancholy impression on the mind of young A., who sought for solace in the study of nature and antiquity. In 1805, after he had been engaged for some time as private mathematical tutor at Lyon, he was called to Paris, where he distinguished himself as an able teacher in the Polytechnic School, and began his career as an author by his essay on the Mathematical Theory of Chances (*Sur la Théorie Mathématique du Jeu*). In 1814, he was elected as a member of the Academy of Sciences; and in 1824, was appointed as Professor of Experimental Physics in the Collége de France. He died June 10, 1836. Scientific progress is largely indebted to A., especially for his electro-dynamic theory and his original views of the identity of electricity and magnetism, as given in his *Recueil d'Observations Electro-dynamiques* (Paris 1822), and his *Théorie des Phénomènes Electro-dynamiques* (Paris, 1830). These researches prepared the way for the experiments of Dr. Faraday. Several of A.'s writings may be found in the *Annales de Physique et de Chimie*.

AMPERE, JEAN JACQUES ANTOINE, son of the above named, Professor of Modern Literature in the College de France, at Paris, and member of the French Academy, was born at Lyon, August 12, 1800. He acquired a brilliant reputation, on account of the keen and searching character of his manifold literary efforts. After laying the ground-work of his comprehensive studies in Paris, he proceeded to Italy, Germany, and Scandinavia. In 1829, when he returned from his travels, he saw no prospect of becoming a professor in Paris, and so consented to give a course of lectures on the history of literature at Marseille. After the July revolution, he succeeded Andrieux as professor in the Collége de France, and also took the place of Villemain in the Normal School. In both chairs he taught with great success. He was especially versed in the knowledge of German literature; while his valuable writings upon China, Persia, India, Egypt, and Nubia, as well as his Levantine voyages, proved that the far east itself was embraced within the circle of his studies. A. allowed many of his linguistic and historico-literary investigations to see the light first in reviews, especially the *Revue des Deux Mondes*. In 1833 he published an essay on the relations of French literature to that of other countries in the middle ages; in 1841, an *Essay on the Formation of the French Language*—a most valuable contribution to philology in general; and in 1850, a work entitled *Greece, Rome, and Dante*, which shows his acquaintance with classical and south-European

literature. Many of his papers for periodicals have been collected under the title *Littérature et Voyages* (2 vols., Paris, 1834). Deep research and judicious criticism, expressed in a clear and classical style, distinguished his various compositions. He died March 27, 1864.

AMPHI'BIA, in the Linnæan system of zoology, a class containing Reptiles and Cartilaginous Fishes. The term *amphibious* (Gr., having a double life) had been previously employed, as it still popularly is, to denote animals capable of sustaining existence for a considerable time either on dry land or in water. Of the animals of the Linnæan class, however, some only are capable of this, whilst some are strictly limited to the one element, and some to the other, and only a very few are truly amphibious, or adapted by the possession of lungs and gills at the same time for breathing either in air or in water. The Linnæan classification was soon altered by the removal of the Cartilaginous Fishes from the class Amphibia, and the name was retained for a class consisting of Reptiles alone—the *Reptilia* of Cuvier. See REPTILES. Some recent naturalists have divided this into two classes, *Reptilia* and *Amphibia*, the former having lungs only, the latter having both lungs and gills; the former including the Chelonian, Saurian, and Ophidian Reptiles; the latter only the Batrachian Reptiles, or the former order Batrachia. It must be admitted that these differ from the other orders more than than they do from each other. For the position of the A. in a still more recent classification of the Vertebrates, see the table in the article ZOOLOGY. In this work, the A. in the narrower sense are discussed at BATRACHIA.

AMPHIC'TYONIC COUNCIL. This central politico-religious court of several Grecian tribes, was held twice a year. In spring, the members assembled in the Temple of Apollo, at Delphi; in autumn, in the Temple of Ceres, at the village of Anthela, near Thermopylæ. Their purpose was twofold: 1. To determine questions of international law; 2. To preserve the religious institutions of the Greeks. As there were many amphictyonies in the early days of Greek history—of which, however, by far the most important was that which forms the subject of our article—it has generally been supposed that they originated out of a desire for social union, and were, consequently, a result of the national instinct for civilization. Like the Olympic games of a later period, their tendency was to develop a spirit of brotherhood where it was greatly required. The restless Greek intellect, in its application to political life, had naturally an excessive and perilous love of individualism, out of which rose the numerous strifes and animosities of the various states. These councils, on the other hand, were calculated to exert a wholesome centralizing influence. They knit together, for a time, the distracted tribes in a bond of common interest and piety. Like the Olympic games, too, they became the occasion of vast gatherings of the Greek peoples, who crowded thither for every variety of purpose, sacred and secular; and thus a feeling of unity and pure national patriotism was, temporarily at least, excited in the popular mind. The special origin of the A. C. or league is unknown, though we know that it was composed of twelve tribes. The ancient writers differ in the names of these; but the list given by the orator Æschines, though containing only eleven, is perhaps the safest to adhere to: the Thessalians, Bœotians, Dorians, Ionians, Perrhæbians, Magnetes, Locrians, Œtæans, Phthiots, Manlians, and Phocians. Probably the remaining tribe was the Dolopians, who are mentioned in other accounts. It has been justly concluded that the great preponderance of the northern tribes, who were of the old Pelasgic race, proves the antiquity of the Council. It must have been older than the descent of the Dorians upon the Peloponnesus, or the emigration of the Ionians to the coasts of Asia Minor. Each of the twelve tribes sent to the A. C. two members,. These twenty-four representatives possessed equal authority, although some of the tribes were very small, and hardly independent. They bound themselves by an oath that 'they would destroy no city of the Amphictyons, nor cut off their streams in war or peace; and if any should do so, they would march against him and destroy his cities; and should any pillage the property of the god, or be privy to, or plan anything against what was in his temple at Delphi, they would take vengeance on him with hand, and foot, and voice, and all their might' (Æschines). It is only right to state, what indeed most people would naturally conclude for themselves, that so excellent an oath was very indifferently kept. In the primitive period of Greek history, it, in all likelihood, exerted the beneficial and civilizing influence of which we have spoken; but it opposed only a feeble check to the passions and ambition of a more powerful age. The members at times connived and even took part in many political crimes, and thus violated their oath. By the time of Demosthenes, the A. C. had ceased to command respect; in the 2d c. after Christ, it still existed, but was then on the verge of extinction.

AMPHIOXUS. See LANCELET.

AMPHI'POLIS, a city of Macedonia, built on an island at the mouth of the river Strymon, which flowed almost round the town, whence it derived its name (Gr. *amphi*, around, and *polis*, a city). In ancient times its position must have been invaluable, as it commanded the only safe entrance from the Strymonic Gulf into the broad Macedonian plains. It belonged originally to the Edonians, a Thracian people, and was called, on account of the roads which met here, Ennea Hodoi (Nine Ways). The first who attempted to colonize it, Aristagoras of Miletus, was cut off with his followers by the Edonians. The Athenians next tried to gain possession of it. Their first army, amounting to 10,000 men, was utterly cut to pieces at Drabescus, 465 B.C., but their second, 437 B.C., under Agnon, son of Nicias, was successful. The Thracians were expelled, and a new city built, to which Agnon gave the name of A. On account of its situation as an emporium for Upper Thrace, and of its neighboring forests of timber for ship-building, A. was an important place. In 424 B.C., it was taken from the Athenians by the Spartan Brasidas, was restored to Athens by the Antalcidean treaty of peace, and afterwards was taken by Philip of Macedon. Under the Romans, it was made the capital of East Macedonia. In the middle ages, it was called Popolia. Its site is now occupied by a Turkish town, but a few of its ruins are still visible.

AMPHITHE'ATER, a spacious building, generally elliptical in form, used by the Romans for exhibiting gladiatorial combats, fights of wild beasts, and other spectacles. The A. differed from a theater for dramatic performances (*theatrum*) in this, that where-

Colosseum.

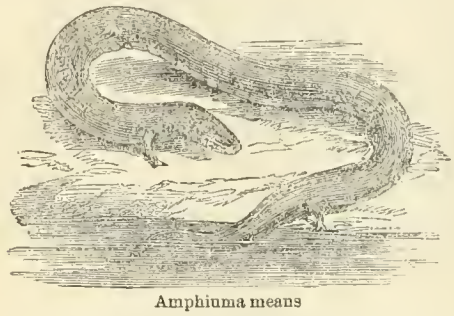
as the theater had only a semicircle of seats fronting the stage, the A. was entirely surrounded by them; and hence the name of Amphitheater (Gr. *amphi*, 'on both sides' or 'all round'). Till a late period at Rome, these erections were of wood, and merely temporary, like a modern race-stand. They seem, however, to have been of enormous size, as Tacitus mentions one, during the reign of Tiberius, which gave way, and caused the death or injury of 50,000 spectators. Amphitheaters of stone had begun, however, to be erected at an earlier period than this, the first having been built at the desire of Augustus. The Flavian A. at Rome, known as the Colosseum, which was begun by Vespasian, and finished by Titus 80 A.D., ten years after the destruction of Jerusalem, was probably the largest structure of the kind, and is fortunately also the best preserved. It covers about five acres of ground, and was capable of containing 87,000 persons.

Its greatest length is 620 feet, and its greatest breadth 513. On the occasion of its dedication by Titus, 5000 wild beasts were slain in the arena, the games having lasted for nearly 100 days. The exterior is about 160 feet in height, and consists of three rows of columns, Doric, Ionic, and Corinthian, and, above all, a row of Corinthian pilasters. Between the columns there are arches, which form open galleries throughout the whole building; and between each alternate pilaster of the upper tier there is a window. There were four tiers or stories of seats, corresponding to the four external stories. The first of these is supposed to have contained twenty-four rows of seats; and the second, sixteen. These were separated by a lofty wall from the third story, which is supposed to have contained the populace. The *podium* was a kind of covered gallery surrounding the arena, in which the emperor, the senators, and vestal virgins had their seats. The building was covered by a temporary awning or wooden roof called *velarium*, the mode of adjusting and fastening which has given rise to many antiquarian conjectures. The open space in the center of the A. was called *arena*, the Latin word for sand, because it was covered with sand or saw-dust during the performances. The taste for the excitement of the A. which existed at Rome, naturally spread to the provinces, and large amphitheaters were erected not only in the provincial towns of Italy, as at Capua, Verona, Pompeii, &c.,

but at Arles and Nismes, in France; and even in this country, at Cirencester, Silchester, and Dorchester.

AMPHITRI'TÉ, the daughter of the sea-god Nereus and of Doris—or, according to Apollodorus, of a daughter of Oceanus—was the wife of Neptune. When the latter demanded her in marriage, she fled to Mount Atlas, but was discovered by a dolphin, which Neptune had sent for her, and borne back to him. As goddess and queen of the sea, she is represented with her husband's trident in her hand, sitting in a car of shells drawn by Tritons, or on a dolphin, before which a Cupid swims.

AMPHIU'MA, a curious genus of *Batrachia*, having an eel-like



Amphiuma means

form, a large head, thick and extensile lips, depressed and rounded snout; the neck contracted, with a transverse fold at the throat; numerous small teeth on the maxillary and palate bones, a single spiracle on each side of the neck; four legs, all very small and two-toed. *A. means* is found in the southern and south-western parts of the United States. It attains a length of more than two feet, and is of a bluish-black color. It lives in muddy water or in mud, burrowing like a worm in the ditches of rice-fields, and feeds on small fish, molluscs, and insects. It is regarded by the negroes as highly venomous, but there is no reason for the notion.

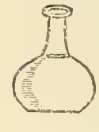
A'MPHORA, among the Greeks and Romans, was a large vessel, usually made of clay, shaped like our pitchers, with a narrow neck and two handles (hence the name, from Gr. *amphi*, on both sides, and *phero*, to carry), and often ending in a sharp point below, for being inserted in a stand or in the ground. Several of this sort, and in an upright position, were found in the cellars at Pompeii. The A. was chiefly used for the preservation of various liquids, especially wine, the age of which was marked on tickets affixed to the vessel. There is also evidence that amphoræ were employed as cinerary urns and as coffins. The A. among the ancients was likewise a measure for liquids. In Greece, it contained about 9 English gallons. The Roman amphora was only two-thirds of the Greek A. In modern times, *Anfora* is the name of a wine-measure in Venice.

Amphora.

AMPLIFICA'TION, i. e., enlargment, a term in Rhetoric, meaning that an idea, an opinion, or an inference is presented to the mind, accompanied by accessory circumstances. Its aim is to produce a powerful and vivid impression through the instrumentality of epithets, particulars, or other methods of elaboration. Rhetorical A. is generally produced—1st, by similitude; 2d, by contrast; 3d, by illustrating the universal in the particular; 4th, by piling up logical arguments. *Exaggeration* is an illegitimate kind of A; being the result of an undue enlargement of particular facts and circumstances.

A'MPLITUDE, in Astronomy, is the distance of a heavenly body, at the time of its rising or setting, from the east or west point of the horizon. When the sun is in the equator (i. e., at the time of either equinox), he rises exactly east, and sets exactly west, and therefore has no A. His A. is at its maximum at midsummer, and again at mid-winter; and that maximum depends upon the latitude of the place, being 23½° at the equator, and increasing to the Aretic Circle, where it becomes 90°. The A. of a fixed star remains constant all the year round.

AMPULLA was a kind of bottle, used by the Romans for the preservation of liquids. It was made either of earthenware or glass, and sometimes, though very rarely, of more costly materials. Great numbers of such vesssels have found their way into collections of antiquities. They are generally 'bellied,' i. e., approaching to globular, narrowing towards the mouth, and provided with two handles. They are frequently mentioned in connection with the baths of ancient times. The *A. olearia* was a 'bottle of oil' which the Roman took with him when he went to the bath, and with which he anointed himself after his ablutions. Sometimes the oils were perfumed.



Ampullæ.

The *A. Remensis* (the holy vessel, Fr. *la sainte ampoule*) was the name of that famous vessel in which was contained the unguent (believed to have been brought by a dove from heaven) that anointed Clovis, king of the Franks, at Rheims in 496 A.D., and with which every succeeding monarch of France, down to Louis XVI., was anointed at his coronation. The A. Remensis was shattered, along with a great many more valuable things, at the revolution of 1789; but a fragment of it was preserved by some devout royalist, and handed over at the Restoration to the Archbishop of Rheims. Curious to say, a little of the miraculous substance still remained, which was mixed up with oil, and used to anoint Charles X. in 1825.

AMPUTA'TION (Lat. *amputo*, I lop or prune) is the cutting off of a part which, by its diseased condition, endangers, or may endanger, the safety of the whole body. The A. of a limb was in ancient times attended with great danger of the patient's dying during its performance, as surgeons had no efficient means of restraining the bleeding. They rarely ventured to remove a large portion of a limb, and when they did so, they cut in the gangrened parts, where they knew the vessels would not bleed; the smaller limbs they chopped off with a mallet and chisel; and in both cases had hot irons at hand with which to sear the raw surfaces, boiling oil in which to dip the stump, and various resins, mosses, and fungi, supposed to possess the power of arresting hæmorrhage. Some tightly bandaged the limbs they wished to remove, so that they mortified and dropped off; and others amputated with red-hot knives, or knives made of wood or horn dipped in vitriol. The desired power of controlling the hæmorrhage was obtained by the invention of the tourniquet (q. v.) in 1674 by a French surgeon Morell. The ancient surgeons endeavored to save a covering of skin for the stump, by having the skin drawn upwards by an assistant, previously to using the knife. In 1679, Lowdham of Exeter suggested cutting semi-circular flaps on one or both sides of a limb, so as to preserve a fleshy cushion to cover the end of the bone. Both these methods are now in use, and are known as the 'circular' and the 'flap' operations: the latter is most frequently used in this country.

A 'flap' amputation is performed thus: The patient being placed in the most convenient position, an assistant compresses the main artery of the limb with his thumb, or a tourniquet is adjusted over it. Another assistant supports the limb. The surgeon with one hand lifts the tissues from the bone, and transfixing them with a long narrow knife, cuts rapidly downwards and towards the surface of the skin, forming a flap; he then repeats this on the other side of the limb. An assistant now draws up these flaps, and the knife is carried round the bone, dividing any flesh still adhering to it. The surgeon now saws the bone. He then, with a small forceps, seizes the end of the main artery, and drawing it slightly from the tissues, an assistant ties it with a thread. All the vessels being secured the flaps are stitched together with a needle and thread, and a piece of wet lint is laid over the wound. An expert surgeon can remove a limb thus in from 30 to 60 seconds.

AMRITSI'R (*Umritsar*), a city of the Punjab, in N. lat. 31° 40', and E. long. 74° 45', containing (1881) 151,896 inhabitants. It is the religious metropolis, a distinction which, along with its name, it owes to its 'pool of immortality,' on an islet of which stands the chief temple of the Sikh faith. A. is a favorite haunt of pilgrims; and it was the place where, perhaps to bind the slippery Sikhs more firmly, was signed the treaty of 1846, for ceding to the British the territory between the Beas and the Sutlej. A. is, next to Delhi, the richest and most prosperous city in Northern India, being connected with the capital, distant 36 miles to the west, by a canal, possessing considerable manufactures of cotton, silks, shawls, &c., and carrying on considerable trade. A. is on the Scinde, Punjab, and Delhi Railway; and is the capital of a district of 2036 sq. m., with a pop. (1868) of 1,083,514, and of a division with an area of 5347 sq. m., and a pop. of 2,743,880, both the same name.

AMSLER, SAMUEL, professor of the art of engraving on copper, in the Academy of Arts, Munich, was born December 17, 1791, at Schinznach in Switzerland, received his first lessons from Lips of Zurich, and afterwards studied under Hess, in Munich. His first great work was an engraving from a Magdalen by Carlo Dolce. In 1816, he went to Rome, where, in several engravings of statues by Thorwaldsen, he succeeded well in uniting the characteristics of the originals with the simple style of Marcus Antonio. Aided by Barth and Hildburghausen, he engraved a title-page for the *Lay of the Nibelungen*, from a design by Cornelius. During his second sojourn in Rome (1820—1824), he began his great work, an engraving of 'Alexander's Triumphal Procession,' by Thorwaldsen. At Munich, in 1831, he finished his large plate of the 'Burial of Christ,' by Raphael, which, with his engraving of a statue of Christ, by Dannecker, displayed the highest qualities of imitative art. These works were followed by a 'Holy Family,' from Raphael, and the 'Madonna di Casa Tempi.' His last great work was an engraving from Overbeck's 'Triumph of Religion in Arts.' A. died May 18, 1849. His style is marked by a clear and noble

treatment of form, rather than by strong contrast of tones. Few engravers have equalled A. in his deep knowledge and faithful representation of the works of Raphael.

A'MSTERDAM, or AMSTELDAM (the dam or dike of the Amstel), the chief city of the Netherlands, is situated at the confluence of the Amstel with the Ij (pronounced Eye), an arm of the Zuiderzee, and is divided by the former, and numerous canals, into small islands, connected by about 300 bridges. Almost the whole city, which extends in the shape of a crescent, is founded on piles. At the beginning of the 13th c., it was merely a fishing-village, with a small castle, the residence of the Lords of Amstel. In 1296, on account of the murder of Count Floris of Holland, the rising town was demolished, and its inhabitants were compelled to leave it. Afterwards, with Amstelland (the district on the banks of the Amstel), it was taken under the protection of the Counts of Holland, and under them enjoyed several privileges which contributed to its subsequent prosperity. In 1482, it was walled and fortified. It soon rose to be the first commercial place in the united states of the Netherlands; in 1585 was considerably enlarged by the building of the new town on the west; and in 1622 had 100,000 inhabitants. This prosperity excited the envy of its neighbors. In the 17th c., the war with England so far reduced the commerce of A., that, in the year 1653, about 4000 houses were uninhabited. Prosperity was restored during the next century, and, though commerce was again injured by the disputes with England in 1781 and 1782, it once more revived. The union of Holland with France in 1810 entirely destroyed the foreign trade of A., while the excise and other new regulations impoverished its inland resources; but the old firms lived through the time of difficulty, and in 1815 commerce again began to expand.

The city has a fine appearance, when seen from the harbor, or from the high bridge over the Amstel. Numerous church towers and spires relieve the flatness of the prospect. The old ramparts have been levelled, planted with trees, and formed into promenades. Between 1866 and 1876, many spacious streets and an extensive public park were added to the city. Tramways have been successfully introduced, and the harbor greatly improved. There is railway communication with all parts of the country and of Europe. Rich grassy meadows surround the city. On the west side are a great number of windmills for grinding corn and sawing wood. The three principal canals in A., on each side of which, with a carriage-way and row of trees intervening, the gentlemen's residences are built, run in semicircles within each other, and are from 2 to 3 miles long, called the Heerengracht, Keizer's-gracht, and Princengracht. The houses are built of brick, and have their gables towards the streets, which gives them a picturesque appearance. In old times, A. was strongly fortified; but now its only defence consists in the sluices, several miles distant from the city, which can flood, in a few hours, the surrounding land. A hard frost, however, like that of 1794–95, when Pichegru invaded the country, would render this means of defence useless.

The pop. 31st Dec. 1879, amounted to 317,011, the majority belonging to the Dutch Reformed Church. Of the remainder, the most numerous are the Roman Catholics, the Lutherans, Jews, and Baptists. The chief industrial establishments are sugar refineries, engineering works, mills for polishing diamonds and other precious stones, dockyards, manufactories of sails, ropes, tobacco, silks, gold and silver plate and jewellery, colors and chemical preparations, breweries, distilleries, with export houses for corn and colonial produce; cotton-spinning, book-printing, and type-founding are also carried on. Income of the city (1875), £496,929; expenditure, £450,127; debt, £3,518,526. The ships which cleared in were 1020; out 1040. The former Stadhuis, converted into a palace for King Louis Bonaparte, and still retained by the reigning family, is a noble structure raised upon 13,659 piles, and extending 290 feet in length, by 239 feet in breadth, surmounted by a round tower, rising 190 feet from the base. It has a hall, 120 feet long, 57 feet wide, and 90 feet high, lined with white Italian marble—an apartment of great splendor.

The *Nieuwe Kerk* (New Church), founded in 1408, is the finest ecclesiastical structure in the city. Its chancel is especially admired. It contains the tombs of Admiral de Ruyter, of the famous Dutch poet Vondel, and of various other notable persons. The Old Church (*Oude Kerk*), built in the 14th c., contains several monuments of naval heroes. Literature and science are represented by a university supported by the municipality (till recently known as the *Athenæum illustre*), by an Academy of Arts and Sciences, an excellent Museum of paintings, a library, harmonic societies, a botanical and a zoological garden, and several theaters. The hospital for aged people, the poor-house, house of correction, the orphan asylums, a navigation school, and many benevolent societies, are well supported, and managed on good principles. Large ships reach the city by the North Holland Canal (52 miles in length) from Nieuwe Diep, but, if drawing more than 15½ feet of water, must first discharge a large part of the cargo. To avoid this delay and expense, the Ij has been separated from the Zuider Zee by a sea-dike, with sluices for admitting the small inland ships, and pumping-machinery capable of discharging 2500 cubic metres of water per minute. Two piers have been built into the North Sea, near Wijk aan Zee, to form a harbor. The peninsula has been cut by a canal which is continued through the Ij, and capable of admitting vessels drawing 22 feet direct to A., reducing also the distance from 52 to 15 miles, the length of the new canal. In carrying out these works, about 12,000 acres of excellent land have been reclaimed from the Ij, and in 1876 a large tract was already bearing fine crops.

AMSTERDAM, a barren islet in lat. 37° 52′ S., and long. 77° 37′ E., the home of sea-birds, shell-fish, and seals. It is worthy, however, of notice at once for its structure and its situation. Manifestly of volcanic origin, it still possesses a burning soil and hot springs; and along with its single neighbor, St. Paul, 60 miles to the north-east, it is about midway in the direct line between the Cape of Good Hope and Van Diemen's Land, being also at nearly the same distance from Cape Comorin.

A'MULET, any object worn as a charm. It is often a stone, or piece of metal, with an inscription or some figures engraved on it, and is generally suspended from the neck, and worn as a preservative against sickness, witchcraft, &c. Its, origin, like its name, seems to be oriental. The ancient Egyptians had their amulets, sometimes forming necklaces. Among the Greeks, such a protective charm was styled *phylacterion;* among the Romans, *amulctum*. This word is probably derived from the Arabic *hamalet* ('what is suspended'). The phylacteries of the Jews (see Matthew, xxiii. 5), slips of parchment on which passages of the Law were written, were evidently worn as badges of piety by the Pharisees; but were also regarded as wholesome preservatives from evil spirits, and from all manner of harm. From the heathen, the use of amulets passed into the Christian Church, the inscription on them being *ichthus* (the Greek word for a fish), because it contained the initials of the Greek words for Jesus Christ, Son of God, Saviour. See ABBREVIATIONS. Among the Gnostic sects, Abraxas stones (q. v.) were much used. Amulets soon became so common among Christians that, in the 4th c., the clergy were interdicted from making and selling them on pain of deprivation of holy orders; and in 721, the wearing of amulets was solemnly condemned by the Church. Among the Turks and many other nations of Central Asia, every person considers it necessary to wear a preservative charm. With the spread of Arabian astronomy, the astrological A. or talisman (q. v.) of the Arabs found its way to Europe. Kopp, a German author, has written a work, *Palæographica Critica*, on amulets and their inscriptions. Among amulets in repute in the middle ages were the coins attributed to St. Helena, the mother of Constantine. These and other coins marked with a cross were thought specially efficacious against epilepsy, and are generally found perforated, for the purpose of being worn suspended from the neck.—The belief in the virtue of the amulets is not extinct among the vulgar.

Egyptian Amulet.

AMURNA'TH, a cave amidst the mountains which bound Cashmere on the north-east. It is a natural cave in a rock of gypsum, about 100 yards wide, 30 high, and 500 deep. It is believed by the Hindus to be the residence of the god Siva, and is therefore visited by multitudes of pilgrims. It is inhabited by vast numbers of doves, which fly out in alarm on the loud shouting of prayers by the pilgrims, and this is supposed to indicate the acceptance of their prayers.

AMY'CLÆ, an old Laconian town, was situated on the eastern bank of the Eurotas, 20 stadia south-east of Sparta, in a richly wooded and fertile region. It was a famous city in the heroic age, the abode of Tyndarus and his spouse Leda, who bore to Jupiter the twins, Castor and Pollux (called *Amyclæi Fratres*, the Amyclæan brothers), and also Helena. Long after the Dorians had subjugated and peopled the rest of the Peloponnesus, A. continued to be a free Achæan town. It was conquered by the Spartans only before the first Messenian War, and in consequence of a curious and absurd law. The inhabitants were so often agitated by false rumors of the approach of the Spartans, that, growing tired of living in a state of continual alarm, they decreed that no one should henceforth mention or even take notice of these disagreeable fictions. Unfortunately, the Spartan *did* come at length, and according to the Greek saying, 'A. perished through silence.' Hence the proverb, *Amyclis ipsis, taciturnior* (More silent than A. itself). After its conquest, A. became a village, noted only for its annual festival of the Hyacinthia, and its temple of Apollo, with the colossal statue of the god himself.—A., an ancient city on the coast of Campania, Italy, said to have been built by a colony from the Greek A. It had ceased to exist in the time of Pliny.

AMYGDA'LEÆ, or DRUPACEÆ, according to some botanists, a natural order of dicotyledonous plants, but more generally regarded as a sub-order of ROSACEÆ. The species are all trees or shrubs. They have the tube of the calyx lined with a disk, the pistil a solitary simple carpel with a terminal style, the fruit a drupe. For other botanical characters, see ROSACEÆ. The bark yields gum, and hydrocyanic acid is present in very notable quantity in different parts, as the leaves, kernels, &c. The A. are chiefly natives of the cold and temperate regions of the northern hemisphere. Some of them yield valuable fruits; and various products of the order are used in medicine. See ALMOND, PEACH, NECTARINE, PLUM, CHERRY, and CHERRY LAUREL. This order or sub-order contains about 110 known species.

AMY'GDALIN ($C_{40}H_{27}NO_{22},6HO$) is a crystalline principle existing in the kernel of bitter almonds the leaves of the *Cerasus lauro-Cerasus*, and various other plants, which, by distillation, yield hydrocyanic acid. It is obtained, by extraction with boiling alcohol, from the paste or cake of bitter almonds, which remain after the fixed oil has been separated by pressure. The alcoholic solution usually contains more or less oil, which must be removed by decantation or filtration; it must then be evaporated till a syrup is left, which must be diluted with water, mixed with yeast, and set aside to ferment, in order to get rid of any sugar that may be present: on now filtering and evaporating, the amygdalin crystallizes in thin transparent needle-like prisms. It has a sweetish somewhat bitter taste, and is not poisonous, and when treated with alkaline solvents, ammonia is expelled, and amygdalic acid, $HO,C_{40}H_{20}O_{24}$, is produced. Its most remarkable change is, however, that which is noticed in the article ALMONDS, VOLATILE OIL OF, and which may be thus briefly stated. When the bruised almond kernel, or almond paste, is brought in contact with water, the peculiar odor of bitter almonds is almost immediately evolved; and in twenty-four hours, all traces of amygdalin will have disappeared, its place being taken by essential oil of almonds, hydrocanic acid, sugar, and formic acid. This transformation is due to the presence of a peculiar nitrogenous matter called Emulsin (q. v.), or synaptase, which sets up a kind of fermentation. As the proportion of hydrocyanic acid which is liberated by the above reaction is fixed, Liebig and Wöhler recommend that amygdalin should be employed in preparing that acid for medicinal purposes. Amygdalin may be dissolved in water for any length of time without undergoing change; but if it be mixed with an emulsion of sweet almonds, immediate discomposition ensues. Seventeen grains of amygdalin, when dissolved in an ounce of emulsion of sweet almonds, furnish exactly one grain of pure hydrocyanic acid, which may be readily diluted to the strength of the Pharmacopœial acid.

AMY'GDALOID (from *amygdalus*, an almond), a rock, consisting of a basis of some kind of trap rock, very frequently of greenstone, forming numerous roundish or oval cells, which are filled with nodules, often of calcareous spar or of zeolitic minerals. The cells are not of large size, but even those which are almost adjacent differ much in this respect. The nodules are evidently the result of a sublimation and imperfect crystallization, under the action of the heat which formed the cells. Empty cells often occur amongst those which are filled with minerals. The name A. is sometimes extended to rocks of the same character, although the basis be not of trap.

A'MYL ($C_{10}H_{11}$) is the fifth in the series of alcohol radicals whose general formula is $C_{2n}H_{2n+1}$, and of which methyl and ethyl are the first two members. It is obtained by heating amyl-iodide with an amalgam of zinc in a closed tube at a temperature of about 350°, and is one of the natural products of the distillation of coal. It is a colorless liquid, with a spec. grav. of 32°, a boiling-point of 311°, and a somewhat aromatic odor, and it exerts a right-handed rotatory action on a ray of polarized light. It enters into a large number of chemical compounds, most of which—as, for instance, bromide, chloride, iodide, &c.—are derived from amylic alcohol, which bears precisely the same relation to amyl that ordinary alcohol bears to ethyl (C_4H_5). Amylic alcohol is sufficiently described in the article FUSEL OIL, which is the name given to the crude alcohol. It seems invariably to accompany ordinary alcohol when the latter is prepared by fermentation, and apparently occurs in largest quantity in those liquids which remain most alkaline during fermentation.

AMYLA'CEOUS (from *amylum*, starch), a term used in Chemistry and Botany, and equivalent to starchy. *A. food* is food consisting at least in great part of some kind of starch, as arrow-root, sago, &c.—A compound radical, called *amyle*, is formed by the decomposition of starch in a peculiar fermentation—the *amylic fermentation*—but to it the term A. has no reference.

AMYLIC ALCOHOL. See FUSEL OIL.

AMYOT, or AMIOT, JACQUES, a French writer, well known by his excellent translations of the Greek classics, was born in 1513, and died in 1593. Racine highly esteemed the translations by A., of which the version of Plutarch is one of the best, and has passed through several editions.—AMIOT, Joseph, a celebrated Jesuit and oriental scholar, was born at Toulon in 1718, and lived as a missionary in China from 1750 to the time of his death, in 1794. His knowledge of the Chinese and Tatar languages enabled him to collect many valuable notices of antiquities, history, language, and arts, in China. Many of his writings may be found in the *Mémoires concernants l'Histoire, les Sciences et les Arts des Chinois* (15 vols. Paris, 1776—1791). His *Dictionnaire Tatar-Mantchou-Français* was edited by Langlès in 1789.

AMYRIDA'CEÆ, a natural order of dicotyledonous or exogenous plants, consisting of trees and shrubs, natives of tropical countries, remarkable for the abundance of their fragrant balsamic or resinous juice. They have compound leaves, occasionally with stipules and pellucid dots. The flowers are in racemes or panicles; the calyx persistent, with 2—5 divisions; the petals are 3—5; æstivation valvate or imbricated. The stamens are twice or four times as many as the petals. The ovary is superior, sessile, 1—5-celled, inserted in a large disk; the style solitary and compound, or wanting; the stigmas as many as the cells of the ovary; the ovules in pairs, anatropal. The fruit is hard and dry, 1—5-celled, its outer rind often splitting into valves. The seeds are exalbuminous. About forty or fifty species are referred to the order; but many of them are still very imperfectly known. Some species afford valuable timber; but the principal products of the order are fragrant resins and balsams, as MYRRH (q. v.), and different kinds of FRANKINCENSE (q. v.), OLIBANUM (q. v.), ELEMI (q. v.), BDELLIUM (q. v.), TACAMAHAC (q. v.), BALSAM OF GILEAD (q. v.), &c. Among the more important genera of the order may be named *Amyris*, *Balsamodendron*, *Boswellia*, and *Icica.—Canarium commune*, a native of Java, which yields a gum similar in its properties to the BALSAM OF COPAIVA (q. v.), produces also triangular nuts, which are eaten both raw and dressed, and from which an oil is extracted for the table and for burning. *Balanites Egyptiaca* is cultivated in Egypt for its fruit, a drupe, which is eaten, and from the seeds of which a fat oil is expressed, called *Zachun*.

A'NA, a termination added to the name of remarkable men, to designate collections of their sayings, anecdotes, &c.; as in the works entitled *Baconiana*, *Johnsoniana*. Such titles were first used in France, where they became common after the publication of *Scaligerana* by the brothers Dupuy (Hague, 1666). In English literature, there are many works of this kind. America, also, has its *Washingtoniana*. A tolerably complete catalogue of works with such titles may be found in Namur's *Bibliographie des Ouvrages publiés sous le Nom d'Ana* (Brussels, 1839).

ANABA'PTISTS, a term applied generally to those Christians who reject infant baptism, and administer the rite only to adults; so that when a new member joins them, he or she is baptized a second time, the first being considered no baptism. The name (Gr. to baptize again) is thus owing to an accidental circumstance, and is disclaimed by the more recent opponents of infant baptism, both on the continent and in Great Britain.

The origin of the sect cannot be distinctly traced; but it is manifestly connected with the controversy about infant baptism carried on in the early church. Opposition to this doctrine was kept alive in the various so-called heretical sects that went by the general name of Cathari (i. e. purists), such as the Waldenses, Albigenses, &c. Shortly after the beginning of the Reformation, the opposition to infant baptism appeared anew, especially among a set of fanatical enthusiasts called the Prophets of Zwickau in Saxony, at whose head were Thomas Münzer (q. v.) (1520) and others. Münzer went to Waldshut, on the borders of Switzerland, which soon became a chief seat of anabaptism, and a center whence visionaries and fanatics spread over Switzerland. They pretended to new revelations, dreamed of the establishment of the kingdom of heaven on earth, and summoned princes to join them, on pain of losing their temporal power.

They rejected infant baptism, and taught that those who joined them must be baptized anew with the baptism of the Spirit; they also proclaimed the community of goods, and the equality of all Christians. These doctrines naturally fell in with and supported the 'Peasant War' (q. v.) that had about that time (1525) broken out from real causes of oppression. The sect spread rapidly through Westphalia, Holstein, and the Netherlands, in spite of the severest persecutions. The battle of Frankenhausen (see MUNZER) crushed their progress in Saxony and Franconia. Still, scattered adherents of the doctrines continued, and were again brought together in various places by traveling preachers. In this capacity, one Melchior Hoffmamm, a furrier of Swabia, distinguished himself, who appeared as a visionary preacher in Kiel in 1527, and in Emden in 1528. In the last town he installed a baker, John Matthiesen, of Haarlem, as bishop, and then went to Strasburg, where he died in prison. Matthiesen began to send out apostles of the new doctrine. Two of these went to Münster, where they found fanatical coadjutors in the Protestant minister Rothmann, and the burghers Knipperdolling and Krechting, and were shortly joined by the tailor Bockhold of Leyden, and Gerrit Kippenbrock

of Amsterdam, a bookbinder, and at last by Matthiesen himself. With their adherents, they soon made themselves masters of the city; Matthiesen set up as a prophet, and when he lost his life in a sally against the Bishop of Münster, who was besieging the town, Bockhold and Knipperdolling took his place. The churches were now destroyed, and twelve judges were appointed over the tribes, as among the Israelites; and Bockhold (1534) had himself crowned king of the 'New Sion,' under the name of John of Leyden. The anabaptist madness in Münster now went beyond all bounds. The city became the scene of the wildest licentiousness; until several Protestant princes, uniting with the bishop, took the city, and by executing the leaders, put an end to the new kingdom (1535).

But the principles disseminated by the A. were not so easily crushed. As early as 1533 the adherents of the sect had been driven from Emden, and taken refuge in the Netherlands; and in Amsterdam the doctrine took root and spread. Bockhold also had sent out apostles, some of whom had given up the wild fanaticism of their master; they let alone the community of goods and women, and taught the other doctrines of the A., and the establishment of a new kingdom of pure Christians. They grounded their doctrines chiefly on the Apocalypse. One of the most distinguished of this class was David Joris, a glass-painter of Delft (1501—1556). Joris united liberalism with anabaptism, devoted himself to mystic theology, and sought to effect a union of parties. He acquired many adherents, who studied his book of Miracles (*Wunderbuch*), which appeared at Deventer in 1542, and looked upon him as a sort of new Messiah. Being persecuted, he withdrew from his party, lived inoffensively at Basle, under the name of John of Bruges, and died there in the communion of the reformed church. It was only in 1559 that his heretical doctrines came to light, when the council of Basle had the bones of Joris dug up, and burned under the gallows.

The rude and fanatical period of the history of anabaptism closes with the scandal of Münster. A new era begins with Menno Simons. (See MENNO.) Surrounded by dangers, Menno succeeded, by prudent zeal, in collecting the scattered adherents of the sect, and in founding congregations in the Netherlands, and in various parts of Germany. He called the members of the community 'God's Congregation, poor, unarmed Christians, brothers;' later, they took the name of Mennonites, and at present they call themselves, in Germany, Taufgesinnte; in Holland, Doopsgezinden—corresponding very nearly to the English designation Baptists. This, besides being a more appropriate designation, avoids offensive association with the early Anabaptists. Menno expounded his principles in his *Fundamentbuche von dem rechten Christlichen Glauben*, 1556 (Elements of the True Christian Faith). This book is still an authority among the body, who lay particular stress on receiving the doctrines of the Scripture with simple faith, and acting strictly up to them, and set no value on learning and the scientific elaboration of doctrines. They reject the taking of oaths, war, every kind of revenge, divorce (except for adultery), infant baptism, and the undertaking of the office of magistrate; magistracy, they hold to be an institution necessary for the present, but foreign to the kingdom of Christ, the church is the community of the saints, which must be kept pure by strict discipline. With regard to grace, they profess universalism, or hold it to be designed for all, and their views of the Lord's Supper fall in with those of Zwingli; in its celebration, the rite of feet-washing is retained. In Germany, Switzerland, and Alsace, their form of worship differs little from the Lutheran. Their bishops, elders, and teachers serve gratis. Children receive their name at birth, baptism is performed in the place of worship, and adults that join the sect are rebaptized.

But along with these general principles, there have been endless diversities and splits in the sect, occasioned by differences as to strictness of discipline. This cause divided the body, as early as 1554, into the Mild and the Strict Mennonites. The first are known by the title of Waterländers, from a place in Holland; the second split again into a multitude of subdivisions, according to minute shades of strictness, and their several designations, derived from the names of leaders, places, and even peculiarities of dress (John-Jacob Christians, Buttoners, Hook-and-eye-ers, &c.), bewilder the student of ecclesiastical history. The purity of their lives, however, commanded everywhere respect, and their industry made them prosperous; so that they gradually secured formal toleration in many places.

Almost the only split among the early continental Baptists on doctrinal grounds was that which took place in Amsterdam in 1664. Arminianism had not been without its influence, especially among the Waterländers, originally more liberal in their views. A leading congregation accordingly divided into two parties, one (Galenists, from Galenus, their leader) advocating freer views in doctrine and discipline; the other (Apostoolists, from Samuel Apostool) adhering to absolute predestination and the discipline of Menno. The liberal party rejected creeds as of human invention, adopted much of the philosophy and theology of England, and exercised no little influence on the intellectual progress of Holland. These two parties gradually absorbed the other sections of the Baptists in the Netherlands; and about the beginning of the nineteenth century, a union took place by which all the congregations now belong to one body.

In Germany, the Baptists have made some attempts in more recent times to extend their church with considerable success. Under the Baptist Union of Germany (which, although including churches in Holland, Poland, and other countries, derives its strength largely from Prussia), there were, in 1872, 103 churches, with 19,393 members. In Prussia, various concessions had been made to the Baptists early in this century, such as exemption from military service. They were tolerated in Bavaria, Baden, Würtemberg, Mecklenburg, Russia, France, and Denmark; but were expelled from Sweden. Wherever they are settled, they are respected as quiet, industrious subjects; but several German governments have imposed restrictions on their exercise of public worship; the reason assigned being the tendency to visionary enthusiasm, which had again shown itself in some congregations.

As the representatives of the sect in Great Britain and North America have little or no historical connection with the earlier A. of the continent, they fall more properly to be noticed under BAPTISTS.

ANABA'SIDÆ, or LABYRINTHIBRANCHIDÆ, a family of Acanthopterygious Fishes, characterized by a remarkable structure of the upper membranes of the pharynx, which are divided into small irregular leaves, containing between them cellular reservoirs. These retain water sufficient to keep the gills moist for a considerable time, and so enable the fish to subsist out of water, and to travel some distance on dry ground; some of the species, as the Climbing Perch (q. v.) of India (*Anabas scandens*), climbing steep banks, or even trees, by means of the spines of the fins, tail, and gill-covers. *Ophicephalus marginatus* is often seen traveling among the grass in the beginning of the rainy season. The fishes of this family appear to leave the water for various reasons; but very commonly, it would appear, upon account of the drying up of pools in periodical droughts, their peculiar organization enabling them to go in search of others. They are all fresh-water fishes, natives of the south-east of Asia, continent and islands, and of South Africa. The species are numerous, and are arranged under eleven genera. Some of them are much esteemed for their delicacy as food.

ANA'BASIS (Greek), literally, an ascent or a march out of a lower into a higher country— the name of two historical works: 1. The *A. of Cyrus*, written by Xenophon, which gives a narrative of the unfortunate expedition of the Younger Cyrus against his brother, the Persian king Artaxerxes, and of the retreat of his 10,000 Greek allies under the command of Xenophon; 2. The *A. of Alexander*, written by Arrian, and giving an account of the campaigns of Alexander the Great.

A'NABLEPS (from the Gr. *anableps*, to look up), a genus of fishes of the order *Malacopterygii Abdominales*, family *Cyprinidæ* of Cuvier—of the family *Cyprinodontidæ* (q. v.) of Agassiz—characterized by a structure of the eyes to which there is nothing similar in any other vertebrated animals. This consists in a division of the *cornea* and *iris* into two somewhat unequal elliptical parts by transverse bands formed of the *conjunctiva* (see EYE), so that the animal appears to have four eyes, and there are really two pupils on each side, the other parts of the eye being single. This peculiarity of structure is supposed to be connected with a habit which these fishes are said to have of swimming with the eyes partly out of the water. They are elongated, scaly fishes, with flattish rounded back, and depressed head. The young are brought forth alive, and in a state of considerable advancement. The best known species, *A. tetropthalmus*, inhabits the rivers of Guiana and Surinam.

ANACARDIA'CEÆ (TEREBINTACEÆ of some botanists, and part of TEREBINTACLEÆ of others), a natural order of dicotyledonous or exogenous plants, consisting of trees and shrubs, which abound in a resinous, sometimes acrid and poisonous juice. The leaves are alternate and without dots; the flowers inconspicuous, usually unisexual. The calyx is generally small and persistent, and has generally five divisions; the petals are perigynous, equal in number to the segments of the calyx, imbricated in æstivation, occasionally wanting. The stamens are equal in number to the petals and alternate with them, or twice as many, or more; distinct when there is a fleshy disk, cohering at the base when the disk is wanting. The ovary is usually single, free or adhering to the calyx, 1-celled; the styles 1, 3, or 4, occasionally wanting; the ovule solitary, attached to the bottom of the cell by a cord. The fruit is usually a drupe, the seed exalbuminous. The order contains about 95 known species, chiefly but not exclusively tropical, among which are a considerable number valuable for the resinous juices and varnishes which they yield, as the varnish of Sylhet, varnish of Martaban, Japan lacker, &c., and others, which produce wholesome and pleasant fruits. See CASHEW NUT, PISTACIA, MASTIC, TURPENTINE TREE, MANGO, HOG PLUM.

ANACA'RDIUM. See CASHEW NUT.

ANA'CHARIS, a genus of plants of the natural order *Hydrocharideæ* (q. v.), of which a species, *A. alsinastrum* (*Elodea Canadensis* of some botanists), has recently become naturalized in Britain, suddenly appearing in so great abundance as to impede the navigation of some rivers and canals. It is a native of North America, growing in ponds and slow streams; and is a dark-green, much-branched perennial, entirely floating under water, its flowers only appearing above water for a very short time at the period of fertilization, as in others of the order to which it belongs. It has numerous leaves, which are either opposite, or in whorls of three or four, without foot-stalks, linear-oblong, transparent, 3—4 lines long. The female flowers are sessile in the upper axils, and are enclosed in a small 2-lobed spathe; the slender tube of the perianth is often two or three inches long, so as to attain the surface of the water, where it terminates in three or six small spreading segments. The male flowers are seldom observed. The plant was first found in Britain in 1842, by the late Dr. Johnston of Berwick, in the lake of Dunse Castle; and again in 1847 by Miss Kirby, in the reservoirs of a canal in Leicestershire. It is now very abundant and troublesome in the Trent, Derwent, and other rivers. Its rapidity of growth is extraordinary.

Anacharis Alsinastrum.

Immense masses disfigure the shallows of the Trent, and cover the beds of the deeps. It strikes its shoots under the mud in a lateral direction for six inches or a foot, and then rises and spreads. The stems are very brittle, and every fragment is capable of growing, so that the means usually adopted to get quit of it serve rather for its propagation. It appears, however, that water-fowl are very fond of it; and by them, probably, its seeds may be conveyed from one river to another. It has been found that swans may be fed upon it with advantage, and its excessive growth kept down more effectually in this way than in any other. It is supposed to be a great impediment to the progress of salmon ascending the rivers in which it occurs; but for some kinds of fish, it probably affords both food and shelter. The manner of its introduction into Britain is unknown, although it has been conjectured that it may have escaped from some garden-pond—a conjecture the more doubtful, from the distance between the localities in which it was first found; but its rapid increase is of great scientific interest, in connection with the important subject of the distribution of species. As being calculated to block up water-courses, the plant involves some serious economic considerations.

ANACHA'RSIS, a Scythian and brother of King Saulios, visited Athens in the time of Solon, with whom he lived on terms of intimacy, but whose abilities for framing a constitution he does not seem to have estimated highly. Incited by a love of learning, he subsequently traveled through several countries. On account of his clearness of understanding, he was numbered among the seven wise men; and many sagacious proverbs and sayings were ascribed to him. No other 'barbarian' ever received the Athenian franchise. The letters which bear his name were written long after his time. It is said that, after his return to his native land, he was put to death by order of the king, who feared the introduction of the mysteries belonging to the Greek religion, in which it was supposed that A. had been initiated.

Under the title, *Voyage du Jeune Anacharsis en Gréce* (Travels of the young Anacharsis in Greece), Jean Jacques Barthélemy, a well-known French author (q. v.), wrote a description of Greek life and manners, displaying learning and good taste, but disfigured by many anachronisms. A. is made to visit Athens only a few years before the birth of Alexander the Great, and the features of several distinct periods in Grecian history are confusedly regarded as having been contemporaneous. The book, therefore, will not bear a critical examination; but it has contributed its share towards an improved knowledge of ancient life, and has given rise to several similar works, such as the *Gallus* and *Charicles* of Becker. The A. of Barthélemy has been translated into English, and is to be found in most old libraries; it is still a deservedly esteemed work, which may be read with advantage by the young.

ANA'CHRONISM, an error in chronology. Sometimes an A. is purposely made for the sake of effect, or to bring certain events within convenient compass for dramatic purposes. Shakspeare, in his *Julius Cæsar*, makes the '*clock*' strike three; and Schiller, in his *Piccolomini*, speaks of a 'lightning-conductor' as existing about 150 years before the date of its invention. These discrepancies, however, do not seriously injure the general truth of a poetical work. The A. is more offensive when, in a work which pedantically adheres to the costumes and other external features of old times, we find a modern style of thought and language, as in the old French dramas of Corneille and Racine. In popular epic poetry, A. is a common feature. Achilles is always young; Helena always beautiful. In their versions of old classic traditions, the writers of the middle ages converted Alexander, Æneas, and other ancient heroes, into good Christian knights of the 12th c. In the *Nibelungen-lied*, Attila and Theodoric are good friends and allies, though the latter began to reign some 40 years after the former. At the end of the poem, the heroine, who must have been nearly sixty years old, is still 'the beautiful Queen Kriemhild.'—Many ludicrous examples of A. may be found in oil paintings—e.g., Abraham, Isaac, and Jacob in modern costumes.

ANACONDA. See Boa, Python.

ANA'CREON, one of the most esteemed lyric poets of Greece, was born at Teos, a seaport of Ionia, spent part of his youth in Abdera, to which place most of his fellow-townsmen emigrated when the city was taken by the Persians in 540 B.C., and rose to fame as a poet about 530 B.C. He was patronized by Polycrates, the ruler of Samos, who invited him to his court; and there he sang, in light and flowing strains, the praise of wine and beauty. After the death of Polycrates, he went to Athens (521 B.C.), and was received with distinguished honor by Hipparchus. On the fall of Hipparchus, he left Athens, and probably returned to Teos, from which, during the insurrection of Ionia against Darius, he fled to Abdera, where he died, at the age of 85. According to tradition, he was choked by a dried grape. Great honors were paid to him after his death; Teos put his likeness upon its coins, and a statue was raised to him on the Acropolis of Athens, which represented him in a state of vinous hilarity.

Only a few of his poems have been preserved. Of five Books which once existed, only 68 lyrics now exist which bear his name; but of these, comparatively few are to be confidently regarded as genuine. They exhibit great simplicity and delicacy of expression, fertility of invention, and variety of illustration. Moore, a poet of congenial spirit, translated the *Odes* of A. into English verse.

ANACY'CLUS. See Pellitory of Spain.

ANADYO'MENE ('emerging'), one of the names of Venus; a painting by Apelles, representing Venus rising from the sea, and wringing her flowing wet hair. Phryne or Pancaste was supposed to have supplied the model for this masterpiece of Apelles. The inhabitants of the island of Cos bought the picture, and placed it in the temple of Æsculapius. Augustus afterward bought it for 100 talents of remitted taxes, and placed it in the temple of Venus Genetrix. It is frequently described in the Greek anthology.

ANÆ'MIA (from *a*, privative, and *aima*, blood) is the condition generally termed poverty of blood, and consists essentially of a diminution in the fibrine, and especially in the proportion of red corpuscles of the blood (see Blood), which in some cases of A. may be so low as 27 in 1000 parts. Persons in an anæmic condition have pale waxy complexions, pallid lips and tongues, and if blood be drawn from them, it forms a clot which is less red, and also smaller in proportion to the serum, than blood from a healthy person.

They suffer from palpitations, fainting, and headaches, singing in the ears, and disturbed vision; and the symptoms may simulate organic disease within the head or of the heart. This A. condition may be induced by repeated losses of blood, or by defective nutrition, or by some cause, as in chlorosis, when the balance is disturbed between the loss and reproduction of the red corpuscles.

The curative treatment of A. consists in allowing the patient fresh air, good nourishment, and those materials which promote the formation of the deficient elements of the vital fluid. Of these, the principal is iron, of which there are several preparations. This remedy has, in some instances of chlorosis, doubled the proportion of red blood corpuscles in a very short time.

ANÆSTHE'SIA (*a* privative, and *aisthesis*, sensation) is a term used to express a loss of sensibility to external impressions, which may involve a part or the whole surface of the body. In some diseased conditions of the nervous centers, a part of the body may become totally insensible to pain, while in another part, sensation may be unnaturally acute, or be in a state of hyperæsthesia. When a nerve is divided, there is no feeling of touch or pain referred to the parts which it supplies, because these are cut off from communication with the brain; and in some diseases, as the *elephantiasis græcorum*, a loss of sensation in patches of the skin is an early and characteristic symptom. This insensibility to external impressions may be either *peripheral*—that is, on the surface of the body—or *central*, that is, from a cause acting primarily upon the brain or spinal cord.

In ancient writers, we read of insensibility or indifference to pain being obtained by means of Indian hemp (*Cannabis Indica*), either inhaled or taken into the stomach. The Chinese, more

than 1500 years ago, used a preparation of hemp, or *ma-yo*, to annul pain. The Greeks and Romans used mandragora for a similar purpose (*poiein anaisthesian*); and as late as the 13th c., the vapor from a sponge filled with mandragora, opium, and other sedatives was used. The mandragora, however, occasionally induced convulsions, with other alarming symptoms; and though Bulleyn, an English author (1579), mentions the possibility of putting patients who were to be cut for the stone into 'a trance or a deepe terrible dreame' by its use, it gradually became obsolete and banished from the pharmacopœia. John Baptista Porta, of Naples, in his work on Natural Magic (1597), speaks of a quintessence extracted from medicines by somniferous *menstrua*. This was kept in leaden vessels, perfectly closed, lest the *aura* should escape, for the medicine would vanish away. 'When it is used, the cover being removed, it is applied to the nostrils of the sleeper, who draws in the most subtile power of the vapor by smelling, and so blocks up the fortress of the senses, that he is plunged into the most profound sleep, and cannot be roused without the greatest effort. . . . These things are plain to the skilful physician, but unintelligible to the wicked.' In 1784, Dr. Moore, of London, used compression on the nerves of a limb requiring amputation, but this method was in itself productive of much pain. In 1800, Sir Humphrey Davy, experimenting with the nitrous oxide or laughing-gas, suggested its usefulness as an anæsthetic; and in 1828, Dr. Hickman suggested carbonic acid gas. As early as 1795, Dr. Pearson had used the vapor of sulphuric ether for the relief of spasmodic affections of the respiration. The fact that the sulphuric ether could produce insensibility was shown by the American physicians, Godwin (1822), Mitchell (1832), Jackson (1833), Wood and Bache (1834); but it was first used to prevent the pain of an operation in 1846, by Dr. Morton, a dentist of Boston. The news of his success reached England on 17th December 1846; on the 19th, Mr. Robinson, a dentist, and Mr. Liston, the eminent surgeon, operated on patients rendered insensible by the inhalation of sulphuric ether. This material was extensively used for a year, when Sir J. Y. Simpson, of Edinburgh, discovered the anæsthetic powers of *Chloroform* (see CHLOROFORM), and introduced the use of it into his own department, midwifery. Since that time, chloroform has been the anæsthetic in general use in Europe, but ether is preferred in America. It is now the opinion of most medical men, that chloroform should not be given where there is a weak action of the heart from disease. Other substances have been used by inhalation, such as nitric ether, and bichloride of methylene. The latter substance has not been generally accepted, as it depresses to a dangerous extent after it has been administered for some time. See the article METHYLENE.

Nothing could be more desirable than the power of producing *local* A. Freezing mixtures have been employed; a stream of carbonic acid or cooled air, or a finely divided spray of ether, have been thrown on the part. All of these methods have the disadvantage that they injure the tissues, and may be followed by much pain. An agent which would benumb the sensory nerves, without injuring them or the neighboring parts, is still a great want. Recently, in dentistry, the inhalation of nitrous oxide has been much employed. It is rapid in action, and is not usually followed by unpleasant effects; but as it induces a condition of the blood similar to that in asphyxia, its use is not unattended with danger. Chloroform continues to occupy its high place as one of the greatest blessings granted to man. It is proper, however, to say that it requires to be used under certain precautions, and that in unskilful hands its application may be fatal.

See *On Chloroform and other Anæsthetics*, by John Snow (Lond. 1858); *The Obstetric Memoirs and Contributions* of James Y. Simpson (Edin. 1855).

ANAGALLIS. See PIMPERNEL.

ANA'GNI (anc. *Anagnia*), a town of Central Italy, 37 miles east-south-east from Rome. It stands on a hill in the midst of a fertile district, and although an ill-built town, is the residence of many noble families. It is the seat of a bishop. There are some remains of ancient buildings. The ancient *Anagnia* was the chief city of the Hernici. It was a place of importance during the whole period of Roman history, and Virgil mentions it as the 'wealthy Anagnia.' Pop. 6000.

A'NAGRAM (from the Greek *ana*, backwards, and *gramma*, writing), the transposition of the letters of a word, phrase, or short sentence, so as to form a new word or sentence. It originally signified a simple reversal of the order of letters, but has long borne the sense in which it is now used. The Cabalists attached great importance to anagrams, believing in some relation of them to the character or destiny of the persons from whose names they were formed. Plato entertained a similar notion, and the later Platonists rivalled the Cabalists in ascribing to them mysterious virtues. Although now classed among follies, or at best among ingenious trifles, anagrams formerly employed the most serious minds, and some of the puritanical writers commended the use of them. Cotton Mather, in his elegy on the death of John Wilson, the first pastor of Boston, in New England, mentions

> His care to guide his flock and feed his lambs
> By words, works, prayers, psalms, alms, and *anagrams*.

The best anagrams are such as have, in the new order of letters, some signification appropriate to that from which they are formed. It was a great triumph of the mediæval anagrammatist to find in Pilate's question, '*Quid est veritas?*' (What is truth?) its own answer: '*Est vir qui adest*' (It is the man who is here). Anagrams, in the days of their popularity, were much employed, both for complimentary and for satirical purposes; and a little straining was often employed in the omission, addition, or alteration of letters, although, of course, the merit of an A. depended much upon its accuracy.

I. D'Israeli (*Curiosities of Literature*, vol. iii.) has a chapter on anagrams, which, as an exercise of ingenuity, he ranks far above acrostics. Among a great many considered by him worthy of record, are the following: The mistress of Charles IX. of France was named *Marie Touchet;* this became *Ie charme tout* (I charm every one), 'which is historically just.' The flatterers of James I. of England proved his right to the British monarchy, as the descendant of the mythical King Arthur, from his name *Charles James Stuart*, which becomes *Claims Arthur's Seat*. The author, in dedicating a book to the same monarch, finds that in *James Stuart* he has *a just master*. 'But, perhaps, the happiest of anagrams was produced on a singular person and occasion. Lady Eleanor Davies, the wife of the celebrated Sir John Davies, the poet, was a very extraordinary character. She was the Cassandra of her age, and several of her predictions warranted her to conceive she was a prophetess. As her prophecies in the troubled times of Charles I. were usually against the government, she was at length brought by them into the Court of High Commission. The prophetess was not a little mad, and fancied the spirit of Daniel was in her, from an A. she had formed of her name,

> ELEANOR DAVIES.
> *Reveal, O Daniel!*

The A. had too much by an *l*, and too little by an *s;* yet *Daniel* and *reveal* were in it, and that was sufficient to satisfy her inspirations. The court attempted to dispossess the spirit from the lady, while the bishops were in vain reasoning the point with her out of the Scriptures, to no purpose, she poising text against text: one of the deans of the arches, says Heylin, shot her through and through with an arrow borrowed from her own quiver; he took a pen, and at last hit upon this excellent A.:

> DAME ELEANOR DAVIES.
> *Never so mad a Ladie!*

The happy fancy put the solemn court into laughter, and Cassandra into the utmost dejection of spirit. Foiled by her own weapons, her spirit suddenly forsook her; and either she never afterwards ventured on prophesying, or the A. perpetually reminded her hearers of her state—and we hear no more of this prophetess.'

On a visit to King's Newton Hall, in Derbyshire, Charles II. is said to have left written on one of the windows, *Cras ero lux* (Tomorrow I shall be light), which is the A. of *Carolus Rex*.

ANAHUA'C, a Mexican term, said to signify 'near the water.' Its application is vague in the extreme. It is either a plateau or a ridge. As a ridge, again it oscillates between the continuation of the Rocky Mountains, below lat. 40° N., and that branch of the chain which runs nearly parallel to the upper course of the Rio Bravo del Norte; and as a plateau, it designates either the whole of the table-land of Mexico or certain portions thereof, more or less extensive, with the capital as a common center. Practically, if one acceptation is more generally admitted than another, A. may be regarded as the largest of those plateaus—a definition which, with reference to the number of lakes, seems more peculiarly to suit the etymology of the word. See further, CORDILLERAS OF CENTRAL AMERICA—a description which, for want of a briefer and better one, may be made to embrace all that less regular section of the backbone of America which lies between the simple formations of the Andes to the south and the Rocky Mountains to the north.

A'NAKIM, a gigantic race of people, whose stronghold was Kirjath-arba, in the south of Palestine. In the opinion of some biblical critics, they were not Canaanites, as they are not included in the list of devoted nations; others, again, conclude from the fact that invariably mention is made only of three individuals or families, that the name is appellative rather than gentile, and that the A. were merely particular tribes of the wide-spread and powerful Amorites, distinguished for their unusual stature. Be that as it may, the Israelites considered them too dangerous for neighbors, and consequently subjected them to the same stern treatment as the rest. It was the A. whose appearance so terrified the Hebrew spies who entered the Land of Promise from Kadesh-

barnea. Those who escaped the sword of Joshua fled to the country of the Philistines; and it has been conjectured that Goliath and the other Philistine giants were their descendants; a supposition probable enough, when we reflect that the particular places in which the fugitive A. took refuge were Gaza, Gath, and Ashdod. The word Anak means a necklace or neck-chain; and some have supposed that these giants received that name from the circumstance of their wearing such ornaments proudly round their necks; others translate the word A. by 'long-necked men,' or men with long-stretched necks, i.e., men of great height. The A., however, in all probability, immediately derived their name from Anak, the son of Arba.

ANAKOLU'THON is a term employed both in Grammar and Rhetoric, to denote the absence of strict logical sequence in the grammatical construction. Good writers sometimes sacrifice this logical sequence to emphasis, clearness, or graceful arrangement. In colloquial speech, nothing is more common than examples of A.

A'NAL GLANDS. Under this name may be described a large and diversified group of glands, found in many animals, and generally characterized by the disagreeable odor of their secretion. Those to which the name most strictly belongs are of frequent occurrence among carnivora and rodents; they consist of follicles which pour their secretion into sacs with muscular walls and narrow orifices, placed one on each side of the anus. According to the most recent investigations, it appears that these sacs are to be considered as prolongations inwards of the common integument, and that two sorts of glands open into them; one of a lobulated structure, having a fatty secretion, and representing the sebaceous glands of the skin greatly hypertrophied; the other crowded more at the bottom of the sac, tubular, and elaborating the specific secretion. In the hyæna, there is a single sac, which opens by a transverse fissure above the vent. There is a gradual passage from true A. G. to others of a somewhat different character. Thus, there are glands called inguinal in the hare and rabbit—little bare places pouring out an unctuous secretion, which are held to be equivalent to A. G., only not enclosed in sacs. The civet cat has an anal sac on each side of the vent; and also two other sacs opening by a common outlet in front of the vent; and from the latter is derived the substance known as civet, which the negroes seek for on the trees where it has been left by the civet cats.

The civet gland furnishes a natural link between the A. G. and those more closely connected with the genital apertures, called preputial. The most remarkable are those of the beaver, large sacs found both in the male and female, and which furnish the castoreum of commerce. The beaver has true A. G. besides. The sac which contains the musk of the musk-deer lies in the middle line beneath the skin of the abdomen, and opens at the prepuce. The secretion peculiar to badgers, polecats, and skunks, and which they use as an instrument of defence, shielding themselves from their adversaries by an overpowering and intolerable odor, comes from a pouch situated beneath the tail. In some animals, we meet with secretions similar to some of the above, poured out on other parts of the body. Thus, in the bat, there are glands on the face opening above the mouth, which prepare a fetid oily secretion; the so-called lachrymal follicles of ruminants, and the cutaneous glands of the tail of the deer, secrete a dark unctuous humor; and the temporal gland between the eye and the ear of the elephant pours out an oily substance at rutting-time. The peccary has an odoriferous gland on its back; and the crocodile has a musk-sac under the lower jaw. Anal sacs opening immediately behind the vent are also found in the crocodile and in many serpents.

A'NALOGUE, a term in Comparative Anatomy. Organs are *analogous* to one another, or are *analogues*, when they perform the same function, though they may be altogether different in structure; as the wings of a bird, and the wings of an insect. Organs, again, are *homologous*, or *homologues*, when they are constructed on the same plan, undergo a similar development, and bear the same relative position, and this independent of either form or function. Thus, the arms of a man and the wings of a bird are homologues of one another. See HOMOLOGY.

ANA'LOGY, a term originally Greek, and which signifies an agreement or correspondence in certain respects between things in other respects different. Euclid employed it to signify proportion, or the equality of ratios, and it has retained this sense in mathematics; but it is a term little used in the exact sciences, and of very frequent use in every other department of knowledge and of human affairs. In Grammar, we speak of the A. of language, i. e., the correspondence of a word or phrase with the genius of the language, as learned from the manner in which its words and phrases are ordinarily formed. A., in fact, supposes a rule inferred from observation of instances, and upon the application of which, in other instances not precisely, but in some respects, similar, we venture, with more or less confidence, according to the degree of ascertained similarity, and according to the extent of observation from which our knowledge of the rule has been derived.

The opposite to A. is *Anomaly* (Gr. irregularity); and this term is used not only in Grammar, but with reference to objects of Natural History which in any respect are exceptions to the ordinary rule of their class or kind. In the progress of science, analogies have been discovered pervading all nature, and upon which conclusions are often based with great confidence and safety. Reasoning from A. indeed warrants only probable conclusions; but the probability may become of a very high degree, and in the affairs of life we must often act upon conclusions thus attained. Reasoning from A., however, requires much caution in the reasoner. Yet even when its conclusions are very uncertain, they often serve to guide inquiry and lead to discovery. Many of the most brilliant discoveries recently made in Natural Science were the result of investigations thus directed. Where the proper evidence of truth is of another kind, arguments from A. are often of great use for the removal of objections. It is thus that they are employed by Bishop Butler in his *A. of Religion, Natural and Revealed, to the Constitution and Course of Nature*. In Law, reasoning from A. must often, to a certain extent, be admitted in the application of statutes to particular cases. Upon similar reasoning, the practice of medicine very much depends. To discover the meaning of any composition, it is also often necessary; the sense of the author in a passage somewhat obscure being in some measure determined according to passages in which he has expressed himself more clearly. The application of this rule to the interpretation of Scripture is a point of difference between Protestants and Roman Catholics, the latter insisting upon the interpretation of difficult passages by ecclesiastical tradition and authority. The extension of it to the whole Scriptures, however, depends upon the admission of their inspiration; but this, when fully admitted, warrants a more confident use of analogical reasoning than in the case of the works, or even of a single work, of an uninspired author. Protestant theologians have very generally employed, with reference to this rule of interpretation, the phrase 'A. of Faith,' deriving it from Rom. xii. 6; but the meaning of the expression in that verse is disputed. However, the reality of an A. of faith, and the right of reasoning from it, are not affected by any criticism on that verse.

ANA'LYSIS (Gr.), the resolution of a whole into its component parts. In mental philosophy, this term is applied to the logical treatment of an idea so as to resolve it into other ideas which combine to form it. A judgment or proposition may thus also be analyzed. The opposite of A., of course, is *Synthesis;* and the opposition of these terms is common in other branches of science as well as in mental philosophy. We speak of an *analytic* method in science, and of a *synthetic method;* and both are necessary, the one coming to the assistance of the other to secure against error, and promote the ascertainment of truth. The analytic method proceeds from the examination of facts to the determination of principles; whilst the synthetic method proceeds to the determination of consequences from principles known or assumed. The test of perfection in a theory is the harmony of the results obtained by the methods of A. and synthesis.

Mathematical A., in the modern sense of the term, is the method of treating all quantities as unknown numbers, and representing them for this purpose by symbols, such as letters, the relations subsisting among them being thus stated and subjected to further investigation. It is therefore the same thing with Algebra, in the widest sense of that term, although the term algebra is more strictly limited to what relates to equations, and thus denotes only the first part of A. The second part of it, or A. more strictly so called, is divided into the A. of Finite Quantities, and the A. of Infinite Quantities. To the former, also called the Theory of Functions, belong the subjects of Series, Logarithms, Curves, &c. The A. of Infinites comprehends the Differential Calculus, the Integral Calculus, and the Calculus of Variations. To the diligent prosecution of mathematical A. by minds of the greatest acuteness, is to be ascribed the great progress both of pure and applied mathematics within the last two centuries.

The A. of the ancient mathematicians was a thing entirely different from this, and consisted simply in the application of the analytic method as opposed to the synthetic, to the solution of geometrical questions. That which was to be proved being in the first place assumed, an inquiry was instituted into those things upon which it depended, and thus the investigation proceeded, as it were, back, until something was reached which was already ascertained, and from which the new proposition might be seen by necessary consequence to flow. A reversal of the steps of the inquiry now gave the synthetical proof of the proposition. The modern mathematical A. affords a much more easy and rapid means of solving geometrical questions; but the ancient A. also afforded opportunity for the exercise of much acuteness, and was the chief instrument of the advancement of mathematical science until comparatively recent times. The invention of it is ascribed to Plato; but of the work of the ancients on geometrical A. none

are extant, except some portions of those of Euclid, Apollonius of Perga, and Archimedes.

ANALYSIS, in Chemistry, is the term applied to that department of experimental science which has for its object the chemical disunion or separation of the constituents of a compound substance: thus, the resolution of water into its components hydrogen and oxygen; of common salt into chlorine and sodium; of marble into lime and carbonic acid; of rust into iron and oxygen; of sugar into carbon, hydrogen, and oxygen; and of chloroform into carbon, hydrogen, and chlorine—all are examples of chemical A. This department of chemistry, therefore, takes cognizance of the breaking down of the more complex or compound substances into their more simple and elementary constituents and is antagonistic to *chemical synthesis*, which treats of the union of the more simple or elementary bodies to produce the more complex or compound. Chemical A. is of two kinds: *Qualitative* A. which determines the quality or nature of the ingredients of a compound, without regard to the quantity of each which may be present; and *quantitative* A., which calls in the aid of the balance or measure, and estimates the exact proportion, by weight or volume, in which the several constituents are united. Thus *qualitative* A. informs us what water, marble, common salt, &c., are composed of; but it remains for *quantitative* A. to tell us that water consists of 1 part of hydrogen by weight united with 8 parts of oxygen; that marble is composed of 28 parts of lime, and 22 of carbonic acid; common salt, of 35½ parts of chlorine, and 23 of sodium; turpentine, of 30 carbon, and 4 hydrogen; chloroform, of 12 carbon, 1 hydrogen, and 106½ chlorine.

The division of inorganic (mineral) chemistry and organic (vegetable and animal) chemistry have led to a corresponding classification of chemical A. into *inorganic* A., comprehending the processes followed and the results obtained in the investigation of the atmosphere, water, soils, and rocks; and *organic* A., treating of the modes of isolation, and the nature, of the ingredients found in or derived from organized structures—viz., plants and animals. Both departments afford examples of what are called *proximate* and *ultimate* A. Proximate A. is the resolution of a compound substance into components which are themselves compound: thus, in inorganic chemistry, marble is resolved into lime (calcium united with oxygen) and carbonic acid (carbon with oxygen); whilst ultimate A. comprehends the disunion of a compound into its *elements* or the simplest forms of matter: thus, lime into calcium and oxygen; carbonic acid into carbon and oxygen; water into hydrogen and oxygen. Organic chemistry affords still better examples of each class: thus, ordinary wheat-flour, when subjected to proximate A., yields, as its proximate components, gluten (vegetable fibrin), albumen, starch, sugar, gum, oil, and saline matter; but each of these proximate ingredients is in itself compound, and when they undergo ultimate A., the gluten and albumen yield, as their ultimate elements or constituents, carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus; and the starch, sugar, gum, and oil are found built up of carbon, hydrogen and oxygen.

Several other terms are in use in chemical treatises: thus, *Gas* A. is applied to the processes employed in the examination of the various gases, and is every day becoming of more and more importance and interest. *Metallurgic* A. includes the smelting of metallic ores, the assay of alloys of gold, silver, &c., and, in general, everything that pertains to the ultimate A. of metallic ores and compounds. *Agricultural* A. is restricted to the examination of manures, feeding-stuffs, and soils; *Medical* or *Physiological* A. to the investigation of blood, urine, and other animal fluids and juices, and the examination of medicinal compounds; whilst *Commercial* A. is the term used where great accuracy or nicety of detail is not required in an A., but where the commercially important constituents alone are determined, as the separation and recording of the amount of phosphates, ammonia, and alkaline salts in a sample of guano; the total amount of saline matter in a certain water; the iron in an ironstone, the lime in a limestone, &c.

ANALYTICAL CHEMISTRY is that department of chemistry which takes cognizance of analyses. The analytical chemist requires some peculiar apparatus, together with reagents, generally solutions, by the addition or reaction of which the nature and amount of the ingredients of a compound are determined.

ANAM, or ANNAM, is an independent kingdom in the east of Further India, and is often called Cochin-China (q. v.) It consists of the once separate states of Tonquin and Cochin-China, and a part of the ancient kingdom of Cambodia. At present it comprises Tonquin in the north, the whole of Cochin-China with the exception of six provinces ceded to France in 1867, and Tchiampa in the south. The country is mountainous in the interior, has rich plains in the north and south, and along its coast-land has excellent harbors. Tonquin possesses rich stores of gold, silver, copper, and iron; and in A. are found most of the best-known vegetable products of Southern Asia. The area is estimated at near 200,000 sq. miles, and the pop. at 21,000,000. The government is an absolute monarchy, and is sometimes called an empire. The independence of A. (as against China) was guaranteed by France in 1872, the king agreeing to accommodate his policy to that of France, to annul all laws against Christians and converts, and to open three ports to foreign vessels. Hitherto the trade of A. has been almost wholly with China, and even in A. is chiefly in the hands of Chinese residents. The Anamese, who speak a monosyllabic tongue, are intelligent and peaceable, and are clever shipbuilders. For the most part they worship tutelary deities; but the upper classes are Confucians, and Buddhism is tolerated. There are besides 420,000 Roman Catholic Christians in A. See COCHIN-CHINA and SAIGON. In 1883, France occupied part of Tonquin, with the aim of making Tonquin independent of A. under a French protectorate.

ANAMIRTA. See COCCULUS INDICUS.

ANA'NAS. See PINE APPLE.

A'NARCHY (from the Gr. *a*, privative, and *arche*, government), the state of society without any regular government, when a country is torn by the strife of parties, and no law or authority remains. Complete A. is necessarily rare and of short duration; but conditions approaching to it often arise after revolutions and gross abuses in government.

ANARRHICHAS. See WOLF-FISH.

A'NAS, a Linnæan genus of birds, included in the order *Palmipedes* (Web-footed birds) of the system of Cuvier, and divided by recent ornithologists into a number of genera; one of which, retaining the name A., contains the true Ducks, and others contain the Swans (*Cygnus*), Geese (*Anser*), Scoters (*Oidemia*) Garrots (*Clangula*), Eiders (*Somateria*), Pochards (*Fuligula*), Shovellers (*Rhynchaspis*), Shieldrakes (*Tadorna*), Musk-ducks (*Cairina*), Teals (*Querquedula*), Widgeons (*Mareca*), &c. These, with Mergansers (*Mergus*) and Flamingoes (*Phœnicopterus*), constitute the family *Anatidæ* of some ornithologists. Cuvier places them in a family called by him *Lamellirostres*, and distinguished by a thick bill, horny only at the nail-like extremity, and elsewhere invested with a soft skin, the edges furnished with laminæ, or with small teeth particularly adapted for the purpose of separating the food from the mud which is often taken into the bill along with it. The laminæ, and a large and broad bill, are the chief characteristics of the old genus *A.* Some, as the true ducks, subsist in great part on small insects; others, as geese and swans, almost exclusively on vegetable food. The species are very numerous, distributed over all parts of the world, some of them very abundant in the polar regions. Some are important for their feathers or down, others for their flesh and for their eggs. A few have been domesticated, and are commonly kept for economic uses. See DUCK, GOOSE, SWAN, EIDER, BARNACLE, TEAL, &c.

ANASTA'SIUS I., Patriarch of Constantinople, was born in the second half of the 7th c. He favored the party of iconoclasts, or image-breakers. He owed his elevation to the Emperor Leon, who exacted from him a pledge that he would assist in the destruction of the images. A. kept his word; but having made himself obnoxious to the new emperor, Constantine Copronymus, the latter (743) seized him, put out his eyes, and marched him through the hippodrome (race-course) mounted on an ass with his head to the tail. He died in 753.

ANASTASIUS, SAINT, surnamed ASTRIC, apostle of the Hungarians, was born in 954, and died in 1044. A Frenchman by birth, he finally settled, after various changes, at the court of Stephen, Duke of Hungary, where he became very influential, and was intrusted with the ecclesiastical organization of the land. All his energies were devoted to securing the triumph of the Christian faith.

ANASTASIUS I. was elected pope, or rather bishop of Rome, in 398 A.D. He succeeded Siricius, one year after the death of Ambrose. Under his pontificate, flourished Chrysostom, Augustine, and Jerome. The most conspicuous act of his life was the reconciliation of the church of Antioch with that of Rome, after a schism of 17 years. Among the epistles attributed to A., two are obviously apocryphal; the one addressed to Nerenianus; the other, to the German bishops. The latter comanded the faithful to remain standing while the gospel was read in the churches, that neophytes should receive holy orders only on the recommendation of five bishops, and that the Manichæans, who had been expelled from Rome, should not be admitted into Germany. But the first of these epistles is posterior to the death of A., and the second, anterior to his accession to the pontificate. A. was vehemently opposed to the doctrines of Origen, one of whose works (*Peri Archon*, i. e., 'Concerning Principles') he condemned as heretical. For this, he is praised by Jerome, who calls him a man of a holy life, of a 'rich poverty,' and of an apostolical earnestness. During his life, several councils were held, at Carthage, Constantinople, Ephesus, and Toledo. He died Dec. 14, 401 A. D.—There were three other popes of this name: ANASTASIUS II. (496—498), ANASTASIUS III. (911—913), and ANASTASIUS IV. (1153–1154). See POPE.

ANASTASIUS I., emperor of the East, was born in 430 A.D.

at Dyrrachium, in Epirus, of an obscure family. The early portion of his life is unknown to history. On the death of Zeno, he was proclaimed emperor by the senate, and crowned on the 11th April, 491, at the age of 60. He owed his elevation to Ariadne, widow of Zeno, whom he married. No monarch was more notable for his heresies. One of his generals, Vitalian, taking advantage of this unpopular feature of his character, revolted, ravaged Thrace, Scythia, and Moesia, compelled Anastasius to promise to recall the orthodox bishops whom he had banished, and secured for himself the title of Governor of Thrace. Anastasius, however, had some good natural qualities, and performed certain praiseworthy actions. He suppressed the cruel and degrading spectacles where men fought with wild beasts, abolished the sale of offices, the tax on domestic animals, which had existed since the days of Vespasian, built a wall on the west side of Constantinople to defend it from the incursions of the barbarians, constructed aqueducts in the city of Hierapolis, made a harbor at Cæsarea, and restored the 'pharos' or light-house at Alexandria. He died 8th July, 518.—ANASTASIUS II., emperor of the East, was born about the middle of the 7th c., and died in 719 A.D. His great aim was to restore peace to the church, but his measures led to his deposition.

ANASTATIC PRINTING. See PRINTING.

ANASTATICA. See ROSE OF JERICHO.

ANASTOMOSIS (Gr. the making of a mouth or opening), an anatomical term used to express the union of the vessels which carry blood or other fluids, and also, for convenience' sake, the junction of nerves. The veins and absorbents anastomose to form large single trunks, as they approach their ultimate destinations. The arteries break up into small branches, for the supply of the tissues, and each small vessel, again, communicates with others given off above and below. At each large joint there is a very free A., so that the safety of the limb beyond may not be entirely dependent on the single arterial trunk passing into it, exposed as it is to all the obstructive influences of the different motions of the limb. After the main artery has been permanently obstructed, the anastomosing vessels enlarge, so as to compensate for the loss; but after a time, only those whose course most resembles the parent trunk continue enlarged, and the others gradually regain their ordinary dimensions.

Arteries anastomosing.

An idea of the profusion of this anastomosing system may be formed from the fact, that if the innominata artery, or great vessel destined for the supply of the right upper half of the body, be tied, and those on the left side injected with size and vermilion, the injection will flow freely into the arteries of the right arm, through branches as minute as they are numerous.

ANA'THEMA (Gr., a thing set or hung up or apart—i. e., as consecrated), a word originally signifying some offering or gift to Deity, generally suspended in the temple. Thus we read in Luke xxi. 5, that the temple was adorned 'with goodly stones and gifts' (*anathemasi*). It also signifies a sacrifice to God; and, as the animals devoted to be sacrificed could not be redeemed from death, the word was ultimately used in its strongest sense, implying eternal perdition, as in Rom. ix. 3; Gal. i. 8 and 9; and other places. In the Catholic Church, from the 9th c., a distinction has been made between excommunication and anathematizing; the latter being the extreme form of denunciation against obstinate offenders. The synod of Pavia, in 850, determined that all transgressors who refused to submit to discipline, such as penance, should be not merely excommunicated, but anathematized, and deprived of every kind of Christian hope and consolation. Such a sentence could not be pronounced without the concurrence of the provincial bishops with their metropolitan. See EXCOMMUNICATION.

ANATO'LIA (Gr. Anatolé, the East, i. e., from Constantinople) is the modern name for Asia Minor; Turkish, Anadoli. It may be considered as coincident with the peninsula; the boundary-line on the east between it and Armenia and Mesopotamia, not being natural, cannot be well defined. The area of the peninsula exceeds 200,000 square miles. It constitutes the western prolongation of the high table-land of Armenia, with its border mountain-ranges. The interior consists of a great plateau, or, rather series of plateaus, rising in gradation from 2400 to 5000 feet, with bare steppes, salt plains, marshes, and lakes; the structure is volcanic, and there are several conical mountains, one of which, the Agridagh (Argæus), with two craters, rises 10,000 feet above the plain of Kaisarijeh, which has itself an elevation of between 2000 and 3000 feet. The plateau is bordered on the north by a long train of parallel mountains, varying from 4000 to 6000 feet high, and cut up into groups by cross-valleys. These mountains sink abruptly down on the north side to a narrow strip of coast; their slopes towards the interior are gentler and bare of wood. Similar is the character of the border ranges on the south, the ancient Taurus, only that they are more continuous and higher, being, to the north of the Bay of Skanderun or Issus, 10—12,000 feet, and further to the west 8—9000 feet. The west border is intersected by numerous valleys, opening upon the Archipelago, through the highlands of the ancient Caria, Lydia, and Mysia, to the northern part of which Mounts Ida and Olympus belong. Between the highlands and the sea lie the fertile coast-lands of the Levant. The rivers of A. are not considerable; the largest are the Yeshil Irmak (Iris), the Kisil Irmak (Halys), and the Sakkariah (Sangarius), flowing into the Black Sea; and the Sarabat (Hermus) and Minder (Mænder) into the Ægean.

The *climate* wears on the whole a south-European character; but a distinction must be made of four regions. The central plateau, nearly destitute of wood and water, has a hot climate in summer, and a cold in winter; the south coast has mild winters and scorching summers; while on the coast of the Ægean there is the mildest of climates and a magnificent vegetation. On the north side, the climate is not so mild, nor the production of so tropical a kind as on the west; yet the vegetation is most luxriant, and a more delightful or richer tract than the coast from the Sea of Marmora to Trebizond is hardly to be found. The whole peninsula, however, is liable to earthquakes.

In point of natural history, A. forms the transition from the continental character of the East to the maritime character of the West. The forest-trees and the cultivated plants of Europe are seen mingled with the forms peculiar to the East. The central plateau, which is barren, except where there are means of irrigation, has the character of an Asiatic steppe, more adapted for the flocks and herds of nomadic tribes than for agriculture; while the coasts, rich in all European products, fine fruits, olives, wine, and silk, have quite the character of the south of Europe, which on the warmer and drier south coast shades into that of Africa.

The inhabitants consist of the most various races. The dominant race are the Osmanli Turks, who number about 1,200,000, and are spread over the whole country; next to these come the Turkomans, belonging to the same stock, and speaking a dialect of the same language. These are found chiefly on the table-land, leading a nomadic life; there also live hordes of nomadic Kurds. Among the mountains east of Trebizond are the robber tribes of the Lazes. The population of the towns, in addition to Turks, consists, in the west, chiefly of Greeks and Jews; and in the east, of Armenians; the non-Turkish population, along with Europeans in the maritime marts, have the whole commerce of the country in their hands. The whole population of the peninsula is supposed not to exceed 5,000,000; the latest official census available made it 10,907,000, including Armenia; but this is thought to be much over-estimated. The political and social arrangements are much as in the rest of Turkey (q. v.). One peculiarity is the old Turkish system of vassal-dynasties, the Dere-begs (valley chiefs), who, like the feudal lords of the middle ages in Europe, are hereditary rulers and military commanders of their district, under the suzerainty of the sultan. This institution is in greatest force in the north-east of the peninsula. The power of these feudal chiefs, however, was broken by Sultan Mahmud.

The whole country is divided at present into eight *eyalets* or governments, under governors-general, and each of these, again into several *sandjaks*, or provinces, under lieutenant-governors. The eyalets are: 1. Khudavendkiar, in the north-west, including ancient Mysia, the west part of Bithynia, and part of Phrygia; chief town Brussa. 2. Kastamuni, occupying the middle of the north coast, including ancient Paphlagonia, the east of Bithynia, and part of Pontus; chief town, Kastamuni. 3. Tarabosan or Trabezun (Trebizond), the ancient Pontus and Colchis; capital, Trebizond. 4. Aïdin, in the south-west, the ancient Lydia, Caria, and Phrygia; capital, Ismir or Smyrna. 5. Konia, formerly Karamania, eastward from Aïdin, the ancient Lycia, Pamphylia, Pisidia, Lycaonia, and part of Cilicia; chief town, Konieh (Iconium). 6. Adana, comprehending the rest of Cilicia, Kataonia, and part of Cappadocia; chief town, Adana. 7. Angora, the central part of the peninsula, ancient Cappadocia and Galatia, chief town, Enguri or Angora. 8. Sivas, east from Angora, embracing parts of Pontus and Little Armenia; chief town, Sivas.

ANA'TOMY (Gr., a cutting up or dissecting) is the science of the form and structure of organic bodies, and is practically acquired by separation of the parts of a body, so as to show their distinct formation, and their relations with each other. It is generally understood as applied to the human body, while the A. of animals is styled ZOOTOMY, and that of plants, PHYTOTOMY. The investigation and comparison of the structures of the different kinds of organic bodies is styled COMPARATIVE A. Theoretical A. is divided into GENERAL and SPECIAL.

GENERAL A. gives a description of the elementary tissues of which the systems and organs of the body are composed, as preliminary to an examination of them in their combined state in the various organs: it also investigates their laws of formation and combination, and the changes which they undergo in various

stages of life. This branch of study may also be styled Structural or Analytical A., and has been first developed in recent times, especially by Bichât (1801) and Bordeu, who have been followed by J. Müller, Goodsir, Mayer, E, H. Weber, Schwann, Valentin, and many others. In our day, microscopic investigation has been successfully applied to the study of elementary textures. See HISTOLOGY.

SPECIAL A. (styled Descriptive by the French writers) treats of the several parts and organs of the body in respect to their form, structure, and systematic connection or relation with each other. The arrangement of the several parts and organs in an order deduced from their similarity in structure or use, constitutes SYSTEMATIC A. According to this mode of study, which is essential as an introduction to physiology, A. has been divided, though not with scientific precison, into six branches of study. 1. *Osteology*, which treats of the bones, including the cartilages of the joints (chondrology).—2. *Syndesmology*, which describes the ligaments, or bands, that unite the bones of various joints. The bones, with their cartilages and ligaments, form a framework, which supports the external soft parts, and within which the vital organs are suspended and protected from injury; they are also arranged in a mechanical system as instruments of motion. —3. *Myology* explains the system of the muscles, which, by their contractile power, serve to impart motion to the bones and joints; while, like the bones, they contribute to form the cavities of the body, and to protect the internal organs. Their structure also serves to produce the external shape and symmetry.—4. *Angeiology* describes the vessels or ducts, with their complex net-work and ramifications, spreading over most parts of the body, and divided into two great systems: (*a*), the blood-vessels with the heart, a fleshy organ propelling the blood through the pulsating vessels or arteries, from which it returns to the heart, after circulation through the veins; (*b*), the lymphatics, by which a certain fluid (lymph) is brought into union with the blood in the organ styled lymphatic glands, and is afterwards passed into the veins.— 5. *Neurology*, or the doctrine of the nerves, describes the nervous system, as divided into, *first*, the two central masses of the brain and the spinal column; *second*, the ramifications of nerves running from the brain and spinal column to almost all points of the surface; and *lastly*, the order of nerves having a peculiar structure, and styled the ganglionic system of nerves.—6. *Splanchnology* describes the viscera or organs formed by combination of the distinct systems of veins, nerves, lymphatics, &c., and mostly situated in the cavities of the body. These are divided into five groups, viz.: (*a*), the organs of sensation—sight, hearing, smell, taste, and touch; (*b*), of voice and respiration—nostrils, mouth, larynx, trachea, and lungs, with the thyroid gland, the thymus gland, and the diaphragm; (*c*), digestive organs—the mouth, with its salivary glands, the throat, gullet, the stomach, the intestines, with the liver, spleen, and pancreas; (*d*), the urinary organs—kidneys, ureter, bladder, and urethra; (*e*), sexual organs of both sexes.

Special A. may be treated in another mode ; by an arrangement made in accordance with natural divisions, or by imaginary lines dividing the body into several regions—as the head, the trunk, and the extremities. Again, the trunk may be subdivided into neck, thorax, and abdomen ; and in each of the main regions, several subdivisions may be made. This system of arrangement may be styled TOPOGRAPHICAL A., and is also known as SURGICAL A., on account of its importance as the basis of operative surgery. It was the eldest of the Monroes of Edinburgh University who first gave this branch of the study its due prominence.

The several parts and organs of the animal body will be found described under their proper heads.

History of A.—It is difficult to determine the date at which this science began to be cultivated, but it is probable that from the earliest times some persons took advantage of favorable circumstances to acquaint themselves with it. The Druids, who were at once the priests, judges, and physicians of the people, demanded from those who came for their advice human victims as sacrifices, and were themselves the executioners ; and it is not unlikely that they availed themselves of these opportunities of acquiring anatomical knowledge. It is probable, says Galen, the Æsculapius, who excelled in the treatment of wounds, dissected animals for the instruction of his pupils. His descendants, that Asclepiades, cultivated A., or rather zootomy, and founded the three famous schools of Cos, Rhodes, and Cnidos. The rabbins tell us that, although among the Jews the touching of a dead body involved ceremonial uncleanness, they did not entirely neglect A., which they studied from the carefully preserved bones of their ancestors, and the necessary manipulations of embalming. They counted 248 bones, and 365 veins or ligaments, which division, according to the rabbins, has relation to the 248 precepts of the Mosaic Law that *command*, and the 365 that *forbid*.

Homer exhibits a certain amount of anatomical knowledge in his description of wounds in the *Iliad*. Pythagoras first reasoned physiologically from observations made by him when in Egypt, where he witnessed the sacrifices, and also the Egyptian methods of embalming. Alcmeon of Crotona, a disciple of Pythagoras, first dissected animals with the view of obtaining comparative knowledge of human A. Democritus, who frequented the sepulchres, probably with anatomical views, practised zootomy, and was engaged dissecting animals when visited by Hippocrates. Hippocrates II., descended in the eighteenth degree from Æsculapius, and born at Cos in 35 A.M., was the first author who treats A. as a science. He caused a skeleton of brass to be cast, which he consecrated to the Delphian Apollo, with the view of transmitting to posterity proofs of the progress he had made, and of stimulating others to the study of A. Aristotle, who lived 384 B.C., does not appear to have dissected men ; and he states that the parts of man are unknown to them, or that they possess nothing certain on the subject beyond what they can draw from the probable resemblance of the corresponding parts of other animals. He first gave the name *aorta* to the great artery.

Diocles (380 B.C.) was the first who treated of the proper manner of conducting anatomical examinations for purposes of demonstration. But no real progress in A. was made, owing to the researches being confined to animals, till the time of Erasistratus, who was born at Ceos about 300 B.C., and who was the first to dissect human bodies. He obtained from Seleucus Nicanor and Antiochus Soter the bodies of criminals, and is said to have dissected some condemned to death while they were still alive. His writings are lost, but fragments are preserved in the writings of Galen. He made many discoveries, among others, of the lacteal vessels. Herophilus, who lived about the same time, was born at Carthage, but carried on his anatomical pursuits principally at Alexandria. He also is said to have dissected living subjects. Parthenius, who lived 200 years B.C., published a book, entitled *On the Dissection of the Human Body*. In the first c. of the Christian era, the dissection of human subjects was forbidden, under heavy penalties. Rufus the Ephesian, who lived 112 A.D., under the empire of Trajan, taught A. in a more exact manner than had been hitherto done, and devised a more exact anatomical nomenclature. He made use of animals in his demonstrations, and mentions that 'of old they used for that purpose human bodies.'

Galen (131 A.D.) dissected apes, as being most like human subjects, though he occasionally obtained bodies of children exposed in the fields, or of persons found murdered, which, however, he was obliged to dissect in secret. There was at this time no regularly prepared skeleton, as there was a law at Rome forbidding the use of dead bodies. Galen's writings show a knowledge of human A. Soranus had extensive knowledge of A., derived from human subjects. Moschion had some anatomical illustrations engraved. Oribasius compiled more than 70 volumes, the 24th and 25th being on A., principally from Galen.

Nemesius, Bishop of Nemesus, a town in Phœnicia, cultivated A. at the end of the 4th c., in which also Meletius lived, who wrote a complete treatise *On the Nature and Structure of Man*. Theophilus, a monk, published in the 7th c. a good abridgment of the A. of Galen.

A. made small progress among the Arabs, which is accounted for by their religion prohibiting contact with dead bodies. When the great Arabian physician, Rhazes, was about to be operated on for cataract, he discovered that the surgeon was ignorant of the structures of the eye, and refused to submit to the operation. Avicenna (980 A.D.), born in the province of Khorasan, was a good osteologist, and described some structures not alluded to by Galen.

A. was now neglected for a long period, till Frederick II., king of Sicily (1194—1250), made a law forbidding any one to practise surgery without having first acquired some knowledge of A. He founded a chair at the solicitation of Martianus, his chief physician, where the science was demonstrated for five years; students from all parts crowded to it, and some time after, a similar school was established at Bologna—these two were largely attended, but no very material progress was made in A.

The university of Montpellier was founded by Pope Nicholas IV. in 1284, and the chair of A. was filled by Bernard Gordon with great distinction for ten years. He published a huge work, called *Lilium Medicinæ*.

Mundinus, born at Milan, 1315, professed A. there, and is considered the real restorer of A. in Italy. He publicly demonstrated it, and published a work which was the text-book in the academy of Padua two hundred years after its publication. Then came Guy de Chauliac, who first correctly described the humerus. Mathæus of Grado published several anatomical works about 1480. Gabriel de Zerbus, in 1495, published a confused and imperfect work on A. at Verona. The science continued to be studied by surgeons such as Vigo (1516), Achillinus, and Berenger (Carpi), (1518), who boasted of having dissected at Bologna more than a hundred subjects. Reports were raised that he dissected living Spaniards, and he fled or was exiled to Ferrara.

André Laeuna (1535), Charles Etienne, Gonthier (1536), Massa, Driander (1537), Sylvius (1539), Levasseur, and Gesner, were celebrated for A.; but especially Andrew Vesalius, born 1514, who

published a great work on A. before he was 28 years of age. He had the misfortune to open the body of a young Spanish nobleman whose heart was found still beating, and was obliged to make an expiatory pilgrimage to Jerusalem. In 1564, the Venetian senate recalled him to succeed, at Padua, the famous Fallopius, who had just died; on his return, he was shipwrecked on the island of Zante, where he was starved to death.

William Horman of Salisbury wrote, in 1530, *Anatomia Corporis Humani* (A. of Human Body); then came Ingrassias, and others of less note.

Thomas Gemini of London, in 1545, engraved upon copper the anatomical figures of Vesalius, which had appeared in Germany upon wood. Gemini suppressed the name of Vesalius, though using his figures and descriptions. Thomas Vicary, in 1548, is said to be the first who wrote in English on A.; he published *The Anglishman's Treasure, or the True A. of Man's Body*. John Ligæus, in 1555, published an anatomical treatise in Latin hexameters. Franco (1556), Valverda, Columbus, and others, wrote works of great merit on A. In 1561, Gabriel Fallopius professed it with great distinction at Padua, and made many original discoveries.

In the 17th c., progress was rapid: Hervey, in 1619, discovered the circulation of the blood, and the microscope was employed to detect the structure of minute vessels. Aselli, in 1622, discovered and demonstrated the existence of the lymph-vessels; and his conclusions were supported by the investigations of Pecquet, Bartholin, and Olaus Rudbeck. The glandular organs were investigated by Wharton, while Malpighi, Swammerdam, and (in the following c.) the illustrious Ruysch, by the use of injections and the aid of the microscope, gave a new impulse to research in the minute structures. Eminent names in the history of A. are numerous in the 18th c. In Italy, which still retained its former pre-eminence, we find Pacchioni, Valsalva, Morgagni, Santorini, Mascagni, and Cotunni; in France, Winslow, D'Aubenton, Lieutaud, Vicq d'Azyr, and Bichât, the founder of General A; in Germany, the accomplished Haller and Meckel prepared the way for greater achievements in the 19th c.; in Great Britain, Cowper, Cheselden, Hunter, Cruikshank, Monro, and Charles Bell contributed to the progress of the science; while Holland was worthily represented by Boerhaave, Albinus, Camper, Sandifort, and Bonn. On the boundaries of the two centuries, we find the names of Sömmering, Loder, Blumenbach, Hildebrand, Reil, Tiedemann, and Seiler; nearly all connected with practical medicine, which was benefited by their studies in A.

The necessity of a union of theory and practice has led to that zealous study of PATHOLOGICAL A. (the dissection and study of structures as modified by diseases) which has recently prevailed. The origin of this branch of A. may be traced back to ancient times in Egypt, where post-mortem examinations were sometimes made to discover the seat of disease and cause of death. In the medical writings of the Greeks, some anatomico-pathological observations are found. During the general revival of science in the 16th c., many notices of pathological A. occur. In 1507, Benevieni of Florence wrote the first book on this branch of science; and Bonet, in 1679, published his compilation of numerous observations. Still, these were only fragmentary indications of a possible science, and the facts stated were often very erroneously interpreted. Morgagni (1767), who must be regarded as the true founder of Pathological A., was worthily followed by Lieutaud, Sandifort, Hunter, Baillie, and others. Meckel the Younger, in Germany, in his study of malformations &c., paid little or no attention to practical applications of the science. The recent change of direction given to the study of Pathological A., which is now properly regarded as a means towards practical improvements in medicine, must be ascribed to Bichât and the pupils of Broussais, among whom may be mentioned the names of Laennec, Cruveilhier, Louis, Andral, Lobstein, Lebert, Virchow, Bennett, &c. In London and other large towns there are societies devoted specially to the investigation of pathology.

COMPARATIVE A. has always preceded anthropotomy, or dissection of the human subject, but was first treated systematically as a distinct science by Cuvier and his pupil Meckel the Younger. The system proposed by the latter was, unfortunately, never completed. Blumenbach, Tiedemann, Home, Blainville, Geoffroy St. Hilaire, Carus, Oken, Goethe, the German poet, Richard Owen, John Goodsir, and Huxley, must be named as eminent contributors to this branch of science; while, in late years, zootomy and comparative A. have been studied, with an especial reference to physiology, by Müller, Wagner, Siebold, Bowman, Todd, and Allan Thomson.

A. FOR ARTISTS is studied with reference to the effects produced by internal structure on the external form, and describes the organs, especially the muscles and tendons, not only in a state of rest, but also as modified by passion, action and posture. Consequently observation of the nude living form is required in this branch of study, which has been treated of by Errard and Genga (1691); and in modern times, by Lavater (1790), Camper (1792), Charles Bell (1806), Salvage (1812), Mascagni (1816), Koeck (1822), Gardy (1831), Fischer (1838), Salomon and Aulich (1841), Berger (1842), Seiler and Günther (1850), &c.

PRACTICAL A. includes *Dissection* (q. v.) and the making of *Preparations*. *Preparation* consists in dividing parts or organs, so that their respective forms and positions may be clearly shown. Organs or parts thus treated are styled *Anatomical Preparations* of bones, muscles, vessels, nerves, &c. For example, a bone-preparation is made by clearing away all muscular and other adhesions; the whole structure of the bones, thus prepared and bleached, when connected by wires in its natural order, forms an artificial *skeleton*.

For preparations of parts containing vessels with minute ramifications, injections are employed. Some colored fluid which has the property of gradually becoming solid, is gently injected into the arteries or other vessels by means of a syringe. Formerly, materials which required a certain degree of warmth to preserve their fluidity were used; but as these were attended with inconvenience, a great improvement was made by Shaw and Weber, who introduced the use of linseed-oil and turpentine, which, when mixed with certain metallic compounds in due proportions, form a fluid which, after a time, becomes solid in ordinary temperatures. Quicksilver and colored limewater are also used, for injection of the finer vessels. Preparations are either dried and varnished or preserved in spirit.

A series of such specimens, arranged in proper order, forms an *Anatomical Museum*. The valuable collections made by Ruysch, Rau, Loder, Walter, John and William Hunter, Meckel, Sömmering, and Dupuytren, are all now public property. There is also a splendid collection in the university of Edinburgh, collected and prepared for the most part by John Goodsir. The College of Surgeons of Edinburgh also possesses a very valuable museum of pathological preparations. As it is impossible to preserve thus all parts in their integrity for any great length of time, artificial copies in wood, ivory, and wax have been made with great exactitude, especially in Florence; and recently Anzou in Paris has employed *papier-mâché* for the same purpose. But, apart from dissections and preparations of the natural organs, the most general and available assistance in the study of A. is found in anatomical engravings and plates on wood and copper. This assistance was known in ancient times. Aristotle affixed to his works on A. some anatomical drawings, which have been lost. In the 16th c., the greatest artists—Leonardo da Vinci, Michael Angelo, Raphael, Titian, and Dürer—gave their aid in designing anatomical figures; but few of their works, in this department of art, have been preserved. Lately, lithography has been employed. Among the numerous illustrations of A. which we now possess, the old works by Vasal (1543), Eustachius (1714), Bidloo (1685), Albin (1747), Haller (1743–1756), and Vicq d'Azyr (1786–1790), may be mentioned. The present century has supplied works of first-rate excellence by Caldani (Venice, 1801–1814), Mascagni (Pisa, 1823), Langenbeck (Göttingen, 1826), Bourgery and Jacob (Paris, 1832), and Arnold (Zürich, 1838). For general use, we may commend the plates of Loder (Weimar, 1803), Cloquet (Paris, 1826), Osterreicher (Munich, 1827–1830), Weber, (Düsseldorf, 1830), Bock (Leipsic, 1840), and D'Alton (Leipsic, 1848); in Surgical A., the works by Rosenmüller (Weimar, 1805), Pirogoff (Dorp. 1840), and Günther (Hamburg, 1844); in Pathological A., Meckel (Leipsic, 1817–1826), Cruveilhier (Paris, 1828–1841), Froriep (Weimar, 1828), Albers (Bonn, 1832), Gluge (Jena, 1843—1850), and Vogel (Leipsic, 1843); in Comparative A., Carus (Leipsic, 1826) and Wagner (Leipsic, 1841). Among English works may be mentioned those by Lizars, Jones, and Richard Quain, in Special A.; by Morton and Maclise, in Surgical A.; and by Baillie and Bright in Pathological A.

ANATOMY (in Law). While the study and practice of A., or the art of dissecting the human body, were necessary to the pursuit of surgical knowledge, there were, until the year 1832, no sufficient legal means in Britain of procuring dead bodies for anatomical purposes; and the consequence was, the evasion, and sometimes even the open violation of the law by persons interested in supplying the surgical profession with subjects for dissection. The high prices, indeed, given for these subjects, may almost be said to have created a lucrative and tempting trade, which led to the most atrocious crimes; and murders, with no other object than the possession of the victim's body for the surgeon's knife, were frequently committed. The notorious case of Burke, tried and convicted before the High Court of Justiciary in Edinburgh, in 1828, is a horrible illustration of the state of the law at that time, and of the position in which it placed surgical practitioners. It was believed that Burke and his associate Hare had been the murderers of sixteen persons, whose bodies they sold to the anatomists. It was their practice to inveigle poor people, generally strangers, into their houses, make them drunk and then smother them. Burke, informed against by Hare, was condemned for thus disposing of an old woman, and suffered the last penalty, of the law, bequeathing a new verb, *to burke*, to the English language. To remedy this state of things, an act of parliament was passed

on the 1st of August 1832, 2d and 3d William IV. c. 75, the preamble of which, sufficiently disclosing its necessity, is as follows: 'Whereas a knowledge of the causes and nature of sundry diseases which affect the body, and of the best methods of treating and curing such diseases, and of healing and repairing divers wounds and injuries to which the human frame is liable, cannot be acquired without the aid of anatomical examination; and whereas the legal supply of human bodies for such anatomical examination is insufficient fully to provide the means of such knowledge: and whereas, in order further to supply human bodies for such purposes, divers great and grievous crimes have been committed, and, lately, murder, for the single object of selling for such purposes the bodies of the persons so murdered: and whereas, therefore, it is highly expedient to give protection, under certain regulations, to the study and practice of A., and to prevent, as far as may be, such great and grievous crimes and murder as aforesaid'—It is therefore enacted, that the Secretary of State for the Home Department in Great Britain, and the Chief Secretary in Ireland, may grant a license to practice A. to any fellow or member of any college of physicians or surgeons, or to any graduate or licentiate in medicine, or to any person lawfully qualified to practise medicine in any part of the United Kingdom, or to any professor or teacher of A., medicine, or surgery, or to any student attending any school of A., on the application of such party for such purpose, countersigned by two justices of the peace acting for the county, city, borough, or place where such party resides, certifying that, to their knowledge or belief, such party so applying is about to carry on the practice of A.

The act provides for the appointment of inspectors of schools of A., and directs them to make a quarterly return to the Secretary of State, or the Chief Secretary, as the case may be, of subjects removed for anatomical examination to every place in the inspector's district where A. is carried on, distinguishing the sex, and, as far as is known at the time, the name and age of each person whose body was so removed. The inspectors are further required to visit and inspect places within their respective districts where A. is practised; and for the performance of all these duties, the inspectors are each to have an annual salary not exceeding £100, with a further reasonable sum for their official expenses. By section 7, it is enacted that it shall be lawful for any executor or other party having lawful possession of the body of any deceased person, and not being an undertaker or other party intrusted with the body, for the purpose only of interment, to permit the body of such deceased person to undergo anatomical examination, unless, to the knowledge of such executor or other party, such person shall have expressed his desire, either in writing, at any time during his life, or verbally, in the presence of two or more witnesses, during the illness whereof he died, that his body, after death, might not undergo such examination; or unless the surviving husband or wife, or any known relative of the deceased person, shall require the body to be interred without such examination: while, by section 8, it is declared that the wishes of persons who had expressed a desire that their bodies should be subjected to anatomical examination shall be respected, unless the deceased person's surviving husband or wife, or nearest known relative, or any one or more of such person's nearest known relatives being of kin in the same degree, shall require the body to be interred without such examination. Bodies are not to be removed for examination until forty-eight hours after death, and without a certificate by the medical attendant, stating, according to the best of his knowledge or belief, the manner or cause of death. The act contains a number of provisions intended to secure its sufficient administration; but by section 15, it is provided that it shall not extend to or prohibit any post-mortem examination of any human body required or directed to be made by any competent legal authority; and it repeals an enactment in a previous statute, 9 George IV. c. 31, which directed the bodies of murderers after execution to be dissected.

This act of parliament is understood to have met the evil it was designed to obviate; and under it the supply of bodies of persons dying friendless, in poor-houses, hospitals, and elsewhere, is stated to have proved sufficient for the wants of the profession.

ANAXA'GORAS, one of the most eminent philosophers of the Ionic school, was born at Clazomenæ, in Ionia, 500 B.C. He belonged to a wealthy and distinguished family, which circumstance may have enabled him to devote himself exclusively to intellectual pursuits. Yet he does not seem to have entered into the possession of his property, but left it to his relations. When only twenty years of age, he went to Athens, where, in the course of time, he acquired a high reputation, and had several illustrious pupils, among whom were Pericles, Euripides, Socrates, and Archelaus. But at last, being accused of impiety towards the gods, he was condemned to death. His sentence, however, was commuted into banishment for life, through the eloquence of Pericles. He withdrew to Lampsacus on the Hellespont, where he died in the 73d year of his age. The old man was accustomed to say proudly, in his exile: 'It is not I who have lost the Athenians, but the Athenians who have lost me.' When on his deathbed, the magistrates of the town asked what funeral honors he desired; 'Give the boys a holiday,' was the quaint reply of the sage; and for several centuries the day of his death was commemorated in all the schools of Lampsacus.

It is not easy to ascertain what were the opinions of A. in philosophy. Fragments merely of his works have been preserved, and even these are sometimes contradictory. Of one thing we are certain, that he had a deeper knowledge of physical laws than any of his predecessors or contemporaries. The absurdities of opinion which are attributed to him are no proof of the contrary, for, in his time, any attempt to explain even a moderate number of the phenomena of nature was sure to be attended with what everybody now sees to be extravagant fictions. He believed the heavens to be a solid vault; the stars to be stones thrown up from the earth by some violent convulsion, and set on fire by the ether which ever burns in the upper regions of the universe; the milky-way to be the shadow of the earth; that the soul had an aërial body; that the sun was a burning mass of stone, larger than the Peloponnesus. But he also arrived at some tolerably accurate conclusions regarding the cause of the moon's light, of the rainbow, of wind, and of sound. His great contribution to ancient philosophy, however, was his doctrine as to the origin of all things. He held that all matter existed originally in the condition of atoms; that these atoms, infinitely numerous, and infinitely divisible, had existed from all eternity, and that order was first produced out of this infinite chaos of minutiæ through the influence and operation of an eternal intelligence (Gr. *nous*). He also maintained that all bodies were simply aggregations of these atoms, and that a bar of gold, or iron, or copper, was composed of inconceivably minute particles of the same material; but he did not allow that objects had taken their shape through accident or blind fate, but through the agency of this 'shaping spirit' or Nous, which he described as infinite, self-potent, and unmixed with anything else. 'Nous,' he again says, 'is the most pure and subtle of all things, and has all knowledge about all things, and infinite power.' A.'s theory is thus only one step from pure theism. He makes the work of the Eternal commence with providence, not with creation.

The fragments of A. have been collected by Schaubach (Leipsic, 1827), and by Schorn (Bonn, 1829).

ANAXIMA'NDER, a Greek mathematician and philosopher, the son of Praxiades, and the disciple and friend of Thales, was born at Miletus 610 B.C., and died in 546. His principal study was mathematics. He is said to have discovered the obliquity of the ecliptic, and certainly taught it. He appears to have applied the *gnomon*, or style set on a horizontal plane, to determine the solstices and equinoxes. The invention of geographical maps is also ascribed to him. As a philosopher, he speculated on the origin (*arche*) of the phenomenal world, and this principle he held to be the infinite or indeterminate (*to apeiron*). This indeterminate principle of A. is generally supposed to have been much the same with the chaos of other philosophers. From it he conceived all opposites, such as hot and cold, dry and moist, to proceed through a perpetual motion, and to return to it again.

Of the manner in which he imagined these opposites to be formed, and of his hypothesis concerning the formation of the heavenly bodies from them, we have no accurate information. It would seem, however, that he did not believe in the generation of anything in the proper sense of the word, but supposed that the infinite atoms or units of which the *arche*, or primary matter, is composed, merely change their relative positions in obedience to a moving power residing in it. Some of his particular opinions were, that the sun is in the highest region of the heavens, is in circumference twenty-eight times greater than the earth, and resembles a cylinder from which flow continual streams of fire; that eclipses are caused by the stopping of the openings from which the fire flows; that the moon is also a cylinder, nineteen times greater than the earth; and that the moon's phases are caused by obliquity of position, and eclipses by complete turning round. He taught that the earth is of the form of a cylinder, and that it floats in the midst of the universe, that it was formed by the drying up of moisture by the sun, and that animals are produced from moisture.

ANAXI'MENES, a Greek philosopher, born at Miletus, flourished about 556 B.C. He held *air* to be the first cause of all things, or the primary form of matter, from which all things are formed by compression.

A'NBURY, a disease to which turnips are liable, and which often proves of serious importance to farmers, destroying the crop of entire fields. It is sometimes called *Club-root*, because of the knobs or tubercular excrescences which form upon the root. The root, instead of swelling into one turnip of good size, generally becomes divided into a number of parts, each in some small degree swelling separately by itself; whence the popular name, *Fingers and Toes*. The growth of the plant is arrested; the root becomes woody; the excrescences rot, and emit most offensive effluvia,

which, however, appear peculiarly attractive to insects of various kinds; and, accordingly, eggs and maggots in abundance are soon to be found in them. It has been very generally supposed that these insects, or some of them, are the cause of the disease; but the truth seems rather to be that they are attracted by the diseased state of the plant. A. has been erroneously confounded with the excrescences, each containing a small grub, which are frequent on the roots of turnips, as on those of cabbages, and many other cruciferous plants, although these also sometimes effect the destruction of the plant. The true nature and cause of the disease are not yet well known. Much attention has been devoted to the subject; and premiums have been offered in connection with it by the Highland and Agricultural Society of Scotland; but hitherto, without eliciting any certain or satisfactory information. It appears probable that the disease is in some measure owing to peculiarities of soil, or of manure, and to the too frequent repetition of turnip-crops upon the same field. A much greater frequency of repetition, however, can be safely practised in some districts, or in some fields, than in others. The liberal application of lime has been found advantageous as a preventative of A.; but even this often succeeds but imperfectly; and the increasing prevalence of this disease in certain districts seems not unlikely to necessitate a considerable modification in the system of husbandry, in which the turnip-crop has long occupied so important a place. See TURNIP.

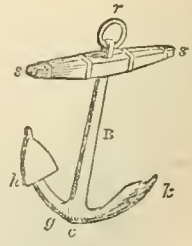
ANCA'STÉ, a town of the Argentine Republic, South America, in the province of Catamarca, 23 miles north-east from Catamarca. Pop. about 8000.

ANCELOT, JAQUES-ARSENE-POLYCARPE-FRANÇOIS, a French poet, born February 9, 1794, at Havre, where his father was clerk of the Chamber of Commerce. The latter being a well-informed gentleman, delighting in verse, early taught his son to recite passages from the French poets. A. was from the first intended for active life in connection with the administration of the navy; and was employed, until the revolution of July, in the government service. His reputation was first established in 1819 by his tragedy of *Louis IX.*, which was played fifty nights in succession, and procured him a pension of 2000 francs from the king. His next piece, *The Mayor of the Palace* (1823), was not so well received. In 1824, appeared his *Fiesque*, a work which exhibited the great skill of the author in adopting a master-piece of Schiller to the French stage. In 1825, he gave to the world an epic poem in six cantos, *Marie de Brabant*; and in 1827, a clever and graceful work, partly prose and partly verse, entitled *Six Months in Russia;* besides a novel in four volumes, *The Man of the World*. *Olga*, a drama, was published in 1828; and *Elizabeth of England* in 1829. Both of these works were highly successful, though neither met with the brilliant reception of *Louis IX.* In 1834 appeared *Les Emprunts aux Salons de Paris*. The revolution of July deprived him of his pension, and also of his situation as librarian of Meudon; and for the next ten years, he was compelled to support himself and family by the concoction of numberless *vaudevilles*, dramas, comedies, anecdotes, &c., sometimes of very questionable morality. In 1841, the French Academy chose him as the successor of Bonald. Shortly after appeared his *Familiar Letters* (*Epîtres Familières*), a collection of satires as remarkably for freshness of epigram as for grace of style and richness of versification. In 1848, he published *La Rue—Quincampoix*. He died in 1850.

A.'s *chef-d'œuvre, Louis IX.*, is a work of genius; the versification is correct, elegant, and harmonious; the manners and characters of the period are delineated with great fidelity and brilliancy; the plot is skilfully constructed; and some of the scenes are contrived with singular felicity.

A'NCHOR,, an implement for retaining a ship in a particular spot, by temporarily chaining it to the bed of a sea or river. Many forms of A. were made by the ancients; some were merely large stones; others, crooked pieces of wood, weighted to make them sink in water, the earlier ones acting mainly as weights, and holding the vessel by their own inertia instead of hooking into the ground. The first *iron* anchors are supposed to have been used by the Greeks. As originally made, the A. had only one fluke or arm for penetrating the ground, but a second was afterwards added; it had no stock (presently to be described), and was, on that account, ill suited for insuring a firm grip into the ground when lowered. The Greek vessels had several anchors, one of which, called the 'sacred A.,' was never let go until the ship was in dire distress. Of whatever form and material the ancient anchors were made, they were lowered from the ships' sides by ropes—chain cables being a modern invention.

The maritime nations of Europe, and the United States of America, employ anchors bearing a good deal of general resemblance one to another. A large-sized modern A., regarded irrespectively of improvements recently introduced, comprises the following parts: The vertical or supporting beam of the A. is the *shank*, B; at the upper end of it is a *ring*, *r*, or a shackle, and just below the ring is a transverse piece called the *stock*, *s s*; the other extremity is the *crown*, *c*, from which branch out two *arms* or *blades*, *g*, in directions nearly at right angles to that of the stock; each arm spreads out into a broad *palm* or *fluke*, *h*, the sharp extremity of which is the *peak* or *bill*, *k*. All these parts bear special relation to the fast-holding of the A. in the ground. When the A. is let go from the ship's side, the crown first strikes the ground; it then falls over in such a manner that one end of the stock rests upon the ground; and the subsequent movements of the ship and the cable cause one or other of the flukes (it matters not which) to dig vertically into the ground, and maintain a firm hold. On the firmness of this gripe depends the safe anchoring of the ship; and the size of all the different parts of the A., as well as the curve of the arms and flukes, are calculated with direct reference to this condition. The most favorable angle between the face of the flukes near their extremities and the shank has been found to be about 45°—that is, the planes of the two flukes should lie approximately at right angles to each other.

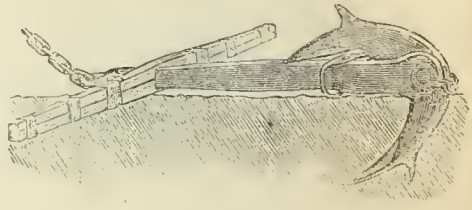


Anchor.

The number of anchors in British ships-of-war is in general four—the 'best bower,' the 'small bower,' the 'sheet,' and the 'spare.' For particular and special services, there are also the 'stream' and the 'kedge,' which are usually carried 'in-board.' Smaller vessels have fewer and smaller anchors; and the 'stream'-A. of a large ship may conveniently serve as the 'bower' for a smaller, the difference between bower, sheet, and spare anchors being rather in size than in design. Lloyd's rules prescribe the number and weight of anchors which must be carried by ships of different sizes registered in their list, as well as the size and length of their cables, hawsers, and warps. A 200-ton vessel must have 3 'bowers,' 1 'stream,' and 1 'kedge' A.; vessels from 250 to 1800 tons carry an additional 'kedge,' and those above 2000, an additional 'bower' also. Steamers are only required to carry the anchors and cables which belong to a sailing vessel of two-thirds their total tonnage.

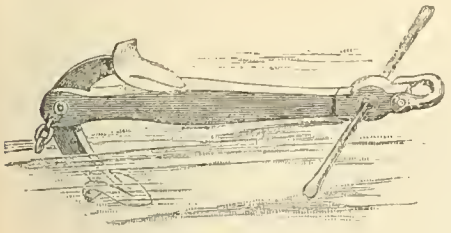
Many important improvements in the shape and construction of anchors have been introduced within the last forty years. Lieutenant Rodgers, to increase the strength, without increasing the weight, took out a patent for *hollow-shanked* anchors; these are not strictly hollow, however, for there is a wooden core, which is bound to the iron of the shank by iron hoops. Mr. Pering introduced iron shanks made of layers of flat bars, instead of solid iron. The same inventor increased the strength of the arms, by making them in great part a curved continuation of the same pieces of iron which form the shank.

The most important novelty, however, is that introduced under Mr. Porter's patent of 1838, seeing that it is the basis which supports all the subsequent improvements of any note. The arms are pivoted to the stock, instead of being rigidly fixed; and there is a projecting piece, called the *toggle*, on the convex part of each arm. These two additions or adjustments have a remarkable effect on the action of A. The advantages of this A. over those of ordinary make are very considerable. There is less chance of 'fouling' by the cable passing over the exposed fluke of the A. when the vessel is swinging in a tideway; there is less danger of injury from the upper peak; the A. cannot lodge on its stock-end; it is stronger in the arm than the ordinary anchors; and it is very conveniently stowed on shipboard. On the other hand, it has the disadvantage of increased complication over A. made in one piece; its taking the ground is not so certain as with the old A.; it is extremely difficult to sweep if the cable parts; and it is somewhat awkward to fish.


Porter's Anchor at Work.

Among the modifications of Porter's A., since introduced, are those of Trotman and Honiball. Trotman's, to which most attention is at present directed, has several advantages over Porter's, principally in the arrangement of the palms and toggles, but it possesses the same disadvantages. This A. was for long the subject of a bitter contention between Mr. Trotman and the Admiralty. In 1852, in compliance with a requisition from numerous ship-owners and underwriters, the Admiralty appointed a committee, consisting of eleven experienced and impartial persons, to make trial of a large number of anchors, with a view of determining the relative merits of various forms and modes of construction. The anchors were to be similar in weight, and were to be tested in a great variety of ways—on shore, and at sea, and in reference to the holding, stowage, sweeping, tripping, fouling, &c. Most of the recently invented anchors tried were

found to be better than the ordinary Admiralty A.; and the one which appeared to possess the greatest number of good qualities was Trotman's. It is beyond doubt a very good A., and is largely used in the merchant service; but the Admiralty—in spite of the favorable report of their committee—have never yet felt justified in adopting any A. not made in one piece, and it is not used either in the British or (we believe) any other navy. The Admiralty A. (often spoken of as Sir William Parker's) has been of late years greatly improved in many details, chiefly by Mr. Lenox, and is probably now as perfect as a solid A. can be.



Trotman's Anchor at Work.

The manufacture of anchors furnished, until recent years, the most formidable exemplification of smith's work anywhere presented, on account of the great dimensions and weight of the pieces of iron which had to be welded into one mass. The anchor-smiths wielded the most ponderous sledge-hammers known to our artisans; and the services of a large number were needed to weld the metal while in the heated and yielding state. At the present time however, the operations are rendered very much more easy by the steam-hammer, the force of which is both greater and more easily applied than that of any available number of sledge-hammers wielded by men. At some of the government dockyards, anchor-making is conducted on a great scale; but the larger portion of the supply for the navy is obtained by contract by private firms.

We have already spoken of the sizes of anchors, &c., prescribed for merchant vessels under Lloyd's regulations. Some of these particulars for a few differently sized vessels, will be found in the accompanying table.

Ship's Tonnage.	*Anchors.*				*Stud-Chain Cables.*		
	No. of Bowers.	*No. of Others.*	*Weight of each Bower.**	*Admiralty Test.*	*Size [minimum.]*	*Length.*	*Admiralty Test.*
			cwts.	*tons.*	*in. 16ths*	*fath.*	*tons.*
100	2	2	4·00	6·4	0 13	150	11.9
200	3	2	8·25	10·4	1 1	180	20 3
500	3	3	18·00	19·0	1 7	270	37.2
1000	3	3	30·00	28·6	1 12	300	55.1
1400	3	3	34·00	31·6	1 14	300	63 25
2000	4	3	40 00	35·7	2 1	300	76.5
2500	4	3	42·00	37·1	2 2	330	81 3
3000	4	3	45·00	39·2	2 4	360	91.1

* Excluding stock.

A'NCHORAGE is a due or toll levied on the owner or captain of a ship for permission to cast anchor at special anchoring-grounds. In most instances, it is payable to the state; but sometimes the right is vested in corporate bodies or in individuals. The tariff varies greatly, depending on the size of the ship, or on the value of the cargo, according to circumstances. In most cases, where a vessel is driven into port by stress of weather, and does not discharge cargo there, it is exempt from this toll. Shore-dues differ from A. chiefly in the fact, that a vessel pays duty on entering a certain port or harbor, whether she anchors or not; and, by a singular anomaly, these duties are in certain instances vested in the corporation of an inland town, many miles distant from the port in question.

A. is a term also sometimes applied to the whole suite of anchors belonging to a ship; and still more frequently it has the same sense as anchor-ground (q. v.).

A'NCHOR-GROUND is a part of the bed of the sea, or of a river, suitable for anchoring. It must not be too deep, or the cable will bear too perpendicularly, and will be likely to drag the anchor out of the ground. It must not be too shallow, or the ship's bottom will be exposed to the hazard of striking at low-water, or when the sea is rough. It must not be too rocky, or the anchor will be liable to break its flukes by hooking into jagged rocks, and the cable to be severed by rubbing against rocky edges. Thus, a combination of favorable circumstances is necessary for the selection of a good anchoring-ground.

A'NCHORITES, or ANCHORETS (Gr. *anachoretai*, literally, persons who withdraw from society), the hermits who began to appear in the Christian Church in the 3d c., living in solitude, and not, like the monks or cenobites, in communities. During the first two centuries. Christians generally thought it enough to withdraw from the world by refusing to participate in heathen festivals and amusements; but extreme views became gradually prevalent, and were connected with a belief in the merit of celibacy, of abstinence from particular kinds of food, of self-inflicted tortures, &c. The persecutions to which Christians were subjected, drove some into the solitude of deserts; afterwards, the glory of a life spent in loneliness and austerity became a substitute for that of the martyr's death. The general corruption of society also caused many earnest and well-meaning persons to flee from it; the Ascetics (q. v.) first set the example of retiring from cities to rural districts and villages; the A. went further, and sought to withdraw themselves altogether from mankind; and if the reputation of sanctity which was connected with a life of solitude constituted its chief attraction to some, there can be no doubt that many chose it in the hope of thereby attaining to real sanctity. Many of the A. voluntarily subjected themselves to the vicissitudes of the weather, without proper habitation or clothing, restricted themselves to coarse and scanty fare, wore chains and iron rings, and even throughout many years maintained painful postures, such as standing on the top of a pillar (see STYLITES), thus displaying an earnestness which greater enlightenment might have directed to the good of mankind. Paul (q. v.) the Hermit, and Antony (q. v.), were among the first and most celebrated A. The A. were not able always to preserve their solitude unbroken. The fame of their sanctity drew many to visit them; their advice was often sought; and the number of their visitors was much increased by the belief that diseases, particularly mental diseases, were cured by their blessing. Sometimes, also, they returned for a short time to the midst of their fellow-men to deliver warnings, instructions, or encouragements, and were received as if they had been inspired prophets or angels from heaven. The number of A., however, gradually diminished, and the religious life of convents was preferred to that of the hermitage. The Western Church, indeed, at no time abounded in A. like the eastern, and perhaps the reason may in part be found in the difference of climate, which renders a manner of life impossible in most parts of Europe that could be pursued for many years in Egypt or Syria.

ANCHOVY (*Engraulis Enchrasicholus*), a small fish, about a span long, much esteemed for its rich and peculiar flavor. It is not much longer than the middle finger, thicker in proportion than the herring, to which it has a general resemblance; the head is sharp-pointed, and the under jaw much shorter than the upper; the scales large, silvery, and easily removed, the tail deeply forked. It is occasionally found on the British coasts, and is said to be not at all uncommon on the coast of Cornwall in the latter part of summer and beginning of autumn. It would seem to have been formerly more abundant than it now is in the British seas, as several acts of parliament, of the reign of William and Mary, regulated the A. fisheries. It occurs on the coasts of the Baltic and of Greenland, and abounds in the Mediterranean and on the Atlantic coasts of Spain, Portugal, and France, where extensive and very productive fisheries are carried on, particularly in the months of May, June, and July, when the shoals of anchovies leave the deep seas, and approach the shores for the purpose of spawning. They are fished during the night, and are attracted to the boats by fires. They are salted in small barrels, and are much used for sauces, &c. The Romans made from them a highly valued sauce called *garum.—Sardines* (q. v.) are often sold as anchovies.—The genus *Engraulis* belongs to the *Clupeidæ* (q. v.) or Herring family, and was formerly included in *Clupea*, from which it is distinguished by the more deeply cleft mouth, the wider gill openings, and more numerous gilt rays. All the species are small, and most of them tropical. *E. Brownii* abounds in the Strait of Malacca and at the mouths of the Ganges, and is used for making a delicious condiment called *Red Fish* in India.

Anchovy.

ANCHOVY PEAR (*Grias cauliflora*), a tree, the only known species of a genus somewhat doubtfully referred by Lindley to his order *Barringtoniaceæ* (more generally regarded as a sub-order of *Myrtaceæ* q. v.). It grows in boggy places in the mountainous districts of Jamaica and other West Indian islands, attains a height of fifty feet, and has great oblong leaves two or three feet in length. The flowers are numerous, on short pedunceles, large and whitish, the corolla consisting of four petals, and the calyx 4-cleft. The fruit is an ovate drupe, crowned with the persistent calyx, the stone marked with eight ridges. This fruit is pickled and eaten like the East Indian mango, which it much resembles in taste.

ANCHUSA. See ALKANET.

ANCHYLOSIS. See ANKYLOSIS.

ANCILLON, a French family who, after the revocation of the

Edict of Nantes, migrated from Metz into Prussia.—DAVID A. studied theology at Geneva, was afterwards pastor of the French Reformed colony at Hanau, and died in Berlin in 1692.—CHARLES, son of the former, was born at Metz, July 28, 1659, and died in Berlin, July 5, 1715. He is known by his writings: *L'Irrévocabilité de l'Edit de Nantes* (1688), and *Histoire de l'Etablissement des Français Refugiés dans les Etats de Brandenbourg* (1690).—LOUIS FREDERICK, grandson of Charles A., was born in Berlin 1740, and died there as pastor of the French congregation in 1814. His son FREDERICK, who rose to be a minister of state in Prussia, was born in Berlin, April 30, 1767. In 1792, he was appointed Professor of History in the Military Academy of Berlin, and afterwards Royal Historiographer, a post to which he had recommended himself by his work, *Tableau des Révolutions du Système Politique de l'Europe depuis le 15me Siècle* (4 vols. Berlin, 1803—1805). In 1814, he took an administrative post under Hardenberg, and, in 1818, held a very prominent position under Count von Bernstorff. In 1830, when the July revolution occurred in France, he assisted the measures of King Frederick William III. for the preservation of peace in Europe. While, like the politicians of Austria, he argued that 'all should be done *for* the people, but nothing *by* the people;' he also contended for the necessity of progressive reforms in legislation, in order to prevent all violent collisions between government and popular opinion. His private life was simple and unostentatious. Though thrice married he left no children. A. died April 19, 1837. His various writings on politics, philosophy, and literature, are chiefly devoted to an exposition of the principles by which he was guided as a statesman.

ANCO'NA, the capital of a province in Italy of the same name, lat. 43° 38′ N., and long. 13° 35′ E. It is situated on a promontory of the Adriatic coast, and rising in the form of an amphitheater, presents a picturesque appearance from the sea. It is the seat of a bishop, and contains (1881) 28,557 inhabitants, of whom above 5000 are Jews. The harbor, once famous, seems likely to be filled up with mud. The commerce is much less considerable than it once was, though, in that respect, it is still one of the most important places on the Adriatic. Corn, and woollen and silk goods, oils, cordage, bacon, fruits, &c., are the chief exports. In recent years there has been a decline in the value of exports and imports. A mole of 2000 feet in length, built by the Emperor Trajan, and a triumphal arch of the same emperor, are the most notable monuments of antiquity. One of the most venerable buildings is the cathedral of St. Cyriac, built in the 10th c., and possessing the oldest *cupola* in Italy. But the houses are in general mean, and the streets narrow.

A. is supposed to have been founded by Syracusans, who had fled from the tyranny of Dionysius the Elder. It was destroyed by the Goths, rebuilt by Narses, and again destroyed by the Saracens in the 10th c. It afterwards became a republic; but in 1532, Pope Clement VII. annexed it to the States of the Church. In 1798, it was taken by the French; but in 1799, General Mennier was obliged to surrender it to the Russians and Austrians, after a long and gallant defence. Since 1815, the citadel has been the only fortification. When the Austrian troops in 1831 occupied the Roman frontiers, whose inhabitants were then in a state of insurrection, the French ministry determined to neutralize the influence of Austria. A French squadron appeared before the harbor, and landed 1500 men, who took possession of the town on the 22d February 1832 without any resistance, the citadel capitulating on the 25th. It remained in their hands till 1838, when both French and Austrians retired from the Papal States. In 1849, a revolutionary garrison in A. capitulated after enduring a siege by the Austrians of 25 days.

ANCRE, CONCINO CONCINI, BARON DE LUSSIGNY, MARSHAL D', a Florentine by birth, who came to the French court in the year 1600, with Maria de' Medici, the wife of Henry IV., and along with his wife, Eleonora Galigai, exercised an unhappy influence in promoting the disagreement between the king and queen. When, after Henry's death, the queen became regent, Concini, as her favorite, obtained possession of the reins of government; and in 1613, was made a marshal and prime minister. He purchased the marquisate of Ancre in Picardy, and took his title from it. He became an object of detestation equally to the nobility and the people. A conspiracy was formed against him, to which the young king Louis XIII. was himself privy—Luynes (q. v.), the king's worthless favorite, being one of the conspirators—and he was assassinated in the Louvre in open day, on the 24th of April 1617. His body was privately buried, but was soon disinterred by the populace, dragged through Paris, and burned before the statue of Henry IV. His wife was soon afterwards accused of witchcraft, which she sarcastically repudiated, saying that the only sorcery she had employed to influence the queen was 'the power of a strong mind over a weak one.' The sneer, however, did not save her. She was executed, and her son, deprived of rank and property, was driven from the country.

ANCUS MA'RCIUS, son of Pompilia, daughter of King Numa Pompilius, was the fourth king of Rome. Following the example of his grandsire, Numa, he endeavored to restore the almost forgotten worship of the gods and the cultivation of the arts of peace among the Romans. But, despite his inclination for peace, he was engaged in several wars with the neighboring Latin tribes, whom he subdued and reduced to order. These Latins, Niebuhr considers to have formed the original *plebs*. Against the Etruscans, he fortified the Janiculum, connected it with Rome by a wooden bridge, and gained possession of both banks of the Tiber, as far as its mouth, where he founded Ostia as the port of Rome; he dug, what he called 'the Ditch of the Quirites'—a defence for the open space between the Cælian Hill and Mount Palatine; and built the first Roman prison of which we read, a proof that civilization had really commenced, inasmuch as offences then formally ceased to be regarded as private and personal matters, and were treated as crimes against the community. He died in 614 B.C., after reigning twenty-four years.

ANCYRA. See ANGORA.

A'NDA, a genus of plants of the natural order *Euphorbiaceæ*, the only known species of which, *A. Brasiliensis*, is a Brazilian tree, with large yellow flowers, and an angular fruit about the size of an orange, containing two roundish seeds, like small chestnuts. The seeds are called in Brazil *Purga dos Paulistas*, are much used medicinally in that country, and are more purgative than those of the castor-oil plant. This quality seems to depend upon a valuable fixed oil, of which twenty drops are a moderate dose. It is obtained by pressure. The bark of the tree, roasted in the fire, is accounted in Brazil a certain remedy for diarrhœa, brought on by cold. The fresh bark, thrown into ponds, is said to stupify fish.

ANDALU'SIA or ANDALUCIA, a large and fertile province or kingdom in the south of Spain, lying between 36° 2′ and 38° 39′ N. lat., and 1° 38′ and 7° 20′ W. long. Having been overrun by the Vandals, it is supposed by some that they gave it the name of Vandalucia or Andalucia; but the real origin of the name is probably *Andalosh*, the Land of the West. It is the *Tarshish* of the Bible, and was called Tartessus in ancient geography. The Romans named it Bætica, from the river Bætis (the modern Guadalquivir). The Moors founded here a splendid monarchy, which quickly attained a high degree of civilization. Learning, art, and chivalry flourished in harmony with industry and commerce. The four great Moorish capitals were Seville, Cordova, Jaen, and Granada. During the darkness of the middle ages, Cordova was 'the Athens of the west, the seat of arts and sciences;' and later still, under the Spaniards, when 'the sun of Raphael set in Italy, painting here arose in a new form in the Velasquez, Murillo, and Cano school of Seville, the finest in the peninsula.' On the north, A. is divided from Estremadura and New Castile by the mountain-chains of Aroche, Cordova, and Morena. On the east it is bounded by Murcia, and on the west by Portugal and the Atlantic. The south coast eastward from Gibraltar is mountainous; the west, where the Guadalquivir flows into the Atlantic, is level. A. was esteemed the richest district of Hesperia, and its former wealth of produce has been indicated by such names as the 'garden,' the 'granary,' the 'wine-cellar,' and the 'gold-purse of Spain.' But, in the present day, such predicates are merited only by comparatively small portions of the hilly country on both sides of the Guadalquivir, where, even with careless cultivation, the soil is luxuriantly productive. Here wheat and maize ripen in April, and yield abundantly. Olives and oranges attain their greatest height, and vegetation generally assumes a tropical character. Cotton, sugar-cane, Indian figs, and batatas flourish in the open air, and the cactus and aloe form impenetrable hedges. Wine and oil abound.

The botany and mineralogy of A. are very rich. The ranges of the Sierra Nevada are composed principally of primary and secondary formations. In the west, towards Xenil, cultivation is more sparing, as there is a natural deficiency of water, and the artificial means of irrigation formerly employed have fallen into disuse. Nearer to the coast lie tracts of land still more barren; and the level strip extending between the mouths of the Guadalquivir and the Tinto, is covered with moving sands. On the whole, A. is still one of the most fertile districts of Spain, owing to its delicious southern climate and the abundance of water supplied by its snowy mountains. Its breed of horses has long been celebrated, and the mules are superior to those of other countries. The *Sierra Morena* mountains supply the wild cattle exhibited in the bull-fights of Madrid. The natural riches of the district have at various times invited colonists and invaders, such as the Phœnicians and the Moors. The Andalusians are regarded as among the most lively, imaginative, and active people of Spain. But they are also considered by the rest of their countrymen to be the Gascons—the braggarts and boasters of Spain. Apparently they have never at any time been warlike, since even Livy calls them *imbelles*. They are, like all braggarts, extremely credulous, and are, besides, remarkable for their intense superstition. The wor-

ship of the Virgin prevails to such an extent that the very country is called 'the land of the Most Holy Virgin.' They speak a dialect of Spanish mixed with Arabic. A. is divided into the provinces of Almeria, Jaën, Malaga, Cadiz, Huelva, Seville, Cordova, ,and Granada. The chief towns are Seville, Cordova, Jaën, Cadiz (q. v.). Area 33,340 square miles. Pop. (1877) 3,282,448.

A'NDAMANS, a group of thickly wooded islands towards the east side of the Bay of Bengal, between 10° and 14° of N. lat., and about 93° of E. long. The population is both barbarous and scanty, and bears no resemblance whatever either in physical features or language to the neighboring Asiatic races. In 1793 the Great Andaman received a British colony, which was withdrawn, however, in 1796. Since 1857, the A. has been a penal settlement for sepoy mutineers and other criminals. In 1872, Lord Mayo, governor-general of India, was assassinated here by one of the convicts. It is physically, however, that the A. deserves mention, not for anything in themselves, but from their being a portion of the long arch, mostly volcanic, of the Indian Archipelago, which, with Timor at its bend, comprises the Moluccas, Celebes, the Philippines, and Formosa, on the one side; and on the other side the Sunda Isles, Java, Sumatra, the Nicobars, and the A.—the outline only requiring to be filled up in imagination, in order to produce a peninsula harmonizing more or less with the other southern projections of the world, Hindostan, Africa, and South America.

ANDA'NTÉ (Italian), in Music, implies a movement somewhat slow and sedate, but in a gentle and soothing style. This term is often modified, both as to time and style, by the addition of other words—as *A. affettuoso*, slow, but pathetically; *A. cantabile*, slow, but in a singing style; *A. con moto*, slow, but with emotion; *A. grazioso*, slow, but gracefully; *A. maestoso*, slow with majesty; *A. non troppo*, slow, but not too much so; *A. pastorale*, slow, and with pastoral simplicity.

ANDENNES, a town of Belgium, in the province of Namur, 10 miles east from Namur, and nearly 2 miles south from the Maas. It has manufactures of paper, porcelain, and tobacco-pipes, for the last of which it is particularly famous. Cotton-spinning, bleaching, and other branches of industry are also prosecuted. There are beds of pipe-clay, quarries of marble, and lead, iron, and coal mines in the neighborhood. Pop. (1870) about 6700.

ANDERA'B, or INDERAB, a town in the Afghan portion of Turkestan, on the northern slope of the Hindu Kush Mountains, and on the right or northern bank of the Anderab or Inderab River, a branch of the Ghori or Kunduz, itself a branch of the Jihun, 80 miles south-south-east from Kunduz. It is surrounded by gardens, orchards, and vineyards. It is a principal entrepôt of commerce between Persia and India. Pop. supposed to be about 6500.

A'NDERNACH, a little town belonging to the district of Coblenz on the Rhine, in lat. 50° 27′ N., long. 7° 25′ E., was once a Roman fortress styled Antunnacum, then a residence of the Merovingian kings, and afterward became one of the most flourishing places on the Rhine. The great tower on the north side, the fine old church—with one tower built in the Carlovingian times—and the old gates and walls, give quite a medieval aspect to the town. It now contains about 5600 people, supported by trade in leather, wine, and corn, and is especially celebrated for its millstones, exported to distant parts of the world, and for its *tuffstein* or trass, an indurated volcanic mud, which, when pulverized and mixed with lime, makes a mortar or cement for constructions under water.

ANDERSEN, HANS CHRISTIAN, one of the most gifted poets that Denmark has recently produced, was born April 2, 1805, at Odense in Funen. His father was a poor shoemaker, who used, however, to console himself by speaking of the former prosperity and wealth of his family. After his father's death, he was for a short time employed in a manufactory. The widow of Bunkeflod, a poet of some reputation, charitably adopted him. He early displayed a talent for poetry, and was known in his native place as 'the comedy-writer.' Hoping to obtain an engagement in the theater, he went to Copenhagen, but was rejected because he was too lean. He was next encouraged to hope for success as a singer; but had hardly commenced his musical studies when his voice failed. He found generous friends, however, to help him in his distress; and application having been made by one of them to the king, he was placed at an advanced school at the public expense, and so began his academic education in 1828. Some of his poems, particularly one entitled *The Dying Child*, had already been favorably received, and he now became better known by the publication of his *Walk to Amak*, a literary satire in the form of a humorous narrative. In 1830, he published the first collected volume of his *Poems*, and in 1831 a second, under the title of *Fantasies and Sketches*. His *Travelling Sketches* were the fruit of a tour in the north of Germany. He completed his *Agnes and the Merman* in Switzerland; and one of his best works, *The Improvisatore*, a series of scenes depicted in a glowing style, and full of poetic interest, was the fruit of a visit to Italy. Soon afterwards, he produced *O.T.* (1835), a novel containing vivid pictures of northern scenery and manners, which was followed (1837) by another, entitled *Only a Fiddler*. In 1840, he produced a romantic drama, entitled *The Mulatto*, which was well received; but another drama, *Raphaella*, was less successful. In the same year appeared his *Picture-book without Pictures*, a series of the finest imaginative sketches. In the end of 1840, he commenced a somewhat lengthened tour in Italy and the East, of which he gave an account in *A Poet's Bazaar* (1842). In 1844, A. visited the court of Denmark by special invitation, and in the following year he received an annuity. After that date he traveled much, visited England as well as other countries. Among other works of A. are *Tales from Jutland* (1859); *The Sandhills of Jutland* (1860); *Tales for Children* (1861); *The Wild Swans*, and *The Ice Maiden* (1863); *The Story of My Life; Ahasuerus*, a drama; and *New Tales and Adventures* (1872). His works have been translated into German, English, &c. His *Dying Child* has been translated into the language of Greenland; and on his seventieth birthday he was presented with a book containing one of his tales in fifteen languages. On the same occasion, the king of Denmark give him the Grand Cross of the Dannebrog Order. A. died in August 1875. He is best known in Britain by his beautiful fairy tales.

ANDERSON, JAMES, LL.D., a writer on political economy and agriculture, was born in 1739 at the village of Hermiston, near Edinburgh. He lost both his parents when very young, so that the management of a large farm, which had been in the possession of the family for a long time, devolved upon himself. Recognizing the practical importance of a knowledge of chemistry to a farmer, he attended the chemistry class in the university of Edinburgh, and brought the results of his study to bear on his profession. He invented, at an early period of life, the small two-horse plough without wheels, commonly called the Scotch plough, which is generally admitted to have been one of the most useful improvements of agricultural implements ever introduced. When only 24 years of age, he went to Aberdeenshire, where he rented a large moorland farm of 1300 acres. Here he remained for a considerable time, devoting his leisure hours to writing upon agriculture. His first attempt was a series of essays upon planting, which, under the signature of *Agricola*, he contributed to the *Edinburgh Weekly Magazine*. In 1780, the university of Aberdeen bestowed on him the degree of Doctor of Laws. In 1784, on account of his pamphlet, entitled *Encouragement of the National Fisheries*, he was engaged by government to make a survey of the western coast of Scotland, with special reference to that object. He next commenced in 1791 the publication of a periodical called *The Bee*, which was continued for three years; in 1797 he went to London, where he pursued his literary avocations with such intense assiduity, that his health gradually gave way. He died on the 15th of October 1808.

A. will deserve a place in any record which details the remarkable advances made by Scotland in agriculture and other sources of wealth in the latter half of the 18th c. And even in the history of ideas he will deserve a prominent notice, as his *Bee* was the type of many periodical miscellanies of a cheap nature, mingling instruction with entertainment, which have since been published. It is also to be observed that, in his essay called *A Comparative View of the Effects of Rent and Tithe in Influencing the Price of Corn* (contained in one of his latest publications, *The Recreations of Agriculture*), he anticipated some important principles subsequently advocated by Malthus, Ricardo, and West, particularly the famous theory of rent.

ANDERSON, JOHN, F.R.S., Professor of Natural Philosophy in the university of Glasgow, and founder of the eminently useful institution bearing his name, was born in the parish of Roseneath, Dumbartonshire, in 1726. He studied at the university of Glasgow, in which, in his 30th year, he was appointed Professor of Oriental Languages. Four years later (1760), he was transferred to the chair of Natural Philosophy. He entered upon his new duties with extraordinary ardor. Besides the work of the class, he was indefatigable in studying the application of science to mechanical practice. Inspired by a rational philanthropy, he instituted, in addition to his usual class, which was strictly mathematical, one for artisans. He continued to teach this *Antitoga Class*, as he called it, twice every week, during the session, to the end of his life. In 1786 appeared his valuable work, entitled *Institutes of Physics*, which went through five editions in ten years. Shortly before the French Revolution, he invented a species of gun, the recoil of which was stopped by the condensation of common air within the body of the carriage; but having in vain endeavored to attract the attention of the British government to it, he proceeded to Paris in 1791, and, being himself a great friend of liberty, presented his model to the National Convention. It was hung up in their hall, with the following inscription over it: 'The gift of SCIENCE to LIBERTY.' Afterwards, when the allied monarchical forces had drawn a military cordon around the frontiers of France,

to prevent the introduction of French newspapers into Germany, A. ingeniously suggested the expedient, which was adopted and proved quite successful, of making small balloons of paper, to which newspapers and manifestoes might be tied, and letting them off, when the wind was favorable, for Germany. A. died 13th January, 1796. By his will, dated 7th May, 1795, he directed that the whole of his effects, of every kind, should be devoted to the establishment of an educational institution in Glasgow, to be denominated *Anderson's University*, for the use of the unacademical classes.

ANDERSON'S COLLEGE, or the ANDERSONIAN UNIVERSITY, was originally intended to consist of four colleges. The will of the founder places the institution under the immediate superintendence of 81 trustees, the mode of whose selection is prescribed, and these trustees elect annually nine of their number as managers. The funds being inadequate to the proposed plan, the institution was opened with only a single course of lectures on Natural Philosophy and Chemistry by Dr. Thomas Garnett in 1796. This course was attended by nearly a thousand persons of both sexes. In 1798 a professor of Mathematics and Geography was appointed. In 1799, Dr. Birkbeck, the successor of Dr. Garnett, commenced the system of giving a familiar exposition of mechanics and general science, and this was the origin of mechanics' institutes.

The institution has gradually enlarged its sphere of instruction, and brought it nearer to the design of the founder. In 1879, the number of professors amounted to 14, besides which there were 7 teachers and lecturers. Courses of instruction are given in Physical and Medical Science and in Chemistry; there are also taught Mathematics, Latin, Greek, Hebrew, French, &c. As a school of medicine, in particular, it possesses a high reputation.

In 1861, John Freeland, Esq., residing at Nice, mortified the sum of £7500 for promoting the permanent establishment, in Anderson's University, of Popular Lectures on Chemistry, Mechanical and Experimental Physics, and Anatomy and Physiology. In addition to the above, Mr. Freeland, in 1871, made a gift, for the general purposes of the university, of £5000. In 1866, William Ewing, insurance broker in Glasgow, settled in trust the sum of £3000 for the establishment of popular lectures on music in the university. In 1870, James Young, Esq., of Kelly, settled in trust the sum of £10,500 for the purpose of establishing a chair of Technical Chemistry; and recently the managers have obtained other funds whereby they have been enabled to institute a chair of 'Applied Mechanics.' In connection with the last two chairs, there are a number of valuable bursaries, the gift of gentlemen connected with the city, and others interested in extending scientific instruction.

A'NDES, the great mountain-chain of South America, extending in a direction nearly parallel with the Pacific, along almost the whole length of the continent. The chain falls short of the Isthmus of Darien, between which and the Atrato—a river falling into the Caribbean Sea—it gradually subsides into a merely undulating country. It appears, also, to fall still further short of the Strait of Magellan, so far as the mainland is concerned. But, on geological grounds, it has been traced, first along the islands that breast Patagonia to the west, and next along those that form the Fuegian Archipelago. Thus may the chain be said to stretch from the neighborhood of the mouth of the Atrato, not merely to Cape Horn, but even to the rocks of Diego Ramirez, which lie about 60 miles to the south-west of that promontory. The extreme length, therefore, is from lat. 8° 15′ N. to lat. 56° 30′ S.—comprising, of course, 64° 45′, or, without any allowance for windings or deviations, about 4500 English miles. But to mark the scale on which nature has moulded the new world, the A. may be regarded as merely a part of the sufficiently continuous chain of about 9000 miles which loses itself near the mouth of the Mackenzie, towards the shores of the Arctic Ocean. In this respect, the old continent can bring nothing into comparison.

Position.—The A., besides being generally in a direction nearly parallel with the Pacific, verge closely on that ocean. From the rocks, indeed, of Diego Ramirez to about lat. 40° S., the mountains, whether they are found on islands or on the mainland, are almost literally washed by the serf; while northward from that parallel, there spreads out, between the chain itself and the sea, a belt of land not exceeding, in average breadth, 70 or 80 miles. Within the limits of Peru, the belt in question is narrowest, while above and below it is, in general, somewhat more extensive. The position of the A. with respect to the Atlantic Ocean presents a striking contrast. To illustrate this, a passage is subjoined from Herndon, the explorer of the Amazon on behalf of the United States. Crossing from Lima to the head-waters of the Amazon, by the Pass of Antarangra, he writes thus: 'Yanacoto, on the western slope of the A., at the height of 2337 feet above the sea-level, is only 28 miles from the ocean that washes the base of the slope on which it is situated; while Fort San Ramon, at nearly the same elevation on the opposite side, cannot be much less than 4000 miles from its ocean by the windings of the river, and in the river's direct course is at least 2500 miles.' Further, to compare the two areas respectively to the west and east of the dividing ridge, the former has been estimated at 180,000 square miles, and the latter at twenty times as much.

Hydrography.—This interesting feature of the A. has been already anticipated, to a considerable extent, under the heads of the AMAZON and AMERICA. It only remains to observe that from one end of the continent to the other, the true and only water-shed, wherever there are two ranges, is the range nearer to the Pacific. Not only is the water-shed in question obviously far closer to the west than to the east, but, beyond this, it is apparently without a single exception, pushed as far to the westward as possible; it thus affords the most conspicuous and most decisive example of an almost universal law in the hydrography of the earth. Throughout both continents, almost every leading water-shed presents a longer descent towards the east than towards the west, or, in other words, sends off larger streams in the former direction than in the latter. To cite a few instances: compare, in North America, the Missouri with the Columbia; in Europe, the Volga with the Neva; in Asia, the Hoang-ho of China with the Oxus of the Sea of Aral; and even in Africa, where, as also in Arabia, hydrographical traces have been largely overlaid by deserts of sand, the plateau of the Sahara and the chain of the Atlas gradually incline, both of them, towards the east. But, if the water-shed be invariably found as far as possible to the westward, it necessarily follows that, wherever there are two ranges, the more easterly range cannot also be a continuous water-shed—unless, indeed, it may be regarded as such with respect to the land-locked basin of the connected lakes, Titicaca and Uroz, already mentioned under the head of AMERICA. With this exception, all the gatherings between the two ranges, whether the intermediate space be plateau or sierra, have found or formed channels of escape—narrow, deep, and dark as they often are—only to that sea which is thirty or forty times more distant than the one at their back.

Breadth and Area.—The area, on an estimate, necessarily rough and vague, has been computed to be triple that of the belt of comparatively level land that borders on the Pacific. In other words, the average breadth of the chain is reckoned to be thrice that of the belt in question. In a rough way, the breadth may be estimated from the very shore of the Pacific, whence the west slope commences, to the lowest *pongos*, or cataracts, on the eastward streams. But it is more correct to measure it from the foot of the mountains, properly so called, on the one side to that on the other. The phraseology of the country, which, on such a subject, ought to be conclusive, appears to support the latter mode of computation. In Lima and its neighborhood, where Herndon crossed the A., that officer speaks of 'coast' and 'sierra,' as distinguished from each other even to the westward of the dividing ridge. The entire distance of the Pass of Antarangra, as measured on the actual road, was 87 miles—the first 50 being *coast*, and the remaining 37 being *sierra*. Nor does the distinction seem to have been an arbitrary one. From Callao to Cocachera—a line of 44 miles—the rise above the sea-level, tolerably uniform the whole way, amounted to 4452 feet, or rather more than 101 feet to the mile; but the next 15 miles, of which about a half still belonged to what was called *coast*, yielded an increase of 2850 feet, an average probably of 200 feet for that part of the stage that fell under the definition of *sierra*. To give instances of extreme breadths of the A.—an average breadth being unattainable—the least breadth, and that in Patagonia, is believed to be 60 or 70 miles; the greatest breadth, again, pretty nearly on the parallel of Lake Titicaca, and right through the grand plateau of Bolivia, is said to be 400 miles; and to give an intermediate case, the breadth from Mendoza, in the basin of La Plata, to Santiago, in Chili, is given at 140 miles—the former city being 4486 feet above the Atlantic, and the latter 2614 above the Pacific.

In order, then, to have a definite idea of the breadth of the A., the chain must be viewed from one end to the other. In doing this, there will be adopted the ordinary nomenclature, referring each division of the A. to the particular country through which it may pass.

Patagonian Andes.—Including the A. of the Fuegian Archipelago, this part of the chain, extending from lat. 56° S. to lat. 42° S., a distance of more than 960 miles, is the narrowest of all, or is, at all events, too irregular to have its breadth accurately estimated. The Patagonian shore, strictly so called, is breasted, very much like the northwest coast between Fuca's Strait and Mount St. Elias, by a number of islands. On these, as already mentioned, the true A. are to be found, or rather, of these the true A. consist—the continent itself affording no footing to the chain till fully 300 miles to the northward of Cape Horn. Even after the chain has laid hold of the mainland, it by no means can be said to abandon the islands; so that here, as further to the north, the chain may be regarded as made up of parallel ranges—the main difference being that the intervening valleys, which, to the north, are basins of fresh-water rivers, here present salt-water channels.

Chilian Andes, stretching from lat. 42° S. to lat. 24° S., a dis-

tance of nearly 1250 miles. Throughout nearly the whole of this line, the A consist of only one range, for the parallel ridges, which run along between the great water-shed and the Pacific, cannot claim to be any exception to this remark, inasmuch as their highest points do not exceed an elevation of 2500 feet above the level of the sea. This part of the chain, however, presents several lateral ranges, if it does not present any parallel ones of importance. These spurs are to be seen on both sides, though of very different magnitudes. To the west, they are akin to the comparatively insignificant parallel ranges just noticed, being, if A. at all, nearly A. in miniature. But to the east, the spurs deserve more consideration. They are two in number, the one branching off between the 33d and 31st parallels, and the other between the 28th and 24th. The former, called the Sierra de Cordova, advances like a promontory into the plains of Rio de La Plata, or Pampas, as they are more generally denominated, as far as the 65th meridian; and the latter, called the Sierra de Salta, runs nearly as far to the east, and in a direction nearly parallel.

Peruvian Andes.—This part of the chain, stretching from lat. 24° S. to lat. 6° S.—a distance about the same as in the last paragraph—is perhaps the broadest of all the divisions of the A. It certainly contains the largest of the plateaus, the plateau of Bolivia. Between the 20th and 19th parallels, not far from the city of Potosi, the chain separates into two ranges, known as the East and West Cordilleras of Bolivia; and it is the reunion of these ranges, between the 15th and 14th parallels, that encloses the land-locked plateau of Titicaca, containing, as is said, 30,000 square miles, or an area equal to that of Ireland. Immediately above this table-land, the united ranges in question constitute the mountain-group of Cuzco, which, in point of superficial extent, is stated to be thrice as large as all Switzerland. About a degree further north, the chain again separates as before, reuniting also as before, between the 11th and 10th parallels, so as to embrace the cities of Guanta and Guancavelica. Hardly have the two ranges reunited, when they mass themselves into the table-land of Pasco, not quite half the size of that of Titicaca. Further to the north, the chain divides, not into two, but into three ranges, which unite again, on the frontiers of Ecuador, in the group of Loxa, about lat. 5° S.

Andes of Ecuador.—Immediately beyond the group of Loxa, between 4° and 3° of S. lat. the chain divides into two ranges, which, by again uniting in 2° 27′, form the valley of Cuença; and immediately beyond this is the group of Assuay, with its table-land. Then another plateau of no great extent, and a short stretch of the undivided chain, lead to the vast table-land of Quito, which is said to be subdivided by low hills into five smaller plateaus, two to the east, and three to the west. Towards the north, the table-land of Quito is succeeded by the group of Los Pastos, forming the extreme portion of the A. of Ecuador.

Andes of New Granada.—Beyond the city of Almaguer, the chain breaks off into two ranges, which never again join each other. The range on the west side remains undivided, till it disappears near the mouth of the Atrato, a little to the east of the Isthmus of Darien. But the range on the east, after massing itself into the group of Paramo de los Papas, breaks into two branches, which, as distinguished from the range aforesaid on the west, are styled the Central and Eastern Cordilleras of New Granada. These two contain between them the upper waters of the Magdalena, the eastern separating them from the basin of the Orinoco, and the central dividing them from that of the Cauca. Between them also they contain several considerable table-lands, the principal one being that of Santa Fé de Bogota.

Height.—Under this head must be treated separately the *plateaus*, the most prominent *mountains* and the *passes*—the altitudes of the lines of perpetual snow falling more naturally under the head of Climate. Here, as in the case of *breadth*, the chain will be followed from south to north.

HEIGHT OF PLATEAUS.

	Feet.
Table-land of Titicaca	12,700
Group of Cuzco	8,500
Table-land of Pasco	11,000
" " Assuay	15,520
" " Quito	9,543
" " Bogota	8,958

The average height of these six colossal masses above the sea-level is thus 11,000 feet, or considerably more than 2 English miles.

HEIGHT OF MOUNTAINS.

	Feet.
Fuegian Andes—	
Cape Horn	3,000
Sarmiento	6,800
Patagonian Andes—	
Yanteles	8,030
Corcobado	7,510
Minchinadom	8,000
Chilian Andes—	
Antuco	13,000
Aconcagua	22,296
Descabezado	12,102
Nevado de Chorolque	16,546
Bolivian Andes—	
Cerro de Potosi	16,040
Gualtieri	22,000
Nevado de Chuquibamba	21,000
" Illimani	21,150
" Sorata	21,290
Analache	18,500
Peruvian Andes—	
Arequipa	20,320
Andes of Ecuador—	
Chimborazo	20,600
Cotopaxi	19,500
Antisana	19,092
Pichincha	15,920
Cayambe	19,250
Andes of New Granada –	
Pic de Tolima	18,314

This last-named mountain is said to be the only one in New Granada that rises above the limit of perpetual snow. All the others appear to fall short of that line.

HEIGHT OF PASSES.

	Feet.
Chilian Andes—	
La Cumbre	12,454
Portillo	14,365
Bolivian Andes—	
Potosi	14,320
Las Gualillas	14,830
Peruvian Andes—	
Alto de Jacaibamba	15,135
Lachagual	15,480
Antarangra	16,199
Andes of Ecuador—	
Assuay	12,385
Andes of New Granada—	
Quindiu	11,500

These passes will bear a comparison with the loftiest pinnacles in Europe. The last and lowest overtops the highest summit of the Pyrenees by 332 feet; while the last but two, that of Antarangra, which Herndon traversed, soars 389 feet above Mont Blanc, the culminating peak of the Alps.

The passes across the A. present a vast variety of surfaces and levels. They appear to skirt, as often as practicable, the mountain-torrents; and when that is impracticable, sometimes surmount them by bridges, and sometimes avoid them by means of a path cut along the shoulder of the overhanging height.

With respect to the mountain-torrents, Herndon, after leaving Antarangra behind him, was enabled to avail himself chiefly of this resource. 'As far as the traveler,' says he, 'is concerned, there are not, on the route we have traveled, two ranges of the A.—that is, he has not to ascend and descend one range, and then ascend and descend another. From the time that he crosses at Antarangra, his progress is downward, till he reaches the plain. Really, however, there are two ranges. The streams from the first or western range have broken their way through the second, making deep gorges, at the bottom of which the road generally runs, and leaves the peaks of the second range thousands of feet above the traveler's head.'

In addition to the essential perils of such a course, Herndon encountered, on one occasion, an incidental danger, which he thus describes—the scene being a narrow path on the shoulder of an almost precipitous hill: 'Mr. Gibbon was riding ahead. Just as he was about to turn a sharp bend, the head of a bull peered round it on the descent. When the bull came in full view, he stopped; and we could see the heads of other cattle clustering over his quarters, and hear the shouts of the cattle-drivers, far behind, urging on their herd. I happened to be abreast of a slight natural excavation; and dismounting, I put my shoulder against my mule's flank, and pressed her into this friendly retreat; but I saw no escape for Gibbon. The bull, with lowered crest and savage look, came slowly on, and actually got his head between the perpendicular wall and the neck of Gibbon's mule. But his sagacious beast, pressing her haunches hard against the rock, gathered her feet close under her, and turned as on a pivot. This placed the bull on the outside; and he rushed by at the gallop, followed in single file by the rest of the herd.'

In the bridging of the mountain-torrents, a good deal of rude ingenuity is displayed. Sometimes chains are suspended from

side to side; and sometimes a rough flooring is laid between projecting beams from either bank, which have previously been fixed as solidly as possible. Nature has also done something in this respect to help man, having thrown two bridges of her own over a fearful chasm at Icononzo. The torrent, which they span, falls down a beautiful cataract into a murky crevice—the noisy haunt of nocturnal birds. At a height of 400 feet above the foaming waters, the two bridges hang in mid-air, both of them, apparently, though in different ways, the work of an earthquake. The upper one is merely a fragment of the original sandstone, which must have resisted the shock that formed the rent; while the lower, probably the most singular arch in the world, consists of three detached rocks, so adjusted as to support each other.

The loftiest pinnacles of the A., when viewed from the table-lands, and, still more, when seen from the crests of the passes, lose, to the eye of the beholder, much of their real altitude. Under such circumstances, not a single mountain presents the actual dimensions of Mount Blanc, as overhanging the Vale of Chamouni. It is only from a distance—best of all, perhaps, from a good offing in the Pacific—that the A. appear in all their gigantic proportions. Standing thus on their pedestal, the most rugged and colossal in nature, they almost realize to the spectator the highest Pyrenees piled on the highest Alps; while, to enhance the grandeur of the scene, the igneous action, which has heaved the chain into existence, is here and there adding to its stature a pillar of smoke and flame.

The geology of the A. is as yet very little known. It is more than half a century since Humboldt traveled through these mountains, and to him we are even now chiefly indebted for our knowledge regarding them. At that time, geology was in its infancy —its language had not been formed, its classification, at least as it now exists, was unknown, and its facts were mixed with absurd and now long-exploded theories; it could, in fact, scarcely be called a science. It is fortunate that as regards the materials constituting the great mass of the A. range—the igneous rocks which form its back-bone, and the metamorphic rocks which form its great bulk—our knowledge was almost as extensive and explicit 50 years ago as it is now, and therefore, in respect to them, Humboldt's observations are as good as if made but yesterday. Not so as regards the more recent sedimentary formations. The value of fossils was not then known, and the vaguest ideas prevailed as to the chronological order of the stratified rocks. Hence descriptions written at that time are almost valueless to modern science. A few scattered notes may be gleaned from the small number of intelligent travelers who have recently visited these mountains; and to them we are obliged for any of the facts we are able to give regarding the deposits referred to.

The elevation of the A. took place at an epoch anterior to the formation of the Rocky Mountains of North America, which are geographically a continuation of them. They are composed, to a very large extent, of stratified metamorphic rocks. It is remarkable that granite occurs in them not as an unstratified plutonic rock, but only intercalated with the other members of the stratified azoic series. The true igneous rocks belong either to the trappean or volcanic divisions. The grand ridge is everywhere covered with one or other of the varieties of trap (greenstone, clinkstone, basalt, or porphyry). These are often broken into columns, and appear at a distance like ruined castles, producing a very striking effect.

Bursting through the trap-rocks, there are a number of *volcanoes* covering their summits with more recent igneous rocks. Among the mountains specified above as to altitude, Yanteles, Corcobado, Minchinadom, Antuco, Gualtieri, Arequipa, Cotopaxi, Antesana, and Pichincha belong to this class. Fifty-one volcanoes have been described as existing throughout the whole range. The mountains of Ecuador are so extensively and continuously of volcanic origin, that they have been regarded as different safety-valves of one and the same burning vault. It is generally maintained that there is a relation between the height of a volcano and its activity and the frequency of its eruptions. Thus, Stromboli (2957 feet) has continued in a state of activity since the earliest ages, serving the purpose of a light-house to the navigators of the Tyrrhenian Sea; while Cotopaxi (18,887 feet) and Tunguragua (16,579 feet) have been active only once in a hundred years. Many of these 51 volcanoes have consequently not yet been observed by Europeans in an active state. In the Quito district there are 10 active, and 7 of doubtful activity; in Peru and Bolivia, the numbers are 9 and 3; in Chili, 17 and 5: making in all 36 active, and 15 about which there is some uncertainty as to their activity. Another characteristic of these volcanoes, resulting from their gigantic altitude, is that few of them emit streams of lava. Thus Antisana is probably the only one in the Quito range that has ejected lava. The force, however, which is repressed apparently by the immense superincumbent mass which fills the crater, is exhibited in a terrific manner when an eruption does take place. Cotopaxi, for instance, the most regular and beautiful outlet of this the grandest of nature's laboratories, has been known to shoot its fiery torrents 3000 feet above its snow-bound crater, while its voice is said to have been heard at a distance of 550 miles. On one occasion a piece of rock, measuring 300 cubic feet, was thrown from its crater to a distance of more than eight miles.

Earthquakes are intimately connected with these volcanic phenomena. No portion of the globe is subject to such frequent and destructive earthquakes as the countries embosomed within the range of the A. and those lying between them and the Pacific. The cities and towns of Bogota, Quito, Riobamba, Callao, Copiapo, Valparaiso, and Concepcion, have all at different times been more or less devastated by their agency. During the year 1859, an earthquake buried many of the inhabitants of Quito under the ruins of its churches and public edifices; scarcely a single building of any size having escaped uninjured.

It is to the same subterranean agency that upheaved and still convulses the A. that we are to ascribe those fearful ravines which are almost peculiar to the chain. An apt instance has already been cited in the case of the deep and dismal crevice which has been spanned by the natural bridges of Icononzo. A still better specimen is the valley or den of Chota, which, with a width at top of only 2600 feet, is 4875 feet in perpendicular height. This den might overlap the loftiest hill in Scotland, with St. Peter's at Rome on its summit.

The flanks of the mountains are clothed with crystalline stratified rocks, consisting of innumerable varieties of granites, gneiss, schists, horn-blende, chloritic, slates, porphyries, &c. These have been greatly disrupted by the underlying igneous rocks, and now occupy a vertical or nearly vertical position. They often run up into bold and rugged peaks on the summits. They alternate with each other in great meridional bands, but without any apparent order in the succession, except that the varieties of schist depend on the crystalline parent rock below; otherwise, no regular sequence can be observed; for miles, only granite and gneiss are found, then schist, quartz, gneiss, &c., interchanging. The variety and quantity of the mineral wealth of these rocks is remarkable; with the exception of lead, most of the metals are obtained in large quantities—see below. The topaz, amethyst, and other gems are abundant.

Lying unconformable with these almost vertical metamorphic rocks, there occur in the valleys and table-land, and creeping up the base of the mountains, a variety of fossiliferous beds, which require further examination before they can be clearly understood. A better estimate of the nature of these deposits will be arrived at by describing one of the localities where they occur. Take the large plateau on which Bogota is built, which is 8958 feet above the sea. The deposits filling up this plain have been formed subsequent to the present conformation of the district, though not necessarily at the present altitude: the whole range may have been since elevated. The almost horizontal rocks, from their organic contents, consisting of Ammonites, Hamites, &c., have been referred by Edward Forbes to the cretaceous era. The basin consists of many beds of sandstones, limestones, shale, coal, gypsum, and salt. The salt occurs in large quantities, one bed being no less than 100 feet in thickness, and the coal in sufficient abundance to be wrought. All these rocks have been more or less affected by their proximity to the underlying metamorphic rocks. The molecular action going on below has in many places been continued in them, and has induced a cleavage at right angles to their planes of stratification. The other patches—some of great extent, as the plateau of the Titicaca—cannot yet be referred to any particular geologic epoch. Coal has been found near Huanco, in Peru, at the height of 17,000 feet; fossiliferous limestones and sandstones have been noticed in Peru at Micuipampa and Huancavelica.

Metals.—The aboriginal term A. is said to have been derived from the Peruvian *anta*, which signifies metal in general, or rather, perhaps, copper in particular. Within the limits of the empire of the Incas, mining-tools, evidently not European, have been dug up in various places; and in one district the ancient Peruvians have left behind them traces of their mining operations at a height of 17,000 feet. Moreover, the term, whatever may have been its meaning, appears to have been, at all events, of Peruvian origin, for it does not seem to have been applied to the great chain of mountains by the aborgines of New Granada, now called the United States of Colombia.

The A. are understood to yield every metal used in the arts.

Gold is found in Chili, Peru, and Colombia. In Chili, however, it is so little productive, that proverbially a gold-mine is inferior to a silver one, and that, again, to a copper one. In Peru gold is most abundant between the 9th and 7th parallels; though further south, to the east of Lima, the mines of Carabayo have been recently wrought to great advantage; and further south still, to the east of Titicaca, very rich washings are situated on the river Tipuani. In the Colombian States, gold-mines are generally so inaccessible as not to bear the expense of working them. The washings, again, though perhaps remotely the product of the A., are confined chiefly to the alluvial soils that lie between the chain and either sea.

Silver also is found in Chili, Peru, and Colombia. In Chili, the most valuable, almost the only very valuable, mines are wrought on the east face of the A., not far from the city of Mendoza, already mentioned in connection with the breadth of the chain. In Peru, the most productive mines are those of Pasco and Potosi. In those of Pasco, which have now been open for more than two and a quarter centuries without even approaching to exhaustion, the ore is a mixture of silver and oxide of iron. In the mines, again, of Potosi, whose very name has become a proverb, there are said to be no fewer than 5000 excavations, while, to all appearance, only the upper crust of the inexhaustible deposits has been penetrated. In Colombia, it is with silver as it has been shown to be with gold, the mines of the former metal, as well as of the latter, being so inaccessible as not to bear the expense of working them.

Mercury or *quicksilver* is found in Quito, near the village of Azogué, which lies to the north-west of Cuença—taking its name, as is said, from this metal; and it is found likewise in Peru, not far from Guancavelica, a town situated, as already stated, to the north of the group of Cuzco. The mercury exists chiefly in combination with sulphur, forming what is called cinnabar.

Platinum appears to exist only in Colombia; but like the gold-washings of that country, it is found rather in the alluvial soils, that have been flooded down from the chain, than in the chain itself.

Copper is found chiefly in Chili, but also in Peru. In the latter country, it is of little account in comparison with silver; but, in the former, it may be styled the staple metal, or even the staple production. The most valuable mines are in the northern and southern provinces; in Coquimbo and Copiapo above, and in the neighborhood of Araucania below.

Climate.—The climate of the A. is, at every point, affected by three different considerations—position with respect to the length of the chain, position with respect to its breadth, position with respect to its height.

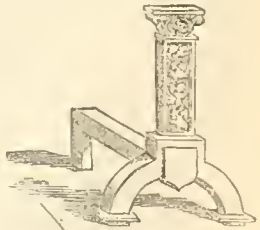
In connection with the *length* of the chain, the variations of climate, though less peculiar than its variations under either of the other aspects, are not merely a counterpart of similar changes in other parts of the globe. In the new world generally, temperature rises and falls more rapidly in proportion to latitude than in the old; and, again, as within the new world itself, more rapidly in the south than in the north. In connection, therefore, with the length of the A., the variations of climate may be regarded as the greatest possible—the tropical heat of the equatorial regions passing gradually into something like polar cold, even within a latitude not greater than that of Edinburgh. This may be best illustrated with reference to the limits of perpetual snow. Within the Strait of Magellan, in about the latitude of Wales, the limit in question is only about 3500 feet, nearly the precise height of the summit of Snowdon. In lat. 33° S., about the center of Chili, the snow-line, according to Humboldt, is estimated at 12,780 feet; while, on a nearly corresponding parallel, the Himalayas present on their northern slope a snow-line of 16,620 feet. In the tropical regions of the A., the snow-line seems to range from 16,000 feet to 18,000. This result, excepting that it does not greatly surpass the height of the snow-line as above on the Himalayas, can scarcely be compared with anything in the old world, whose tropical regions do not present any chain of the requisite altitude for the purpose. Till lately it was held that there were no glaciers in the central and northern divisions of the A. It was assumed that the alternations of heat and cold, or of thaw and frost, necessary to the production of glaciers, did not exist in the lower latitudes of the A., where, generally speaking, every stage or terrace, as already noted under the head of AMERICA, possesses an almost monotonous temperature. But Mr. Whymper has recently examined carefully many of the chief peaks, several of which he has ascended for the first time. In 1880, he announced with confidence that there are regular glaciers, some of them of enormous extent, on Chimborazo, Cotopaxi, Antisana, Sincholagua, and at least six other great peaks.

In connection, next, with the *breadth* of the chain, the variations of climate, if not peculiar to the A., have no perfect parallel elsewhere. At every point, excepting, perhaps, towards the extreme south, the chain is almost as much of a water-shed to the clouds as it is to the rivers. Rarefied as the air is at the elevation of the A., no vapor, generally speaking, can cross them—even the existence of snow at the height of several miles being a phenomenon which, *a priori*, was hardly to be expected. This fact is rendered more important by the ordinary directions of the currents of air. The prevailing winds blow against the A., not alongside of them, being generally from the east between the equator and 30°, and from the west in latitudes towards the south. Thus, generally speaking, every section of the chain has permanently a windward and a leeward side—the former intercepting nearly all the moisture, and the latter being condemned to comparative drought. Peru, Chili, and Patagonia, one and all, confirm these observations in detail. On the west, Peru, unless in the immediate vicinity of the mountain-streams, is little better than a desert; while, on the east, the Montana, as it is called, is remarkable for its fertility. To the west, on the contrary, Patagonia has its glaciers to show as the result of its rains from that quarter; while to the east, its five terraces, extending 700 miles to the Atlantic, are almost uniformly arid and sterile. Between Patagonia and Peru, Chili has something in common with both, resembling the former in its southern half, and the latter in its northern. To take the Pacific side alone: in the northern parts, showers are only occasional, sometimes at an interval of three years—the deficiency being partly supplied by frequent dews; while, to the south of lat. 34°, the rains are sufficiently copious to form considerable rivers.

In connection, lastly, with the *height* of the chain, the variations of climate stand alone in the world, being approached, though at a great interval, only by the corresponding changes in Central America. The Alps, to take a familiar analogy, have, it is true, their gradations of climate. But, situated, in round numbers, on about the 45th parallel, they represent only half of the latitudes between the equator and the pole; while the A. of Quito, before reaching this level, must have seen melting into each other the temperatures of Borneo, India, Persia, Asia Minor, and Italy. Taking the snow-line of the A. of Quito at 18,000 feet, and that of the Alps at 8000, the lower and hotter 10,000 feet of the former have no counterpart at all on the latter. Now, Herndon found Tarma to lie within this height, precisely at an elevation of 9738 feet; and he there saw apples, strawberries, almonds, grapes, and maize—a state of things not far behind that at the foot of the Alps. No space remaining for details, one general observation must close this article. In an open locality the naked eye may embrace half a zone, for, to quote a traveler's words, it may look upwards to the barley-field and the potato-patch, and downwards to the sugar-cane and the pine-apple. Perhaps the most striking instance of this more than telescopic vision is connected with the magnificent fall of Tequendama, the single outlet of the waters of the table-land of Bogota. This fall, 600 feet high, leaps down from the temperate zone to the torrid, from rich crops of wheat to a few scattered palms.

ANDI'RA, a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having an almost orbicular, one-celled, one-seeded pod.—*A. inermis* (formerly known as *Geoffroya inermis*) grows in low savannahs in the West Indies, and is there called *Cabbage Tree* or *Cabbage-bark Tree*. It is a tree of considerable height, having pinnate leaves, with 13—15 ovato-lanceolate leaflets, and panicles of reddish lilac flowers. Its bark, called *Cabbage Bark* or *Worm Bark*, is a powerful anthelmintic; and although it has recently been discarded from the pharmacopœias of Britain, still finds a place in those of other countries, along with *Surinam Bark*, the bark of *A. retusa* (formerly *Geoffroya Surinamensis*), a native of Surinam. Similar properties reside in the bark of several species of the allied genus Geoffroya. Cabbage Bark contains an alkaloid called *Jamaicina*.

A'NDIRON, or HANDIRON, is a term frequently to be met with in inventories of the furniture of old houses; and in some parts of the country is still used for what is more generally known as a fire-dog. Andirons were used for burning wood on an open hearth, and consisted of a horizontal bar raised on short supports, with an upright standard at one end. A pair were used, one standing at each side of the hearth, and the logs of wood rested across the horizontal bars. The upright portions of the A. were of various forms, some of them, in later times, representing a human figure. More generally, the design was architectural much ornamented with arabesques, and frequently with the monograms of their possessors. The ornamental parts of the A. were sometimes silver, but more often copper.



Andiron.

ANDKHUY', a town, formerly of Bokhara, but now of Afghanistan, Central Asia, about 200 miles south of Bokhara, on a river flowing north towards the Jihun, but only part of which has as yet been traced. It lies on the high road to Herat, and is much exposed to the attacks of the Emirs of Bokhara and Afghanistan. Down to the year 1840, it is said to have been tolerably flourishing. It was then subject to Bokhara, and was compelled to oppose the victorious march of Mohammed Khan, who besieged it during four months, and at last only took it by storm. The city was plundered, and left a heap of ruins. The sovereign, Gazanfer Khan, to preserve himself from utter destruction, threw himself into the arms of the Afghans. A. contained in 1863 about 2000 houses, which form the city, and about 3000 tents, which are either in the environs, or scattered over the oases in the desert. The pop. is estimated at 15,000, consisting principally of Turkomans, with a mixture of Uzbegs and a few Tadjiks.—Vámbéry's *Travels in Central Asia*.

ANDO'RRA, a valley in the Eastern Pyrenees, between the French department of Ariège and Catalonia, in Spain. It is inclosed by mountains, through which its river, the Balira, breaks to join the Segre at Urgel; and its inaccessibility naturally fits it for being the seat of the interesting little republic which here holds a kind of semi-independent position between France and Spain. Area (divided into six parishes) about 300 square miles; pop. variously stated at from 4000 to 12,000. The capital is Andorra, on the Balira, with a population of 2000. The former abundant forests are becoming thin from use as fuel; there is much excellent pasture; vines and fruit-trees flourish on the lower grounds, and the mountains contain rich iron-mines; but agriculture is so neglected, and the quantity of arable land so small, that the inhabitants partly depend for corn upon France. A. was declared a free state by Charlemagne, in reward for services rendered to him by its inhabitants, when he was marching against the Moors. He retained certain rights which Louis le Débonnaire afterwards transferred to the bishop of Urgel, in 819 A.D., and which the bishop of Urgel still exercises. The republis is governed by a sovereign council of twenty-four members, chosen by the people, and the council elects one of its members to be syndic for life, who exercises the chief executive power. There are two judges called *viguiers*, of whom the first is appointed by France, which exercises a kind of protectorate, and the second by the bishop of Urgel. There is also a civil judge appointed by France and the bishop of Urgel alternately. The first viguier is a Frenchman, and the second a native of A. Under each viguier is an inferior judge called a *bailie;* but there is an appeal from his judgment to the civil judge, and finally to the Court of Cassation at Paris, or to the Episcopal College at Urgel. In criminal cases there is no appeal from the court of the republic itself, in which the first viguier presides. The revenue of the state is derived from lands, and from some inconsiderable taxes. A sum of 960 francs is paid biennially to France, in return for which is granted the privilege of free importation of corn. A payment of 891 francs is made in the intervening years to the bishop of Urgel. The manner of life of the Andorrans is very simple. There are schools, but education is in a low state. There is a complete military organization. In the Carlist wars the neutrality of A. was strictly respected, though various complications resulted from its connection with the bishop of Urgel, &c. French speculators have endeavored to introduce gambling at the springs of Escaldas.

A'NDOVER, a market-town of Hampshire, lies in the northwest part of the county, lat. 51° 12′ N., long. 1° 28′ W. The origin of the town dates from a remote antiquity, as might indeed be suspected from its name, which is a modification of the Saxon *Andeafaran*, i. e., ferry over the river Ande. It is said that the corporation of A. is as old as the time of King John. The inhabitants, 5654 in 1881, are chiefly supported by their malt-trade, their agriculture, and their traffic in timber with Portsmouth. At Weyhill, a few miles to the west of the town, a fair is held, formerly one of the most celebrated and important in England. It lasts for six days. The church of A. is a new erection, in the early English style of architecture, and cost £30,000, the whole of which was defrayed by the late rector, the Rev. W. S. Goddard. Various relics of antiquity have been discovered near Andover.

A'NDOVER, a township in Massachusetts, about 21 miles to the north of Boston, reaching on the north to the Merrimac. It is intersected by several railways, while water-power is employed in manufacturing thread, linen, and flannels. The township was incorporated in 1646, 26 years after the landing of the Pilgrim Fathers. Pop. (1870) 4873. A. is famous, even in Massachusetts, for its educational institutions. The Theological Seminary of the Congregationalists, and the Phillips Academy, instituted within 5 or 6 years after the close of the war of independence, through the efforts of two brothers from whom it derives its name, are liberally constituted, and well attended. The latter has a revenue of $60,000. The Abbot Female Academy, for the education of female teachers, is also a flourishing institution.—There are several other places of the same name in the United States.

ANDRAL, GABRIEL, a celebrated French physician, member of the Institute and of the Academy of Medicine, was born in Paris on the 6th of November, 1797. In 1823 he established his reputation by the publication of the first part of his *Clinique Médicale;* in 1828, partly through the influence of M. Royer-Collard, whose daughter he had married, he was appointed Professor of Hygiène; and in 1830 was advanced to the chair of Internal Pathology, a branch of medical science which had always possessed great attractions for him. A., in fact, commenced his investigations with pathological anatomy. He presented to the Academy, at a comparatively early period of his career, a paper *Sur l'Anatomie Pathologique du Tube Digestif* (On the Pathological Anatomy of the Alimentary Canal), which was greatly admired. Besides, he published, in 1829, a *Précis Elémentaire* of the same science, which met with striking success; and his *Clinique Médicale* treats principally of diseases of the chest, of the abdomen, and of the brain.

In 1839, A. was almost unanimously elected by his colleagues to succeed Broussais in the chair of pathology and general therapeutics, the highest in the school. Here he has shown the vast range of his medical knowledge; but in occupying himself so much with the pathological anatomy of the dead body, it is alleged that he has not paid sufficient attention to the phenomena of disease before the organs begin to exhibit traces of alteration. Though actively engaged in his general practice, he has found time to write several other works besides those already mentioned. In 1835 appeared his *Projet d'un Essai sur la Vitalité;* in 1836, he edited and considerably enlarged Laennec's *Traité de l'auscultation Médiate et du Cœur;* in 1836—1837, a *Cours de Pathologie Interne;* in 1837, his report to the Academy *Sur le Traitement de la Fièvre Typhoïde par les Purgatifs;* in 1843 he presented to the Institute his *Traité Élémentaire de Pathologie et de Thérapeutique Générale* (published in 1840), &c.

AN'DRÉ, JOHN, an unfortunate soldier who met his death under circumstances which have given his name a place in history, was born in London in 1751 of Genevese parents. At the age of twenty, he entered the army, and soon after joined the British forces in America, where, in a few years, through the favor of Sir Henry Clinton, he was promoted to the important post of adjutant-general, with the rank of major.

Sir Henry Clinton being in treaty with the American general Arnold, who commanded the fortress of West Point, for the betrayal to the British of the fortress with its magazines, including the whole stock of powder of the American army, confided the conduct of the correspondence on his part to Major A. The secret correspondence was conducted by Arnold and A. under assumed names, and as if it related to commercial affairs; and the treachery was so well concealed, that the Americans had no suspicion whatever of Arnold's fidelity. At last it remained only to settle the time and means of carrying the scheme into execution; and these it was determined should be settled in a personal interview between Arnold and A., either because Arnold required such an interview, or, more probably, because Clinton had some misgivings as to the identity of his correspondent. Various projects to bring about the interview having failed, A., at last, on the 20th September 1780, proceeded in a British sloop of war—the *Vulture*—up the Hudson nearly to the American lines. The original design was to have met under cover of a flag of truce, on the pretense of effecting some arrangement as to the sequestrated property of a Colonel Robinson, a loyalist gentleman who accompanied A., and whose house was at the time Arnold's headquarters; but this design had to be abandoned, and Arnold was obliged to contrive a secret interview. On the night of the 21st September he prevailed on a Mr. Smith, who lived within the American lines, to go to the *Vulture* with a packet for Colonel Robinson. Smith went, and returned with A., who passed under the assumed name of Anderson. Arnold met him on the shore, where they conferred some time, after which they went within the lines to Smith's house, and there spent the rest of the night and part of the next day arranging the details of their plan for the treacherous surprisal of West Point. The attack was fixed for the day when the return of General Washington was expected; and there is reason for thinking that part of Arnold's scheme was, if possible, to betray Washington also into the hands of the enemy.

Early on the morning of the 22d September, a gun was brought to bear on the *Vulture*, and obliged her to fall down the river so far that A. could not prevail on the boatmen to take him to her, and so was forced to make his way by land to the English lines in a disguise furnished by Smith, and provided with a pass from the general. A. actually got safely within sight of the English lines, when he was stopped and taken prisoner by three American militia-men, to whom, mistaking them for British, he inadvertently revealed the fact that he was a British officer. His captors, on searching him, having discovered concealed in his stockings the plans of West Point and other papers connected with the proposed treachery, which he was bearing from Arnold to Clinton, carried him as a spy to a Colonel Jamieson, who, not suspecting anything, was for sending him to Arnold. Here a chance of escape opened for him, but only for a moment. He was ultimately sent, with the papers found on his person, to General Washington. Jamieson, meantime, having sent word to Arnold of the capture of A., Arnold fled to the *Vulture*, and so saved his life.

A., as a spy taken in the act, was liable, according to the rules of war, to be hanged at once. But considering the rank of the prisoner, and the circumstances, Washington resolved on referring the case to a Board of general officers, to report the facts, with their opinion of the light in which the prisoner ought to be considered, and the punishment that ought to be inflicted. The Board found that he ought to be considered as a spy from the enemy, and punished with death. Strenuous efforts were made by the British commander to save him. It was represented to Washington that A. could not be regarded as a spy, because—1.

He entered the American lines under a flag of truce; 2. That all his movements within the lines were directed by the general. The first plea, on A.'s own authority, was contrary to the fact; and to the Americans it rightly appeared that the point of the offence lay in the communication with the base traitor Arnold. All the efforts of Clinton failed to move the American commander. A. was sentenced to death. On one condition only would Washington spare him—that the British should surrender Arnold. But this they could not think of doing; the sense of honor which, yielding to the spirit of war, offered no opposition to a bargain with Arnold for the blood and liberties of his compatriots, made it impossible to deliver up the runaway traitor to the death that otherwise awaited the soldier who only went too far in his zeal for his country.

A. suffered death by hanging at Tappan, in the state of New York, on the 2d October 1780, in his 29th year. His death everywhere excited the deepest sympathy. The whole British army went into mourning for him; a monument was erected to his memory in Westminster Abbey, and in 1821 his remains were disinterred at Tappan, and conveyed to a grave near his monument.

Much has been written on the subject of A.'s execution. It has often been maintained, and recently by Lord Mahon, in his *History of England* (vol. vii.), that his sentence was unjust. But a simple narrative of the circumstances, even as they are to be gathered from Lord Mahon's own pages, shows that the American general had no alternative. Indeed, the circumstances cited to show that A. was not a spy, in the ordinary sense, all go to prove that he was a spy of the worst sort. The success of the treachery of Arnold would have been the destruction of the American cause; and it is hard to see how the agent who went secretly within the American lines, and was captured returning in disguise with the information that was to insure that success, is to be held in a better case than the common soldier who steals his way into the enemy's camp of a night, to see the extent of his preparations and forces.

A. was a handsome and amiable man, of considerable accomplishments; he was a good artist, and appears, when in England, to have been known to certain literary circles of his time. These circumstances naturally heightened the feeling with which his fate was regarded.

See *Biographical Dictionary* of the Society for the Diffusion of Useful Knowledge, vol. ii.; also, in vol. vi. of the *Memoirs of the Historical Society of Pennsylvania*, 1858, *The Case of Major A., with a Review of the Statement of it in Lord Mahon's History of England*, by Charles J. Biddle—an essay containing a full narrative of the case, with a discussion of all the questions of law and duty raised in connection with it.

ANDREÆ, Joh. Valent., a very original thinker and writer, born at Herrenberg, near Tübingen on the 17th of August 1586. He studied at Tübingen, spent some time in traveling in the south of Europe, obtained ecclesiastical preferments in the Protestant Church of his native country, and died on June 27, 1654, at Stuttgart, where he was chaplain to the court. Eminently practical in his mental disposition, he was grieved to see the principles of Christianity made the subject of mere empty disputation, and all science and philosophy in like manner perverted by a frivolous scholasticism. To the correction of this prevailing tendency of his age, the efforts of his whole life were directed. His writings are remarkable for the wit and humor, as well as for the learning, acuteness, and moral power which they displayed. He has been long regarded as the founder, or at least the restorer of the order of the Rosicrucians (q. v.); and this opinion is plausibly supported by reference to three publications—the *Chymischz Hochzeit Christiani Rosenkreuz* (1616), the *Fama Fraternitatis R. C.*, i. e., *roseæ crucis* (1614), and the *Confessio Fraternitatis R. C.* (1615), of the first of which he acknowledged himself the author, and the other two have so much resemblance to it as to be evidently from the same pen. But, however, these works were misunderstood by his contemporaries, and particularly by those who were inclined to mysticism in religion, his intention in them was certainly not to originate or promote secret societies of mystics and enthusiasts, but to ridicule the follies of the age. He attacked Rosicrucianism itself in some of his later writings with great severity. Among the best of his works are his *Menippus s. Satyricorum Dialogorum Centuria* (1617). His *Mythologica Christiana* (1619) is another of the best known. He wrote an allegoric poem called *Die Christenburg* (of which an edition was published, Stuttg. 1836), and an autobiography (Winterthur, 1799). Herder has done much to extend a knowledge of A.'s works in the present age.

ANDREOSSY, Antoine François, Count, was born on March 6, 1761, at Castelnaudary, in Languedoc, and was the great-grandson of François A., who, along with Riquet, constructed the canal of Languedoc in the 17th c. He entered the army as a lieutenant of artillery in 1781, joined the Revolutionists, rose rapidly in military rank, served under Bonaparte in Italy and Egypt, accompanied him on his return from Egypt to France, and took part in the revolution of the 18th Brumaire. He was ambassador at London during the peace of Amiens, and afterwards at Vienna, was governor of Vienna when it was in the hands of the French after the battle of Wagram, and was for some time ambassador at Constantinople, from which he was recalled by Louis XVIII. on the Restoration. He was raised to the peerage by Napoleon after his return from Elba. After the battle of Waterloo, he advocated the recall of the Bourbons; but as deputy from the department of Aube, he generally took part with the opposition. He died at Montauban on September 10, 1828. He was a man of eminent scientific attainments, and distinguished himself as a member of the Institute founded at Cairo. One of his first works was the *Histoire Générale du Canal du Midi* (Par. 1800; new edition, 2 vols. 1805), in which he asserted the right of his great-grandfather to honors long enjoyed by Riquet. Among the most valuable of his works are his *Mémoire sur l'Irruption du Pont-Euxin dans la Méditerranée*, his *Mémoire sur le Système des Eaux qui abreuvent Constantinople*, and his *Constantinople et le Bosphore de Thrace pendant les Années* 1812—1814 *et pendant l'Année* 1826 (Par. 1828), a work of importance in physical geography.

ANDREW, the first disciple of Christ, and afterwards an apostle, was, like his brother Peter, a fisherman. Previous to his recognition of Christ as the Messiah, he had been numbered among the disciples of John the Baptist. (See John i. 40, 41.) The career of A., as an apostle, after the death of Christ, is unknown. Tradition tells us that, after preaching the gospel in Scythia, Northern Greece, and Epirus, he suffered martyrdom on the cross at Patræ in Achaia, 62 or 70 A.D. A cross formed of beams obliquely placed is styled St. A.'s Cross. In the early times of the Church, a spurious supplement to the Acts of the Apostles was circulated among certain sects under the title *Acta Andreæ*. The anniversary of *St. A.* falls on November 30. St. A. is the patron saint of Scotland, he is also held in great veneration in Russia, as the apostle who, according to tradition, first preached the gospel in that country. In both countries there is an order of knighthood named in his honor.

ANDREW, St. or THE THISTLE, a Scottish order of knighthood, named after the patron saint of Scotland. Nisbet, with pardonable partiality, prefers it to all other orders, purely military, 'chiefly for the antiquity of it, which gives it a place and precedency over all other orders now in being.' (*Heraldry*, part iv. c. xi., p. 107.) He then proceeds, after Bishop Lesley, to recount the story of the St A.'s Cross having appeared in heaven to Achaius, king of Scots, and Hungus, king of the Picts, as a sign of the victory which they should gain the following day over Athelstane, king of England; and their subsequent vow, when the prophecy was fulfilled, to bear it on their ensigns and banners. It is frequently said to have been recognized as an order of knighthood in the reign of James V., and after a period of abeyance, to have been revived by James II. of Great Britain in 1687. For the actual facts of the case see, however, the article Thistle, Order of the.

The star of the Order of the Thistle is worn on the left side. It consists of a St A.'s Cross of silver embroidery, with rays emanating from between the points of the cross, in the center of which is a thistle of gold and green upon a field of green, surrounded by a circle of green, bearing the motto of the order in golden characters.

Star of the Order of the Thistle.

The badge or jewel is worn pendent to the collar, or to a dark-green ribbon over the left shoulder, and tied under the arm. It consists of a figure of St. A. with the cross enamelled and chased on rays of gold; the cross and feet resting upon the ground of enamelled green. The collar is of thistles, intermingled with sprigs of rue. By a statute passed in May 1827, the order is to consist of the sovereign and sixteen knights. The letters K. T. are placed after the names of knights of the order. The motto is 'Nemo me impune lacessit.' Nisbet, differing from Sir George Mackenzie, prefers 'lacesset,' as 'having more of daring and gallantry.'

ANDREW, St, The Russian Order of, is the highest in the empire, and was founded by Peter the Great in 1698. It is confined to members of the imperial family, princes, generals-in-chief, and others of like rank. The badge of the order shows on the obverse a cross enamelled in blue, bearing a figure of the saint surmounted by a crown, and in the four corners of the cross the letters S. A. P. R. (*Sanctus Andreas Patronus Russiæ*). On the reverse is a spread eagle, with the legend (in Russian) *For religion and loyalty*, and the name of the saint. The collar consists of St. Andrew's Crosses alternating with imperial crowns.

ANDREWS, Lancelot, an eminent English prelate, was born

in London in 1555, and educated successively at the Coopers' Free School, Ratcliffe, Merchant Taylors' School, and Pembroke Hall, Cambridge, of which college, after having greatly distinguished himself by his industry and acquirements, he was in 1576 elected a fellow. On taking orders, he accompanied the Earl of Huntingdon to the north of England. His talents attracted the notice of Walsingham, Queen Elizabeth's secretary of state, who appointed him successively to the parsonage of Alton, and the vicarage of St. Giles, Cripplegate. In 1589 he was appointed a prebendary and canon residentiary of St. Paul's, a prebendary of the collegiate church of Southwell, and Master of Pembroke Hall. The queen next testified her esteem for his gifts and piety by appointing him one of her chaplains in ordinary, and a prebendary and dean of Westminster. He rose still higher in favor with King James, who was well qualified to appreciate his extensive learning and peculiar style of oratory. He attended the Hampton Court conference, as one of the ecclesiastical commissioners, and took part in the translation of the Bible. The portion on which he was engaged was the first twelve books of the Old Testament. In 1605 he was consecrated Bishop of Chichester. In 1609 he was translated to the see of Ely, and appointed one of his majesty's privy-councillors, both for England and Scotland. To the latter country he accompanied the king in 1617, as one of the royal instruments for persuading the Scotch of the superiority of episcopacy over presbytery. In the following year he was translated to Winchester, where he died on the 27th March, 1625. Bishop A. was, with the exception of Usher, the most learned English theologian of his time. As a preacher, he was regarded by his contemporaries as unrivalled; but the excellent qualities of his discourses are apt to suffer much depreciation in modern judgment from the extremely artificial and frigid character of the style. His principal works published during his life were two treatises in reply to Cardinal Bellarmin, in defence of the right of princes over ecclesiastical assemblies His other works consist of sermons, lectures, and manuals of devotion. Bishop A. was the most eminent of that Anglican school in the 17th c. of which the 19th has seen a faint revival under the name of Puseyism. Its distinctive peculiarities were high views of ecclesiastical authority, and of the efficacy of sacraments, ceremonies, and apostolic succession, and extreme opposition to Puritanism. In his private life, A. was singularly pious, meek, and charitable.

ANDREWS, St., an ancient city of Scotland, is situated on the bay of the same name, in Fifeshire, about 10 miles from Cupar, and 44 miles from Edinburgh. Tradition dates the origin of this city as far back as the 9th c., when St. Regulus or Rule is said to have taken refuge in this place, then called Mucros, and afterward Kilrymont, bringing with him some of the bones of St. Andrew, which, being enshrined here, continued to be an object of pilgrimage for several centuries. A cave on the sea-shore still bears the name of St. Rule. He would seem to have founded a Culdee monastery, of which the Scottish King Constantine, having resigned his crown, became abbot about the year 940. Probably about the same time, it became the seat of a prelate, who, as 'bishop of the Scots,' continued to enjoy a certain pre-eminence among the other bishops, until, in 1471, the see was erected into an archbishopric, when he became primate. In the reign of Alexander I., a priory of Canons Regular was founded at St. A., which afterwards became one of the chief ecclesiastical establishments in Scotland. The last prior was the Regent Moray. In 1140 St. A. was created a burgh by the bishop, with consent of King David I. The cathedral, commenced in 1162, and consecrated in 1318, was sacrificed in 1559 to the frenzied zeal of the mob, an outrage which it is customary to attribute to the preaching of Knox. The eastern gable, part of the western, and part of the south side wall and of the transept, are all that remain of this building. It was the second cathedral of St. A., the first being what is now called St. Rule's Church, but was long known as 'the old cathedral.' Of this interesting little edifice, built between 1127 and 1144, the roofless chancel, and a square tower 108 feet high, are still preserved. They are in the Romanesque style.

The university of St. A., the oldest in Scotland, was founded by Bishop Wardlaw in 1411. It consists of the United College of St. Salvator, founded by Bishop Kennedy in 1456, and St. Leonard founded in 1512; and St. Mary's College, founded by Beaton in 1537. The education in the latter is exclusively theological. The number of chairs in the colleges which constitute the university is 14, and the attendance of late years has been rather less than 200. The castle, once a very extensive and strong building, is now in ruins. It was for some time the residence of Cardinal Beaton, who was assassinated here in 1546. As the ecclesiastical metropolis of Scotland, an ancient seat of learning, and the center of a considerable trade, St. A., at the time of the Reformation, was an important and flourishing city. Since that period, it has greatly declined in importance; but its excellent educational establishments and convenience as a watering-place still make it an eligible residence for a highly respectable population. Its chief interest is still connected with the past Here in the center of the papal jurisdiction in Scotland, the Reformation first made its appearance; Scotland's proto-martyr, Patrick Hamilton, suffered here in 1528, and George Wishart in 1546, and here John Knox first opened his lips as a preacher of the Reformed faith.

The trade of St. A. is inconsiderable. The harbor is difficult of access, and particularly exposed to the east wind. A few coasters and fishing-boats constitute all the shipping of the port. St. A. is much frequented as a bathing-place, and the game of golf is more practised than anywhere else in Scotland on the Links or downs which stretch along the shore to the north of the town for about two miles. Besides its university, St. A. affords singular advantages for cheap and excellent education in the Madras College, established by the well-known Dr. Andrew Bell, which attracts a very large number of pupils, the annual average being about 900. The grammar school and commercial school are incorporated with it. St. A. is a royal and parliamentary burgh, and unites with several smaller burghs in returning a member to parliament. The corporation includes a provost, dean of guild, and four bailies. Pop. (1851), parish, 6740; parliamentary burgh, 5107; (1871) parliamentary burgh, 6316; (1881) 6453.

A'NDRIA, a city of South Italy, in the province of Bari, 31 miles west from the town of Bari. It stands on a plain, and in its vicinity are numerous caverns (*antra*), whence its name. Its cathedral, a fine edifice, was founded in 1046. During the wars of the Parthenopean Republic (q. v.), it was besieged by the republican army under General Broussier, and being taken after a gallant resistance, was burned, at the suggestion of Ettore Carafa, Count of Ruvo, himself its feudal lord. The neighboring country is famous for its almonds, which are a principal article of trade of the city. Pop. (1881) 36,795.

ANDRIEUX, François Guillaume Jean Stanislaus, a French writer of comedies, was born at Melun, May 6, 1759. In 1798, he was elected deputy of the Seine department, and distinguished himself by his speeches on several points of public interest. In 1800 he was made Secretary, and soon afterwards, President of the Tribunal. From this post he was removed by Bonaparte in 1802, and afterwards devoted himself to literature. During his political career he had written a comedy, *Les Etourdis*, 1787. From 1803 to 1815 he held a professorship in the Polytechnic School, and in 1814 was appointed professor in the Collége de France. Louis XVIII. gave him a place in the Academy in 1816, of which he was made perpetual secretary in 1829. In this position he took an active part in the preparation of the *Dictionnaire de l'Académie* His most popular dramas were *Molière avec ses Amis*, *Le Vieux Fat*, and the tragedy of *Brutus*. A collection of his æsthetic lectures was published under the title *La Philosophie des Belles Lettres* (Paris, 1828). He died May 10, 1833.

ANDRO'GYNOUS (i e., male-female; from two Greek words), a term sometimes employed in botany to designate an inflorescence which consists of distinct male and female flowers; and more frequently in zoology in reference to animals which possess a distinct male and female generative system in the same individual. This is the case with very many of the lower kinds of animals, but is not inconsistent with a necessity for the co-operation of two individuals in the propagation of the species. See Hermaphrodite, Physiology and Reproduction.

ANDRO'MACHE, the wife of Hector, was the daughter of King Eëtion of Thebes, in Cilicia, and is one of the finest female characters in Homer's *Iliad*. During her childhood, Achilles slew her father and her seven brothers. Her love of Hector is pathetically depicted in her address to the hero on his going to battle, and her lamentation over his death (*Iliad*, 6 and 24). After the fall of Troy, she was given into the hands of Pyrrhus (son of Achilles), who took her away to Epirus, but afterwards surrendered her to Helenus (Hector's brother), by whom she had a son named Cestrinus. A. is the heroine of one of the tragedies of Euripides.

ANDRO'MEDA, daughter of the Ethiopian King Cepheus, by Cassiopeia, was, like her mother, remarkably beautiful. When Cassiopeia, with motherly pride, boasted that her daughter was more beautiful than the Nereids, those offended deities prayed Neptune to revenge the insult. Accordingly, the territory of King Cepheus was devastated by a flood; and a terrible sea-monster appeared, whose wrath, the oracle of Ammon declared, could only be appeased by the sacrifice of A. As A. was fastened to a rock, and left as prey to the monster, Perseus, returning from his victorious battle with Medusa, saw the beautiful victim, and determined to rescue and win her. Having slain the sea-monster, he received A. as his reward. Minerva gave A. a place among the constellations.

ANDRO'MEDA, a genus of plants of the natural order *Ericaceæ* (q. v.), distinguished by a 5-valved naked capsule, which splits up through the back of the cells; anthers with two awns, and a globose corolla with the orifice contracted. The species, which are pretty numerous, have very much the general appearance of

heaths. Most of them are small shrubs, but some attain a considerable size. The only British species is *A. polifolia*, occasionally found in peat-bogs in different parts of the country and common throughout the north of Europe and of North America, a small evergreen shrub with beautiful rose-colored drooping flowers. It has acrid narcotic properties, and sheep are sometimes killed by eating it. The shoots of *A. ovalifolia* in like manner poison goats in Nepaul; and similar effects are ascribed to *A. Mariana* and other species in the United States—*A. fastigiata* was observed by Dr. Hooker abounding at great elevations in the Himalaya; a humble shrub, resembling the heather of Scotland. The leaves are used as a substitute for tea. See SORREL-TREE.

Andromeda polifolia.

ANDRONI'CUS, the name of three Byzantine emperors.—A. I., the son of Isaac Comnenus, was one of the most conspicuous characters of his age, which produced no man more brave, more profligate, or more perfidious. His life was full of extraordinary vicissitudes. During part of his youth, he was a prisoner of the Turks in Asia Minor. He afterwards spent some time at the court of his cousin, the Emperor Manuel, and a niece of the emperor became his mistress. He was appointed to a military command in Cilicia; but although his courage, his noble appearance, and his gracious manners made him the favorite of the army, his imprudence and waste of time in dissolute pleasures involved him in defeat. Having engaged in a treasonable correspondence with the king of Hungary and the German emperor, he was thrown into prison by Manuel, and remained there above twelve years; but at last succeeded in making his escape, and, although not without further extraordinary adventures, reached Kiew, the residence of the Grand Duke Jaroslav. He regained the favor of his cousin by persuading the Russian prince to join him in the invasion of Hungary, and by his gallantry in that war; but incurred his displeasure again by refusing to take the oath of allegiance to the Prince of Hungary, the intended husband of Manuel's daughter, as presumptive heir to the empire. He was sent in honorable banishment to Cilicia, where he found a new mistress in a sister of the empress. The resentment of the emperor breaking out against him, he sought refuge in a pilgrimage to Jerusalem. His professions of zeal made his former conduct to be forgotten, and he was invested with the lordship of Berytus; but his profligacy became, if possible, more scandalous than ever in the seduction of Theodora, the widow of Baldwin, king of Jerusalem, who lived with him for years as his mistress. The emperor's anger made Palestine unsafe for him, and he fled with Theodora to Damascus, and finally settled among the Turks in Asia Minor, with a band of outlaws, making frequent inroads into the Roman province of Trebizond, from which he carried away spoil and slaves. Theodora and her children were at last taken and sent to Constantinople, and thither he followed, imploring, with a chain about his neck, and in a form of abject submission, the forgiveness of the emperor, which he obtained, but was sent to Oenoe in Pontus. After the death of Manuel, popular indignation was excited against the empress, who acted as regent for her son, Alexius II., and A. was recalled in 1182 to deliver the empire from her tyranny. He was appointed guardian of the young emperor, and soon after, his colleague in the empire. He caused the empress-mother to be strangled, and afterwards Alexius himself, with whose widow he contracted an indecent marriage. His reign, though short, was vigorous, and restored prosperity to the provinces; but tyranny and murder were its characteristics in the capital.

He set no bounds to the gratification of his revenge against all who had ever offended him, and his jealousy of possible rivals was equally sanguinary. At last, a destined victim, Isaac Angelus, one of his relatives, having fled to the church of St. Sophia for sanctuary, a crowd gathered, and a sudden insurrection placed Isaac on the throne, whilst A., now 73 years of age, was put to death by the infuriated populace, after horrible mutilations and tortures, on September 12, 1185. He was the last of the Comneni that sat on the throne of Constantinople; but the succeeding Dukes and Emperors of Trebizond were descendants of his son Manuel.—A. II., the son of Michael Palæologus, ascended the throne in 1283; but after a weak and inglorious reign, was driven from it in 1328 by his grandson, A. III., who, after a reign equally inglorious, died in 1341. During these reigns, province after province was conquered by the Turks.

ANDRONI'CUS—surnamed CYRRHESTES from his birthplace, Cyrrhos in Syria—is said to have erected the octagonal tower called the Tower of the Winds at Athens, a building of the 3d or 2d c. B.C. It probable received its name from figures representing the eight principal winds, and from a brazen Triton which surmounted it, and showed the direction of the wind—the first known weathercock.

ANDRONI'CUS of Rhodes, a Peripatetic philosopher, lived at Rome in Cicero's time, and employed himself in criticising and explaining the works of Aristotle, a great number of which he was probably the means of preserving to us. None of the writings of A. himself are extant; for the works ascribed to him are probably the productions of *Andronicus Callistos*, a learned Greek of the 15th century.

ANDRONICUS, LIVIUS. See LIVIUS ANDRONICUS.

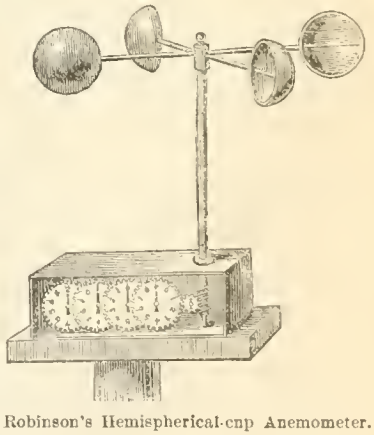
ANDROPO'GON. See LEMON-GRASS.

A'NDROS, an island of the Greek Archipelago, the most northern of the Cyclades, separated from Eubœa by a channel, the Doro Channel, six miles broad. The island is 21 miles long, and about 8 miles in its greatest breadth. Its eastern coast is very irregular. It is very mountainous, and on some of its mountains snow lies during great part of the year. The soil is very fertile, and wine, silk, wheat, barley, lemons, oranges, and pomegranates produced. Silk is the chief article of export. The pop. is supposed to be about 16,000. The chief town, ANDROS, is situated on a bay of the eastern coast. It has manufactures of silk and carpets, and a large port, which, however, is suitable only for small vessels. Pop. 5000.

ANDU'JAR, a town of Andalusia, Spain, in the province of Jaen, 24 miles north-north-west from Jaen, on the right bank of the Guadalquivir, at the base of the Sierra Morena. Its streets are irregular, but many of the houses are well built. The river is crossed by an old dilapidated bridge. The situation of the town is unhealthy. The inhabitants are mostly employed in agriculture; but there is some trade in grain, fruit, oil, and cattle, the produce of the neighboring country, and the town is famous for the manufacture of the porous cooling clay water-vessels which are in general use throughout Spain. The Convention of Baylen was signed here on 23d July 1808. Pop. 12,000.

ANEGA'DA, the most northerly of the Lesser Antilles, its lat. being about 19° N., and its long. between 64° and 65° W. It contains about 13 square miles, with a scanty population of little more than 200. It belongs to England. It is of coral formation, being, like most islands of the kind, low and beset by reefs. One reef in particular, which runs out ten miles to the south-east, is marked, even on ordinary maps, as the scene of numerous shipwrecks.

ANEMO'METER (Gr. *anemos*, the wind, and *metron*, a measure; Fr. *anémomètre*, Ger. *Windmesser*), an instrument for measuring the strength and velocity of the wind. The simplest and best A. is that which is generally known as Robinson's hemispherical-cup A. (see fig.). It consists of four hollow hemispheres or cups fixed to the ends of two horizontal iron rods crossing each other at right angles, and supported on a vertical axis which turns freely. The cups revolve with a third of the wind's velocity, and the instrument is so constructed that 500 revolutions are made whilst a mile of winds passes over it. The revolutions are registered by a system of wheels similar to those of an ordinary gas-meter. The difference between two readings gives the number of revolutions passed over during the intervening time, from which the miles can be calculated, and the rate per hour.

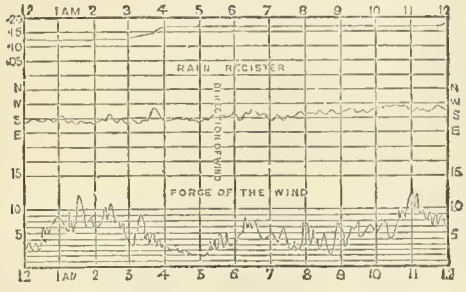

Robinson's Hemispherical-cup Anemometer.

The following table gives approximately the relation of the height of the water in the A. to the force and velocity of the wind in winds of different characters. (See AERODYNAMICS.)

	Height of Water.	Pressure per Square Foot.	Velocity per Hour.
Feeble Wind,	$\frac{1}{24}$ in.	$\frac{1}{160}$ lbs.	$4\frac{1}{16}$
Fresh Breeze,	$\frac{1}{4}$ "	$1\frac{8}{160}$ "	$16\frac{1}{4}$
Very Strong Wind,	1 "	$5\frac{2}{10}$ "	$32\frac{1}{2}$
Tempest,	4 "	$20\frac{8}{10}$ "	65

Pressure anemometers are of very great importance in meteorological observatories. Of these, the most complete is that invented by Osler. In this instrument, the force of the wind is ascertained

in a different way from the hemispherical-cup anemometer. A brass plate one foot square is suspended by means of springs, and being attached to the vane of the instrument, is maintained at right angles to the direction of the wind. This plate, by the action of the wind, is beaten back upon the springs, and in so doing, causes a pencil to move backwards and forwards on a sheet of paper placed below it. This sheet of paper is made to pass under the pencil in a direction at right angles to its oscillation; and by means of clock-work, moves at a uniform rate, so that the force of the wind at any particular time of the day is recorded with perfect accuracy. A pencil in connection with the vane, and moving in the same transverse line as the former, records the changes in the direction of the wind; and a third pencil, guided by a rain-gange, registers the quantity of rain that has fallen. The following sketch, taken from



Register-sheet of an Osler's Anemometer.

the first half of a daily register-sheet, gives an idea of the kind of record made by an Osler's A. The space between two upright lines indicates an hour; that between two horizontal lines, in the rain-register $\frac{1}{20}$ of an inch of rain, in the direction of the wind two cardinal points, and in the force of the wind 1 lb. of pressure on the square foot.

Thus, on the day in which these lines were traced, there was in the rain-register, brought over from the former account, between ·10 and ·15 of an inch; and during the twelve hours, the pencil had only risen one space, indicating a fall of ·05, or $\frac{1}{20}$ of an inch, almost entirely between the hours of 3 and 4 in the morning, and immediately before 12 in the day. If the day had been very rainy, and the pencil had risen to the top of the register, it would have fallen immediately to the bottom of it, and begun a new account; and it might have done so several times in the course of the twelve hours. This would have been effected by the mechanism connected with the rain-gauge, which enables the gauge to empty itself each time that the pencil reaches the top of the rain-register. As regards the direction of the wind, it was, during the first six hours, south, veering slightly towards the east; and for the last six hours, it was tending decidedly towards the west, being between 10 and 11 nearly west. From the line marking the force of the wind, it will be seen that the day was stormy. Between 1 and 2, and at 11, the wind was blowing a very high gale, producing a pressure of upwards of 12 pounds on the square foot; and between the hours of 4 and 5, there was a decided lull, the wind being brisk but not stormy (2—3 lbs.). Both the hemispherical-cup A. and the pressure A. are equally indispensable in fully equipped observatories. The former registers the quarterly wind which passes over the place, but cannot register the force of those sudden and almost instantaneous gusts of wind to which storms and hurricanes owe their destructive energy.

In Lind's A., the wind entering the mouth of one of two upright glass tubes connected below, depresses the column of water contained in the one tube, and raises proportionately that in the other. This A. is convenient for rough purposes.

ANE'MONE, a genus of plants of the natural order *Ranunculaceæ*, having an involucre of three divided leaves, more or less remote from the flower, a petaloid calyx, scarcely distinguishable from the corolla, and soft woolly achenia (see ACHENIUM), which in some species have tails. The name is originally Greek, and is said to be derived from the word for *wind*, because many of the species love very exposed situations. The species are numerous, and generally beautiful. Most of them flower early in spring. They are natives of temperate and cold climates, chiefly of the northern hemisphere. One species, *A. nemorosa*, the Wood A., is a common native of all parts of Britain, and its white flowers, externally tinged with purple, are an ornament of many a woodland scene and mountain pasture in April and May. Another species, *A. pulsatilla*, the PASQUE FLOWER, adorns chalky pastures in some parts of England at the same season. Its flowers are purple and externally silky. The Garden A, is a favorite florist's flower; the varieties are very numerous, and whole works have been published on them and their cultivation, which is most extensively carried on in Holland, and has prevailed from a very early period. It is generally supposed that all these varieties have originated from two species, *A. coronaria*, and *A. hortensis* or *stellata*. Both are natives of the Levant; the latter is found also in Italy and the south of France. By cultivation, the size of the flower is increased, its form and colors are modified, and many of the stamens are often changed into small petals, forming a sort of *heart* of the flower. The cultivation of the A. requires great attention. It prefers a light soil. The root, which consists of clustered tubers, is taken up after flowering. The plant is propagated by parting the roots, or by seed. In the latter way, new varieties are obtained. Seedling plants do not flower till the second or third year.—Besides the species which have been named, others occasionally appear as ornaments of our flower-gardens. *A. Apennina* and *A. pratensis* have beautiful blue flowers. They are both natives of the south of Europe. *A. Japonica*, a most beautiful species, has recently been introduced from Japan.—The species of this genus are characterized by the acridity prevalent in the natural order to which they belong; and the rhizomes of *A. nemorosa*, and others, have been recommended in obstinate rheumatism and in tænia.—The genus *Hepatica* was formerly included in *A. H. triloba* (*A. hepatica*), with three-lobed leaves, grows wild in most parts of Germany, and throughout the north of Europe, but is not a native of Britain. It is also found in North America. Varieties of different colors, and both single and double, are among the finest ornaments of our flower-borders in early spring. The plants are very apt to suffer from being removed or having the earth much loosened about them, and must be permitted to remain as much as possible untouched.

Anemone coronaria.

ANEMONE, SEA, a popular name of the species of *Actinia* (q. v.) and some other *Actiniadæ*. It seems to have been first applied to them about a century ago by Ellis, one of the most celebrated investigators of the department of natural history to which they belong, who remarks that 'their tentacles, being disposed in regular circles, and tinged with a variety of bright lively colors, very nearly represent the beautful petals of some of our most elegantly fringed and radiated flowers, such as the carnation, marigold, and anemone.' It is only, however, when in their proper element and undisturbed, that the sea-anemones expand their tentacula and exhibit their beauty. When left dry by the receding tide, they contract into a jelly-like mass, usually hemispherical or conical, with a puckered hole in the top. The most common of all the British species of sea-A. is the *Actinia Mesembryanthemum*, which has received its specific name from another floral association. It attaches itself to rocks and stones from low-water almost to high-water mark, and when left by the tide, appears as a sub-conica liver-colored or greenish mass, not more than 1—1½ inch in diameter, which, when touched, is found to be very smooth and slippery, but of pretty firm consistency. The tentacula, when fully extended, are in length nearly equal to the height of the body, and are nearly of the same color. An azure line frequently encircles the base; and on the base are dark-green lines converging towards the center, and which are formed by radiating vertical plates in the fleshy substance of the animal, analogous (although not calcareous) to the calcareous partitions in the single-starred madrepores. Around the margin of the mouth, there is a circle of azure tubercles, like turquoise beads of the greatest beauty. These are only to be seen when the mouth is pretty fully expanded. They are about twenty-five in number in full-grown specimens. Their use is not known, though they have been conjectured to be eyes.—A smaller species, *Actinia* (or *Sagartia*) *troglodytes*—olive-green, with snow-white stripes and numerous tentacula, is pretty common on the British shores, inhabiting holes in the rocks, often the deserted holes of the *Pholas*, above which its oval disc and tentacula scarcely rise, and into which it quickly withdraws, upon being disturbed.

Actinia Mesembryanthemum.

A number of species inhabit holes as this does.—*Actinia*

(or *Bunodes*) *coriacea*, which attains a diameter of two inches, attaches itself to sand-covered rocks, and is often much buried in the sand. It is covered with pale perforated warts, which have the power of agglutinating to themselves sand, gravel, fragments of shell, &c.; so that, when the tide is out, the animal is readily passed over by the inexperienced eye as a mere inequality in the surface of the sand, unless some accidental pressure cause it to squirt out water through its tentacula; as, in such circumstances, many of the species are very apt to do, sometimes to the annoyance of those who incautiously meddle with them.—*Actinia* (*Bunodes*) *crassicornis* is one of the largest and most beautiful British sea-anemones, being about four inches in height, and fully more when expanded between the tips of the opposite tentacula. It exhibits great diversity of the most beautiful colors. Red is usually predominant; the surface of many is variegated with white, or with orange-green and yellow. It occurs almost totally white, cream color, sulphur yellow, and bright scarlet with pale warts like ornamented beads.—Beauty of color and form are still more abundantly lavished on *Actinia Dianthus*, a still larger species, with very numerous tentacula, which inhabits deep water.—*Anthea Cereus* is, on some parts of the coast, one of the most abundant sea-anemones. Its tentacula are from 120 to 200 in number, are longer than in the Actiniæ generally, and are incapable, it is said, of being retracted, as in the true Actiniæ, but remain constantly expanded, and are almost never completely at rest.

Actinia crassicornis.

Actinia Dianthus.

Of all the species, *Actinia Mesembryanthemum* is perhaps most easily kept in the aquarium. It not unfrequently changes its place, and its locomotion is an interesting subject of observation. It will subsist for a considerable time without supplies of food, but readily accepts morsels of beef or mutton, fish, or almost any kind of animal food. The tentacula with which the offered food first comes in contact attach themselves to it; those next to them are in motion, as if to support them, if necessary, and a sort of sympathy seems to extend even to the most remote; but except in the case of struggling prey, or of a very large morsel, only a small number of the whole tentacula are usually employed in conveying the food into the mouth, or, more properly, into the stomach, for they do not seem to part from it till they have fairly lodged it there.

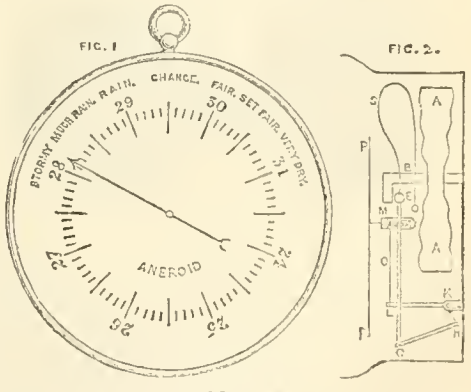
Sea-anemones are extremely voracious, and almost every observer has his own anecdotes to illustrate it. Dr. Johnston relates one which at the same time remarkably illustrates their power of reproducing organs of their own body. 'I had once brought to me a specimen of *Act. crassicornis*, that might have been originally two inches in diameter, and that had somehow contrived to swallow a valve of *Pecten maximus* of the size of an ordinary saucer. The shell, fixed within the stomach, was so placed as to divide it completely into two halves, so that the body, stretched tensely over, had become thin and flattened like a pancake. All communication between the inferior portion of the stomach and the mouth was of course prevented; yet, instead of emaciating and dying of an atrophy, the animal had availed itself of what undoubtedly had been a very untoward accident, to increase its enjoyments and its chances of double fare. A new mouth, furnished with two rows of numerous tentacula, was opened up on what had been the base, and led to the under-stomach; the individual had indeed become a sort of Siamese twin, but with greater intimacy and extent in its unions. (*British Zoophytes*, i. 235).

As inmates of the aquarium, sea-anemones are apt to prey upon their fellow-prisoners. 'Simple contact of the tentacula,' says Sir J. G. Dalyell, 'is the prelude of destruction. Some animals, as if conscious of their inevitable fate, seem paralyzed by the touch, and yield without a struggle. Others, whose size and strength should insure indemnity, are held in the relentless grasp; the tentacula crowding faster and faster around, until the victim is speedily swallowed alive.' There appears to be in other marine animals an instinctive horrer of the tentacula of the sea-A. The hermit-crab will instantaneously flee out of its shell, if the shell is caught by them. It is now believed that, like the *Acalephæ* (q. v.) and the *Hydras* (q. v.), the sea-anemones possess a power of benumbing their prey. Sea-worms (*Nereides*) have been observed first to writhe, and then to become paralyzed. Little elliptical capsules are in some species scattered over the whole surface of the body; in others, confined to the tentacula, or even to their tips. These are furnished with spicula or minute spears, by which it is probable that not only are wounds inflicted, but poison is also conveyed into them.

The sensations produced by the touch of the tentacula appear to be very different in the case of different persons, from a mere 'rasping feeling' on the withdrawal of the hand, to a slight tingling, and even to a stinging as by a nettle. The *Anthea Cereus* possesses the stinging power in a much greater degree than the ordinary *Actiniæ*. Probably the skin of the human hand is in general too thick or hard to be pierced by their fine spicula. Dr. A. Waller of Birmingham discovered that, on submitting the tip of his tongue to the tentacula, a pungent pain and stinging, as by a nettle, were the constant result. He also found that a thin India-rubber membrane grasped by the tentacula retains the microscopic 'poison-darts' sticking on its surface. Some of these are only two or three times the length of the capsule which contain them, or at most 100th part of an inch; but others are much longer, and when within the capsule, are coiled up after the manner of a watch-spring. The capsules are therefore called *fililiferous* or *thread capsules*. This thread is higly elastic, and the expulsion of it, as of the shorter spicula, is effected, Mr. Gosse tells us, by organs having this for their special office.

AN-END, a maritime term relating to the position of any mast or boom when perpendicular to the plane of the deck or other level from which it springs. When a top-mast is in its proper place at the head of the lower mast, it is said to be 'an-end.'

A'NEROID (formed in an anomalous way from Gr. *a*, priv., and *neros*, wet), the name given to a barometer invented by M. Vidi of Paris, in which the pressure of the air is measured without the use of liquid, as in ordinary instruments. The face of



Aneroid Barometer.

the A. barometer, represented in fig. 1, has a diameter of about 5 inches, and the case behind, which contains the mechanism, a general idea of which is given in fig. 2, is about 2 inches deep. The pressure of the atmosphere acts upon a circular metal box, AA, about 3 inches in diameter, and ¼ of an inch deep, which has been nearly exhausted of air, and then soldered air-tight. The sides are corrugated in concentric rings, so as to increase their elasticity, and one of them is fixed to the back of the brass case which contains the whole. The amount of exhaustion is such that if the sides of the box were allowed to take their natural position, they would be pressed in upon each other, and to prevent this they are kept distended, to a certain extent, by a strong spring, S, fixed to the case, which acts upon the head of the stalk, B, attached to the side next the face.

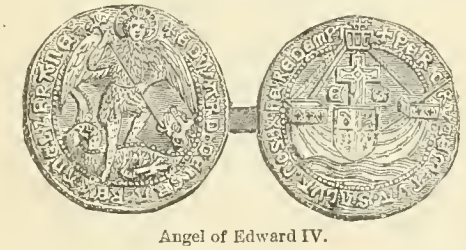
When the pressure of the air increases, there being little or no air inside the box to resist it, the corrugated sides are forced inwards, and when it diminishes again, their elasticity restores them to their former place; and thus the little box becomes a spring extremely sensitive to the varying pressure of the external atmosphere. Supposing the two sides pressed inwards, the end of the spring, E, will be drawn towards the back of the case, and carry with it the rod, EG, which is firmly fixed into it. EG, by the link GH, acts on the bent lever, HKL, which has its axis at

K, so that, while the arm, KH, is pushed to the right, LK is moved downwards. By this motion, a watch-chain, O, attached at L, is drawn off the little drum, M, and the index-hand, PP, which is fixed to it, would move from the position represented in fig. 1 to one towards the right. When the contrary motion takes place, a hair-spring moves the drum and the hand in the opposite way. By this mechanism, a very small motion of the corrugated sides produces a large deviation of the index-hand $\frac{1}{250}$ of an inch causing it to turn through 3 inches. The A. barometer is graduated to represent the inches of the mercurial barometer. Both from its small size and construction, it is extremely portable, and consequently a very useful instrument; but from its liability to change from time to time, it must be frequently compared with the mercurial barometer. The 'Metallic Barometer' of M. Bourdon is a modification of the A. principle.—See *Manual of Barometers*, by J. H. Belville.

A'NEURISM (Gr. *aneurysma*, a dilatation) is a pulsating tumor consisting of a sac or pouch into which blood flows through an opening in an artery. The sac of an arterial A. may be formed in the first instance by one or more of the tunics of the vessel, generally the outer one, the two inner having given way. This is called a *true* A., in contradistinction to the *false*, in which the sac is formed of cellular tissue condensed by the blood flowing into it after a wound has been inflicted on the artery from without. Should the sac give way, and the blood escape among the tissues, the A. is said to be diffused. Varicose A. is when the sac communicates both with an artery and a vein; Aneurismal Varix, when these vessels communicate without any sac intervening; both of these are generally the results of bleeding being performed by non-professional persons. Aneurisms prove fatal by their pressure on some important part, or by bursting and allowing a sudden escape of blood. They are cured by the deposit, within the sac, of fibrin from the blood—a result the surgeon can promote by obstructing the artery above the A. by compression or by ligature; applying the latter close to the sac, if the A. is of the 'false' variety, but at a distance, if it is the result of disease. Internal aneurisms are treated by those remedies which moderate the heart's action, as digitalis, &c.

ANGEIOLEUCI'TIS. See ADENITIS.

A'NGEL, an ancient English gold coin, varying in value from 6*s.* 8*d.* to 10*s.* It was so called from the figure of the archangel



Angel of Edward IV.

Michael piercing the dragon upon its obverse. Angels continued to be coined down to the time of the Commonwealth.

ANGEL-FISH (*Squati'na A'ngelus*), a fish common on the southern coasts of Britain, and remarkable for its extreme ugliness. On some parts of the coast, it is called *monk-fish*. It is very nearly allied to the sharks, and was included by Linnæus in the genus *Squalus*. See SHARK. It is very voracious, preying chiefly upon fishes. It attains a length of seven or eight feet; and the body is broad and flattened horizontally. The head is nearly round, and broader than the body, from which it is separated by

Angel Fish.

a very distinct neck; the mouth is extremely large, and at the extremity of the snout; the eyes are on the upper part of the head, and are very small; behind the eyes are large spout-holes; the skin is very rough, and covered with tubercles. The upper parts are of a gray color; the under parts, dirty white. The female is said to produce seven or eight young in spring and autumn.

ANGE'LICA, a genus of plants of the natural order *Umbelliferæ* (q. v.), by some botanists divided into two: *A.*, and *Archangelica*. The species are mostly herbaceous and perennial, natives of the temperate and colder regions of the northern hemisphere. They have bipinnate or tripinnate leaves. WILD A. (*A. sylvestris*) is a common plant in moist meadows, by the sides of brooks, and in woods in Britain and throughout many parts of Europe and Asia. The root is perennial, short, ringed, and branched; it is white within, and contains a yellow milky juice.

The stem is hollow, 1½—5 feet high, often flecked with red; the umbel is convex. GARDEN A. (*A. Archangelica* or *Archangelica officinalis*) is a biennial plant, becoming perennial when not allowed to ripen its seeds. It has greenish flowers in almost spherical umbels. The stem is as high as a man. The fruit is long and straw-colored. The root is long and fusiform, an inch or more in thickness, with thick irregular rugose radicles. The whole plant, and especially the root, is aromatic and bitter, containing much resin and essential oil. The root is admitted into the pharmacopœia as an aromatic stimulant and tonic, and is used in nervous ailments, and in indigestion and flatulence. It is very little used in Britain. The root of *A. sylvestris* is sometimes substituted for it, but is much weaker.—The Garden A. was at one time much cultivated for the blanched stalks, which were used as celery now is; but its cultivation for this purpose has long been almost entirely discontinued. The tender stalks and midribs of the leaves, candied, are still, however, a well-known article of confectionary, and an agreeable stomachic; the roots and seeds are employed in the preparation of gin and of 'bitters.' The plant is a very doubtful native of Britain, but is common in many parts of Europe, and even in Lapland and Iceland. The Laplanders not only use it as food, but regard the stalks roasted in hot ashes as an efficacious remedy in pectoral disorders.—The powdered seeds of the Wild A. are used by the country people in some parts of Europe to kill lice. Several species of A. are natives of North America.

Angelica archangelica.

ANGELICA TREE. See ARALIA.

A'NGELO, MICHAEL. See MICHAEL ANGELO.

A'NGELS (Gr. messengers), in Jewish and Christian theology, a class of superior spirits, represented as the immediate instruments of Divine Providence. As Scripture contains no complete and systematic account of angels, the belief of the Church respecting them, except in a few points, has never been exactly defined. It has always been held that A. and human souls, notwithstanding the high origin of the latter, are distinct; only Dionysius Areopagita (q. v.) and a few modern speculators have maintained the contrary. Dionysius, in his *Hierarchia Cœlestis*, divides A. into nine orders. Whether there are not spirits superior both to men and A., has been a disputed point. As to the number of A. and their names, the Church in the middle ages repeatedly checked the tendency to go beyond the usually received accounts; a Romish council, in 745 A.D., mentions with reprobation the use of the unwonted names of Uriel, Raguel, Simiel, &c. The names that have all along been in most common use are Michael, Gabriel, and Raphael.

The creation of the A. was placed, by the Platonizing Church-fathers, before that of the material world; others assigned it to some of the six days. Equally various were the opinions as to the nature of the A. The second synod of Nice (787) assigned them a subtle, ethereal, or firelike body; the scholastics, on the other hand, and the Lateran Council of 1215, maintained their immateriality; while others, owing to the appearing of A., mentioned in Scripture, attributed to them the power of assuming momentarily the corporeal form. The poet Nonnus (lived in Egypt in the 5th c.) is the first to speak of angels' wings.

The belief in *guardian* A. was common both to heathens and Jews, and had been reduced to system by Philo; and the doctrine was adopted in the Christian Church, and defended by Origen and others, founding on Matthew xviii. 10, and Acts xii. 15. It has been cherished by many in all ages and of all parties, but has

never been decided on by the Church. Some of the fathers also spoke of good and bad guardian-angels, the former of whom were always ready to prompt to good actions, and to avert evil, while the latter were equally quick in bringing about mischief, wickedness, and calamity. From the belief in the guardianship of A., and their participation in the government of the world, arose naturally the early practice of invoking and worshiping them. Many Christian teachers condemned it, appealing to Colos. ii. 18; and the Council of Laodicea, 300, called it disguised idolatry. But after the Council of Nice had conceded that though A. were not to receive divine worship, they might receive a reverential obeisance, the practice mentioned became more and more rooted, and continues in the Greek and Roman Catholic Churches to this day.

A'NGER is displeasure or vexation accompanied by a passionate desire to break out in acts or words of violence against the cause of the displeasure; which must, of course, be a sentient being capable of feeling the infliction. Like most other emotions, it is accompanied by effects on the body, and in this case they are of a very marked kind. The arterial blood-vessels are highly excited; the pulse, during the paroxysm, is strong and hard, the face becomes red and swollen, the brow wrinkled, the eyes protrude, the whole body is put into commotion. The secretion of bile is excessive, and it seems to assume a morbid consistency. In cases of violent passion, and especially in nervous persons, this excitement of the organs soon passes to the other extreme of depression; generally, this does not take place till the A. has subsided, when there follows a period of general relaxation. The original tendency to A. differs much in individuals according to temperament; but frequent giving way to it begets a habit, and increases the natural tendency.

From the nature of A., it is easy to see that it must be—often at least—prejudicial to health. It frequently gives rise to bile-fever, inflammation of the liver, heart, or brain, or even to mania. These effects follow immediately a fit of the passion; other evil effects come on, after a time, as the consequence of repeated paroxysms—such as paralysis, jaundice, consumption and nervous fever. The milk of a mother or nurse in a fit of passion will cause convulsions in the child that sucks; it has been known even to occasion instant death, like a strong poison.

The controlling of A. is a part of moral discipline. In a rudimentary state of society, its active exercise would seem to be a necessity; by imposing some restraint on the selfish aggressions of one individual upon another, it renders the beginnings of social co-operation and intercourse possible. This is its *use*, or, as it is sometimes called, its final cause. But the more social intercourse comes to be regulated by customs and laws, the less need is there for the vindictive expression of A. It seems an error, however, to suppose that the emotion ever will be—or that it ought to be—extirpated. Laws themselves lose their efficacy when they have not this feeling for a background; and it remains as a last resource for man, when society, as it does every now and then, resolves itself into its elements. Even in the most artificial and refined states of society, those minor moralities on which half the happiness of social intercourse depends, are imposed upon the selfish, in great measure, by that latent fund of A. which every man is known to carry about with him.

ANGERMANLAND (Swedish, *Angermanland*, pronounced Ongermanland), a former division of Sweden, now chiefly comprised in the län of Westernorrland, extends along the Gulf of Bothnia, and is watered by the river Angermann. It exhibits great variety of wild and beautiful landscape—wood, mount, stream, and lake; vieing with the banks of the Rhine, the Danube, or the far-famed scenery of Switzerland. In addition, it is one of the best-cultivated districts in Sweden, producing barley, rye, and peas, and abounding in excellent pasturage. The river Angermann, in its lower course, becomes navigable for the largest ships, and broadens out into a lake shortly before discharging itself into the Gulf of Bothnia. The inhabitants are reckoned among the solidest of the Swedes, and are favorably known for their sobriety and industrious habits, on account of which, prosperity is general. The chief town of the district is Hernœsand, with a population of rather more than 2000, standing on the small island of Herno, and having steam-communication weekly with Stockholm. It is the see of a bishop, has a cathedral-school and literary and printing establishment with Lappish type, public baths, and building docks. It exports linen fabrics, and the Baltic products generally.

ANGERS, the ancient *Juliomagus* or *Andegavum*, formerly the capital of the Duchy of Anjou, and now of the French department of Maine-et-Loire, is situated on both sides of the navigable river Mayenne, not far from its junction with the Loire, lat. 47° 28′ N., long. 0° 33′ W. A. is the see of a bishop, and was the seat of a university founded in 1246; instead of which it has now an academy of the highest class. Lord Chatham and the Duke of Wellington received a portion of their education at the military college which was once here, but which is now removed to Saumur. It has also given birth to two distinguished men, Bernier, the traveler, and David, the sculptor. It has also a theological seminary, an institution for the deaf and dumb, a botanical garden, a large picture-gallery, and a public library containing 40,000 volumes. The ruins of the ancient castle of A., built by St. Louis, about the middle of the 13th c., are situated on a projecting rock above the river. The cathedral of St. Martin is a fine building of the 9th c., in the Roman basilica style. Sail-making, cotton-spinning, stocking-weaving, &c., are carried on to a considerable extent, and a trade in corn, wine, brandy, flax, hemp, honey, &c. The neighboring slate-quarries employ 3000 men. Pop. (1881) 65,225.

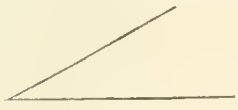
ANGHIA'RI (anc. *Castrum Angulare*), a town of Central Italy, in the province of Arezzo, Tuscany, 10 miles north-east from Arezzo, on the slope of a hill near the Sovarà, one of the headwaters of the Tiber. In 1440, a battle was fought here, in which the Milanese were defeated by the Florentines. Pop. of commune, 6941.

ANGI'NA PECTORIS, or HEART-STROKE, is characterized by intense pain and sense of constriction, which occur in paroxysms beginning at the breast-bone, or deep in the chest, and extending towards the left shoulder. The fits recur, and the patient either dies in one of them, or from effusion of fluid within the chest.

A. P. rarely occurs before the fiftieth year, and is caused by some defect in the vascular or nervous supply of the heart itself; but the exact seat of the disease has not yet been ascertained, and, indeed, probably varies with the individual. The paroxysms are induced by any excess in diet, by exertion, as walking uphill or against a boisterous wind, or by mental emotions. As during the paroxysm, but little can be done, 'whoever is subject to fits of the heart-stroke, should studiously shun all occasions of having his feelings roused or his passions warmly interested. If he is prone to anger, he must either endeavor to restrain his passion, or must withdraw from scenes likely to awaken it. If he feels keenly contradiction, disappointment, or insult, he had better avoid all disputes in which he may meet either one or the other. He must lead a sober, quiet, and temperate life, in which neither the emotions of the soul are to disturb the functions of the body, nor corporeal affections are allowed to disturb the serenity of the mind.'—*Craigie*.

ANGIOSPE'RMOUS (from the Greek *angeion*, a vessel, and *sperma*, seed), a term in Botany, applied to phanerogamous plants which have their seeds enclosed in a pericarp. This is the case with the greater part of the phanerogamous plants. Those which have the seeds naked, as the *Coniferæ* (q. v.), are called *Gymnospermous*. In the Linnæan system, one of the two orders of the class *Didynamia* is called *Angiospermia*.

ANGLE (from the Lat. *angulus*, a corner) means, in Geometry, the opening or inclination of two lines that cut or meet one another. If the lines are straight, the A. is *rectilinear*. The magnitude of an A. depends, not upon the length of lines or legs, but upon the degree of their opening. If the legs are supposed closed, like a pair of compasses, and then gradually opened till they come into one straight line, they form a series of gradually increasing angles; when half-way between shut and straight, they contain a *right* A. Any A. less than a right A. is called *acute*, and one greater, is called *obtuse*. Angles are measured by degrees, of which a right A. contains 90. The A. made by two curved lines (*curvilinear*) is the same as the A. made by the tangents to the two curves at the point of intersection. Angles made by planes with one another can also be reduced to rectilinear angles. When three or more planes meet at the same point, the angular space included between them is called a *solid* A.

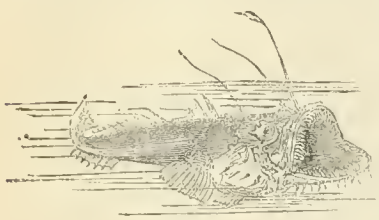

Angle.

The FACIAL ANGLE, on which Camper founded a scheme for estimating the degrees of intellect and sagacity bestowed by nature on the several members of the animal kingdom, was measured by him in the following way: One straight line was drawn from the ear to the base of the nose, and another from the prominent center of the forehead to the most advancing part of the upper jawbone, the head being viewed in profile. 'In the angle produced by these two lines,' says the physiologist, may be said to consist not only the distinction between the skulls of the several species of animals, but also those which are found to exist between different nations; and it might be concluded, that nature has availed herself at the same time of this angle to mark out the diversities of the animal kingdom, and to establish a sort of scale from the inferior tribes up to the most beautiful forms which are found in the human species. Thus it will be found that the heads of birds display the smallest angle, and that it always becomes of greater extent in proportion as the animal approaches most nearly to the human figure. Thus there is one species of the ape tribe in which the head has a facial angle of forty-two degrees; in another animal of the same family, which is one of those *simiæ* approaching most closely to the

human figure, the facial angle contains exactly fifty degrees. Next to this is the head of the African negro, which, as well as that of the Kalmuc, forms an angle of seventy degrees, while the angle discovered in the heads of Europeans contains eighty degrees. On this difference of ten degrees in the facial angle, the superior beauty of the European depends; while that high character of sublime beauty which is so striking in some works of ancient statuary—as in the head of the Apollo and in the Medusa—is given by an angle which amounts to *one hundred* degrees.'

ANGLE, Dead. In fortification, where an angle of the wall is so formed that a small plot of ground in front of it can neither be seen nor defended from the parapet, it is called a 'dead angle.' See Bastion, Curtain, Fortification.

A'NGLER (*Lophius piscatorius*), a fish not uncommon on the British shores, and sometimes called the *Fishing-frog*, sometimes from its ugliness and voracity, the *Sea-devil*. It usually attains the size of about three feet in length, sometimes five feet. The head is enormously large, depressed, and spinous; the mouth is of similar proportions (whence the Scottish name *Wide Gab*), and furnished with many sharp curved teeth. The lower jaw is considerably longer than the upper. The body is narrow in comparison with the great breadth of the head, and tapers rapidly to the tail. The whole fish is covered with a loose skin, almost without scales. There are two dorsal fins, which are spinous, and three anterior rays, regarded as belonging to the first dorsal, are free and articulated to the head, which are with great probability supposed to serve the animal as delicate organs of touch. The nostril tube is elongated into a membraneous stalk, capable of spreading out like a cup at the upper end, and of being moved in every direction by a very numerous set of muscles, the bottom of the cup being divided into projecting leaflets, on which the olfactory nerve is finally distributed. There are also numerous worm-like appendages about the mouth, and by means of these, and still more of the filaments which rise from the upper part of the head, the creature is supposed to attract small fishes, upon which it seizes. The wonderful stories told upon this point seem to require authentication, yet they are in themselves by no means incredible, and have been current concerning this fish and its congeners, since before the days of Aristotle, who mentions them, and says that this fish is called a *fisher* because of the means by which it procures its food. Yarrell justly remarks of the stratagem ascribed to the *Lophius*, that it is not more wonderful than that of spiders, which spin and repair their webs to catch insects, upon which they subsist.—The genus *Lophius* belongs to a family of Acanthopterygious Fishes, called *Lophiadæ* or *Lophioids*, and by Cuvier, *Pectorales Pedunculati*, remarkable for the elongation of the carpal bones, so as to form a sort of wrist, to the extremity of which the pectoral fin is articulated; so that, by means of it, these fishes are able to leap suddenly up in the water to seize prey which they observe above them; and some of them can hop about upon seaweeds or mud from which the water has retired. They do not suffer so quickly as most other fishes from being out of the water, their gill-opening being very small, and an A. has been often known to devour flounders or other fish which have been caught along with it. The bones are much softer than those of Acanthopterygious Fishes in general.



Angler.

A'NGLES (*Angli*), a German tribe of the race of the Suevi, who seem originally to have occupied the country lying on the east of the Elbe, between the mouths of the Saale and the Ohre, and moving northwards, to have settled in Schleswig, between the Jutes and the Saxons. Along with the latter the A. passed over in great numbers to Britain, during the 5th c., and ultimately established there the Anglo-Saxon (q. v.) kingdoms of the Heptarchy. From them England derived its name (Lat. *Anglia*, Anglo-Saxon, *Engla-land*). After these migrations from Schleswig, the Danes from the north entered the deserted districts, and mingled with the A. who remained there. The German language and manners were afterwards introduced by immigrant nobles from Holstein, and prevailed among the higher classes; but to the time of Christian VI., the Danish was still generally spoken by the common people. During the present century, the German has more completely gained the ascendency. The modern Angles are of a more passive disposition than the Frieslanders and the people of the Dithmarsch, and religious sentiment is very strongly manifested among them. The district called *Angeln* extends from the Schlei on the south, to the Flensburg Hills on the north, contains about 330 square miles, and a population of about 50,000. The name has no political or administrative signification.

A'NGLESEA, Henry William Paget, Earl of Uxbridge and Marquis of A., born May 17, 1768, was educated in Oxford, and, as Lord Paget, entered the army at the beginning of the French Revolution. From 1793 to 1794 he commanded a volunteer corps in Flanders, and subsequently acquired a high reputation as a cavalry officer in the Peninsular War, especially during the retreat under General Moore. At the battle of Waterloo, where he commanded the British cavalry, he lost a leg. On his return to England, he received a vote of thanks from parliament, and was made Marquis of A. Afterwards, he took a part in the administration under Canning, and in 1828 was appointed lord-lieutenant of Ireland, at a period when that country was greatly agitated on the question of its religious privileges. He at first opposed the emancipation of the Catholics; but ultimately became convinced that it was essential to the peace of the country, in consequence of which he was recalled from Ireland by Wellington in 1829. He was again appointed to the same office under Lord Grey's administration in 1831; but the perverse policy of the Tories had involved matters in such perplexity that even the decisiveness and integrity of his character could not allay the irritation. O'Connell had now commenced his ruinous career of agitation, and the marquis was compelled to resort to severe coercive measures, which destroyed the popularity he had previously acquired. His rule in Ireland was not characterized by any superior statesmanship; but it ought to be remembered, to his honor, that he founded the Irish Board of Education, which has been of immense service to that nation. In 1833, he was succeeded by the Marquis of Normandy; but did not again take any prominent part in public proceedings till 1846, when he accepted the office of Master-general of the ordnance in Lord John Russell's ministry. In the same year he was raised to the dignity of field-marshal. He died on the 29th April 1854.

ANGLESEY, or ANGLESEA (Sax. *Angles' Ey*, i. e. 'the Englishmen's island'), an island and county of Wales, on the north-west coast of that principality, being separated from the mainland by the Menai Strait. Its form is that of an irregular triangle, the base facing the mainland. Its length is about 20 miles, breadth, about 17; coast-line, about 80; area, 193,511 acres. Pop. (1871) 51,040. (1881) 50,964. The climate is mild, but foggy, especially in autumn; the soil, generally a stiff loam, varying with sandy and peaty earth; the general aspect of the island, flat and uninteresting, there being very little wood. The prevailing rock is mica schist; limestone ranges traverse the county; granite, marble, coal, serpentine, soapstone, are also found. The island is rich in minerals; the Parys and Mona copper-mines, near Amlwch, were opened in 1768. Lead ore, containing much silver, has also been found. The manufactures of A. are inconsiderable. Agriculture, though still rather backward, has yet in recent years made considerable advance in the way of adopting means of improvement. Increased attention has also been given to the breeding of cattle and sheep. The number of acres under all kinds of crops, bare fallow, and grass, in 1881, was 147,548; under corn crops, 26,954; under green crops, 9742. The number of horses used for agricultural purposes was 7217; of cattle, the number was 44,918; of sheep, 38,146; and of pigs, 14,797. Communication with the mainland is by the Menai Suspension Bridge, and the great Britannia Tubular Bridge, over which the Chester and Holyhead Railway passes. See Tubular Bridges. A. was known to the Romans under the name of *Mona*. It was one of the chief seats of the Druidical power, which in 61 A.D. was all but destroyed by the Roman general, Suetonius Paulinus. The island was again subdued by Agricola, 76 A.D. Egbert conquered it in the 9th c.; but the native princes afterwards recovered their dominion, establishing the seat of government at Aberffraw. It was finally subdued by Edward I. The ancient remains consist chiefly of dolmens, two of which, side by side, are in the park of Plas, Newydd, the seat of the Marquis of A. At Holyhead are the remains of a Roman camp.

The climate of A. is milder than that of the mainland of Wales; but in the autumn the air is frequently filled with noxious mists. The county is divided into three districts, called *cantrefs*, each sub-divided into two *cwmwds*. The market-towns are Amlwch (a flourishing little seaport of 2968 inhabitants), Beaumaris (q. v.), Holyhead (q. v.), Llangefni (pop. 1222), and Llanerch-y-medd. The first four of these towns unite in returning one member to the imperial parliament; the county returns another.

A'NGLING is the art of alluring and capturing fish, by means of a rod, line, and hook—the hook being furnished with a lure, which is either some object on which the animals naturally prey, or is a counterfeit of such an object. A. is of great antiquity, as we learn from mention being made of it by the prophet Isaiah: 'The fishers also shall mourn, and all they that cast angle into the brooks,' chap. xix. v. 8. The practice has continued through all ages, till the present time, and in almost all countries. In 1496, Wynken de Worde 'emprented at Westmestre' a '*Treatise of*

Fysshinge with an Angle, by Dame Juliana Berners or Barnes. Izaak Walton, in 1653, gave to the world his *Complete Angler*, a work afterwards enriched with additions by his friend Charles Cotton, and till this day esteemed both for correctness of details, and the singularly happy humor of its apologues, poetical pieces, and disquisitions.

We reserve for future articles the habits and best methods of capturing the principal species of fish that haunt the streams and lochs of Great Britain, and here confine ourselves to a short notice of A. apparatus, and some general directions, &c., for the guidance of tyros, proceeding at once to describe. first:

FISHING-TACKLE.—The angler's equipment consists of *rod* and *reel, lines, hooks, baits, flies, tackle-book*, and *basket;* these should be as simple as possible in their construction many accessories added by the fishing-tackle maker being more ornamental and cumbrous than really useful.

The *rod* must be long or short, stiff or supple, to suit the habits of different species of fish; thus, a long rod of sixteen or eighteen feet, very strong, but not very elastic. is necessary for salmon; while a rod of ten or fourteen feet, light, elastic, and finely tapering, is sufficient for trout. The rod for trout and similar kinds of fishing should be light enough to be wielded easily for several hours together by one hand. Spliced rods are easier mended than those with joints, and do not so readily get out of order. For salmon and other kinds of large fish, a large rod of several pieces, united by joints, is necessary.

The *reel* or *pirn*—an apparatus fixed near the bottom of the rod, and upon which the line is wound—should be simple in its mechanism, and made so as to wind or unwind freely and quickly.

Lines should be long, smooth, and flexible, and of a material not easily injured by wet. The part of the line which is wound upon the reel, and passes along the rod, is called the *reel-line;* that which is attached to it, is called the *casting-line*. The casting-line is usually made of triple gut, twisted, and between it and the gut to which the hooks are attached. there should be several threads of strong single gut. Reel-lines vary from twenty to one hundred and twenty yards in length, according to the dimensions of the water to be fished, and the habits of the species to be captured. Lines are made of various materials, such as horse hair and oiled silk. If, in purchasing, the angler be at a loss to decide between a heavy or a light line, he should incline rather to the heavy, for the sake of its *casting* superiority, and the advantage gained in windy weather. The *casting-line* is sometimes made of horsehair, lighter and finer than the reel-line, and at the end of this is attached the *gut-line*—the finest of all. Sometimes, however, the horsehair casting-line is dispensed with. The casting and gut lines should taper in thickness from the reel-line to the end hook on the gut-line; all knots should be small, but *secure*, the only breaks discernible by a general glance throughout the entire length of casting and gut lines, being the hooks.

Hooks range in size from several inches down to a quarter of an inch in length. Their chief places of manufacture are Kendal and Redditch.

Baits consist of any substance put upon a hook to act as a lure to the fish; and when used, the baited hook is dropped into, and allowed to sink in the water, instead of being kept near the surface, as is the case with fly. The materials, living or dead, used for bait are very numerous, the principle kinds being worms, caddis-worms, pastes, maggots, minnows, artificial and natural, and various kinds of insects. The methods of using baits are extremely various, and in many cases rather complicated.

Artificial Flies, intended as they are to bear something like a resemblance to the actual live flies, are the most important lures used by the angler. The chief materials for dressing flies are cocks' hackles or other feathers, to form wings; the fur of a hare's ear, mouse, water-rat, or some other animal, to form the body; and waxed silk thread to tie the whole, in an artful, neat manner, to the shank of the hook.

The following is a list of trout-flies and spiders, with a supply of which the angler may pursue his 'meditative art' in almost any river or stream in Great Britain throughout the entire season; and it is almost needless to add, that the wood-cut below, though copied from two favorite flies and a spider, is intended as a guide to *size* rather than to pattern. Spiders are dressed, as they naturally exist, without wings.

Flies.—No. 1. Wings formed of feathers from the wing of the chaffinch, with a black hackle, tied with slate-colored silk.

2. Wings composed of woodcock or partridge feathers, and red hackle, tied with yellow silk.

3. Wings formed of the feathers of the corn bunting, with a red hackle wound round close to the head, tied with orange-colored silk.

4. Wings formed from the speckled feather of the teal, with a black hackle wound round close to the head, tied with brown silk. The same wing with a red hackle, tied with yellow silk, also makes a killing fly.

5. Wings from the feathers of the dotterel; body and hackle same as No. 2.

6. Wings from woodcock or corn bunting wing; body of hare's ear.

Spiders.—1. From the small feather of the dotterel wing tied with yellow silk thread.

2. From the small glistening feather taken from the outside of the shoulder of the starling's wing, tied with yellow silk thread.

3. From the neck-feathers of the hill-partridge, tied with yellow silk thread.

4. From the black hen-hackle, tied with small black silk thread.

5. From the blue hen-hackle, tied with yellow silk thread.

Flies. Spider.

6. From the small red cock-hackle, or the small feather of the landrail's wing, tied with yellow silk.

Of *salmon-flies*, the best two we know of are formed from the following materials:

'No. 1. Tail.—crest-feather from golden pheasant; tip—gold tinsel and orange silk, with two turns of ostrich herl; body composed of claret-colored pigs' wool and mohair mixed, with a little pigs' wool at the head, of a light-blue shade; wound with silver tinsel and dark-red hackle, with blue jay's feathers for shoulders; wings—from the teal-duck or widgeon, distinctly marked or barred; head—of black ostrich herl.

'No. 2. Tail—crest feather from golden pheasant; body composed of pigs' wool and mohair mixed, of a dark-cinnamon shade;

Salmon Flies.

wound with silver twist and dark-red hackle; shoulders composed of breast-feather of the argus pheasant; wings composed of golden pheasant tippet or neck feathers, distinctly marked teal, four fibres of blue and red macaw tail-feathers, with pairs of wings from the brown and black barred feathers of the peacock wing surmounting the whole; a blue feather from the kingfisher or blue chatterer on each side of the wings; feelers—from blue and buff macaw tail-feathers; head—black ostrich herl.'

Larger and more gaudily dressed hooks are necessary for some of the bigger rivers of Great Britain, such as the Shannon in Ireland, and the Tay in Scotland; but the two here described are the most killing varieties for general use that we know of, and have been found more or less serviceable in every salmon river of any importance. No. 1 may be varied by different shades of wing, to suit various colors and sizes of water. Both are stock-flies with every tackle-maker.

The angler's equipment is completed by the addition of a *basket* or *bag* for holding his fish, and a *tackle-book;* also a flat, round tin box for holding his fly-casts. In fishing for perch, gudgeons, bream, &c., a small float is often used. Floats are made of cork, quill, reed, and other light materials; and a choice, according to circumstances, may be added to the tackle-book. Books adapted for the angler's purpose can be had of any tackle-maker.

The angler's dress should be a plain, dull-colored suit; his shoes strong; and if he prefers wading, his boots or leggings should be waterproof.

The *gaff* and *landing-net* are each useful for securing large fish when stranded in very shallow water, or when fishing from a boat; and the *drag-hook*, which is an instrument with three bent prongs or hooks, with a long strong line attached, is frequently useful for casting into rivers or lochs to clear away any object at the bottom on which the hook has fouled.

PRACTICE OF ANGLING.—*Bait-fishing*—As a rule, bait-fishing is practised more on sluggish, deep rivers than on swift running streams, though it answers as well, and, under certain circumstances, even better in the latter than in the former. The fish usually sought for in the slow-running, deep rivers south of the

Tweed, are gudgeon, roach, dace, bream, chub, barbel, tench, carp, perch, pike, trout, &c. All are sometimes taken with fly; but worms, gentles, or paste are more generally used.

The first thing the bait-fisher has to learn, is the art of baiting his hooks. Taking the hook in his right hand, and the bait between his fingers in the left, let him enter the hook at the head of the worm, and carry it through the animal to near the tail, covering the entire hook and its tying. The worm should be broken or mangled as little as possible; and the more life-like it appears, the greater the probability of its proving an effectual lure. There must not, however, be too much spare worm left dangling from the hook, otherwise the fish will keep nibbling it away without biting at the bait bodily, and taking it into its mouth—the thing which the angler desires.

In throwing the line with bait, take care not to splash the water, but throw forward and upward, so as to let the bait fall gently on the surface, and sink slowly in the water to the required depth. The motion of the line down the stream must then be carefully followed and watched.

Occasionally, the angler will *feel* a nibble, but he must not be in a hurry to *strike*—that is, to fix the hook in the fish's mouth. Perhaps it is no more than a nibble, and it is well to allow the fish time to bolt the hook. If drawn too quickly, you may actually pull away the hook after it is half-gulped. Experience and dexterity are required in this ticklish part of the craft.

In May the creeper, or stone-fly in its embryo state, is a deadly bait; and in June, when it assumes the winged state, it is the most killing bait that can be used. The creepers are mostly found under large stones in the water, the flies under large stones in the dry channel at the edge of the water. On Tweedside this fly is frequently but erroneously called the May-fly, and is productive of large takes of trout when other lures are comparatively useless. Minnows and parr-tail are two important baits; tackle is made on purpose for these, and consists of several hooks tied within an inch or so of each other. These are inserted in the minnow, so as to give a curving form to the bait, for the purpose of making it *spin* in the water; swivels are attached to the tackle further up, to prevent the line from twisting with the spinning of the minnow. Stoddart says: 'Fish in rapid streams, also in deep discolored pools, and during a smart curl. Manage the minnow as you would your fly, throwing it down and across as far as you are able; bring it towards you about six inches below the surface, spinning rapidly by the aid of several swivels. When a fish rises, give him time before you strike; let him turn and gorge the bait, then strike sharply, and he is yours.' This mode of fishing requires more dexterity and practice than ordinary bait-fishing, and will be best learned by carefully watching the motions of an experienced hand.

Fly-fishing.—This is the true A., all other kinds being tame in compariso . Trout and salmon are the fly-fisher's chief objects of desire; and here we will quote some remarks of Mr. Stoddart's upon the method of capturing the former of these fish with the lure in question: 'Your rod and tackle being ready, the wind in your favor down the river, draw out with your left hand a few yards of line from your reel, dip the top of your rod in the water, and with a rapid jerk you will lengthen as you wish that part you intend for throwing. A thirteen-foot wand will cast from six to seven fathoms of line. With a large double-handed rod you may manage a much greater length. Always, if you can, angle from a distance. Trout see you when you least imagine, and skulk off without your notice.

'All jerks in casting, are apt to whip off your hooks or crack your gut. A fly-fisher may use two, three, or four flies on his casts, according to pleasure. When angling with small hooks, we adopt the medium number. Large ones ought to be fished with in pairs, and well separated. In throwing the cast, lowermost or trail-fly should be made to alight foremost; its fall ought to be almost imperceptible; it should come down in the water like a gossamer followed by the droppers. The moment a fly touches the surface, it is ten times more apt to raise a fish than during the act of drawing it along. At no time are we stanch advocates for the system of leading our hooks either against or across a stream; our method is rather to shake them over it for a moment, and then repeat the throw. A trout will discover your fly at the distance of several yards, if feeding, and will dart at it like lightning.

'Trout will sometimes take in the most unlikely weathers, so that the angler should not despair at any time. Hunger causes them to feed at least once in the twenty-four hours, and generally much oftener. If the wind blows down the river, commence at the pool-head, and fish every inch of good water; you may pass over the very rough and very shallow parts, also those which are absolutely dead calm and clear, unless you see fish rising in them, when, should your tackle be light, there is no harm in taking a throw or two. Dead water, however, when rippled or discolored, may be angled in with great success.'

The following remarks and hints apply chiefly to trout-fishing in streams, and may be found of service to those who follow that delightful recreation. As a rule, fish *up*, especially when the water is clear, and the wind not directly down-stream; the advantages are, that the fish do not so readily detect the presence of the angler—their heads being directed up the water; they are more easily hooked; and when a large trout is hooked, he may be landed down-stream, thus saving the water above for further operations. The practice of angling up-stream is somewhat difficult at first, but a little practice works wonders, and is sure to bring its reward ultimately. Gut should be *round, clear, strong* and *fine;* the finer it is, consistent with strength, the better, as it scares fewer fish than coarser material. Trout-flies for ordinary use in rivers such as Tweed, &c., should be dressed rather sparely, and should be small; some half-dozen varities, such as those already enumerated, will be found amply sufficient; and were we asked to choose three kinds as being more valuable than any others, our choice would incline to a red hackle, a black hackle, and a woodcock wing dressed with hare-ear body.

For turbid or dark water, however, the size may be increased, and the dressing be made rather gaudier by the addition of tinsel. Practise casting till you can throw your flies like gossamer on the water, and, above all, avoid splashing. The use of a short line will give you great advantage over your tackle. Heavy fish hook themselves in nine out of ten cases, so that striking is unnecessary; striking is performed by a motion of the wrist, not of the arm, and is only to be learned by practice; it then comes quite naturally to the angler. Cast *frequently;* you get over more ground, and vastly increase your chances of success. Trout generally seize the fly the instant it lights on the water, or the instant after; hence, it is necessary that the angler be on the *qui vive in time.* Cast above where fish are likely to lie, and remember that the greater part of your success lies in the art of *keeping out of their sight.* Dull-colored clothes materially assist in achieving this important desideratum.

When fishing with a friend, always come to a distinct agreement, before starting, relative to the division of the water, especially if the stream be small.

The true angler returns all smoults, parr, and small trout to their native element—his maxim being quality, not quantity. He also keeps his rod well varnished, dries his line and tackle after using, and looks into his tackle-book at least once every three months during the non-A. season; he thus saves his flies from the ravages of the moth. The tyro should always be guided in his selection of a rod and tackle by some experienced friend; and upon arriving at strange angling quarters, he should place himself in the hands of a resident fisherman, who will guide him to the best casts of the river, loch, or stream. A day spent in watching the proceedings of an expert angler, is a day well spent; and a few hours' lessons in fly-busking, knot-tying, &c., work wonders. And, lastly, let the angler practise courtesy towards all his brethren of the rod, and be ever willing to lend a killing-fly to a needy friend.

The principal works on A. are Izaak Walton, Stoddart's *Angler's Companion*, the article A. in the *Encyclopædia Britannica*, Davy's *Salmonia*, the angling section of Colquhoun's *Moor and the Loch*, Dryden's *Hints to Anglers*, the angling section in Stonehenge's *British Rural Sports*, Francis's *Book on Angling*, and Stewart's *Practical Angler*. The copious literature of the subject will be found in Lambert's *Angling Literature in England*.

A'NGLO-CA'THOLIC CHURCH, or ANGLICAN CHURCH, a term frequently employed to designate collectively those churches which embrace the principles of the English Reformation. The following are, in brief, the views generally entertained of those principles by the members of the churches in question: By referring the Anglo-catholic Church to the English Reformation, it is not meant that her origin dates from that event, but that her tenets, as she now exists, are those which the Reformation cleared of what she holds to be corruptions. For, as the word 'church' itself suggests—being derived, like 'kirk' in Scotland, from the Greek adjective *kuriakë*, which means '*the Lord's*' (i. e. *house*)—the origin of the Anglican Church is to be traced not to a Roman but to an Eastern source. She claims the name of Catholic—which also is from the Greek *katholikë*, universal—because she is united, in origin, in doctrine, and in form of government, with the Universal Church as it has existed, with various differences of rites and ceremonies, in all countries and in all ages. Eusebius even asserts that some of the apostles passed over into Britain. Tertullian, who lived in the 2d c., speaks of places in Britain which, though inaccessible to the Romans, were subject to Christ: 'Britannorum inaccessa Romanis loca, Christo vero subdita.' At the Council of Arles, 314 A.D., there were three British bishops present; and St. Alban suffered martyrdom, under Diocletian, about the close of the 3d c., or nearly three centuries before the landing of St. Augustine (q. v.) and his missionaries, 596 A.D. Christianity, however, was driven by the heathen Saxons into the mountainous districts of Wales; and though Augustine, on his arrival, found no less than seven bishops and one archbishop in those parts, and though Bertha, queen of Ethelbert, was a Christian, yet the whole Saxon part of the country was in a state of heathenism. The British Church differed from the Roman and

other Western Churches, as to the form of administering baptism, and the time of keeping the festival of Easter (see EASTER), following the customs of the Greek or Eastern Church; and it was not until the close of the 7th c., under Theodore, that the two churches became united. In the meantime, the conversion of Britain was as much due to the labors of St. Aidan, the Scottish Bishop of Lindisfern in the north, and of St. Chad, the Saxon saint, as to the missionaries of the Roman Church in the south. See ANGLO-SAXONS.

Nor is this glance at the history of the Anglican Church, in the earlier period of her existence, unimportant, when we come to consider what and whence are her present form and tenets. From the beginning of the 8th to the middle of the 16th c., she became gradually, and at last completely, assimilated in doctrine and practice to the Church of Rome, as well as subject to her domination; and the fact of her having at length freed herself from both, is in no small degree due to her having existed, in Saxon times, in a state of freedom and purity. It required, as we have seen, a struggle of nearly a century to make the British Church conform to the Roman in the matters of baptism and Easter; and it was the same spirit which offered a strenuous, and for some time an effectual, resistance to the peculiar doctrines of the Church of Rome and the claims of papal dominion. There were always found individuals, some of great eminence, to protest against the former, whilst large sections of the church never ceased to protest against the latter. For a hundred and fifty years previous to the Reformation, the doctrines of Wickliffe were leavening the body of the Anglican Church. The overthrow of the papal supremacy was indeed effected by Henry VIII.; but that monarch rather hindered than favored the reformation of *doctrine*, as appeared from the rapid progress which it made when Edward VI. came to the throne. The bloody reign of Mary interposed a check to further progress; and it was not till the accession of Queen Elizabeth that the principles of the Reformation finally triumphed, and the Anglo-catholic Church assumed the form in which she has since continued to exist. During the period of more than 800 years preceding the Reformation, she became gradually, and at length completely, merged in the Roman Catholic; at the Reformation, she may be said to have emerged; when Rome, at the Council of Trent, anathematized all who would not receive her articles, the separation became final, and the positions of the two churches with respect to each other irreconcilably hostile.

The doctrines of the Anglican Church are to be found in the *Book of Common Prayer* (q. v.), which is based upon the second prayer-book of Edward VI., and was settled in its present form 1662 A.D. Her tenets are more *legally* defined in the Thirty-nine Articles, which were settled 1562 A.D. (see ARTICLES THIRTY-NINE). As distinguished from Rome, she rejects tradition as a rule of faith, though admitting it as to rites and ceremonies, and bases all her teachings upon the books of the Old and New Testaments, rejecting from them as apocryphal certain which Rome receives as canonical. She recognizes only two sacraments, Baptism and the Lord's Supper, whereas Rome allows five others—namely Confirmation, Orders, Penance, Matrimony, and Extreme Unction; she denies the doctrines of transubstantiation and the propitiatory sacrifice of the mass; she forbids what Rome practises—the adoration of the Virgin, saints, and angels, and the reverence of relics and images; she also denies the Roman doctrines of purgatory and the spiritual supremacy of the pope. It is not, however, to be forgotten that a great part of her liturgy is derived from the missals of the Roman Church. As distinguished from the Presbyterian Churches—e. g., that of Scotland—she is Episcopal, and holds the unbroken succession of her orders from the apostles, as one of her most esteemed privileges; whereas the Presbyterians, especially in Scotland, reject prelacy as a remnant of popery. These do not, however, differ from her materially in essential matters of faith, but chiefly as to the sacraments, the form of administering them, and the grace conveyed in them; as to the observance of seasons, such as Christmas, Lent, Easter; and as to the forms of public worship, the Presbyterians using no set forms. Her differences with the Greek Catholics are less wide than with the Roman, and will be best seen by referring to the article GREEK CHURCH. From the Lutherans she differs on the doctrine of consubstantiation in the sacrament of the Lord's Supper. From the Calvinists she differs radically as to the extent of the efficacy of Christ's death, they believing only in 'particular,' she in 'universal,' redemption (meaning, of course, not that all men will actually be saved, but that Christ died for all); nevertheless, some of her articles, as the 17th, are decidedly Calvinistic. The numerous sects of Wesleyans, Baptists, and Independents do not differ from her on what they themselves consider essential articles of faith, but chiefly as to the necessity of orders, the grace conveyed in the sacraments, and the forms of public worship and of church government. But since their separation from her, endless varieties of doctrine and worship have spread among them. Unfortunately, there remains no Gallo-catholic Church with which to compare her.

The Anglo-catholic Church embraces the Church of England, the Protestant Episcopal Church in Ireland, the Episcopal Church in Scotland, all the colonial and the American Episcopal Churches. All but the latter use the English *Book of Common Prayer;* in America this has been slightly altered. The American Church is one of the most flourishing offshoots of the Anglican. It was planted in Virginia, 1607 A.D., but, for nearly two centuries, the mother church in England withheld from her offspring the necessary boon of an episcopacy of her own. It was not till the close of the 18th c. that the first three American bishops were ordained (one by the Scottish bishops in 1784, and two by the archbishop of Canterbury and the bishops of Bath and Peterborough in 1787); but now this branch of Anglo-catholicism has spread over the greater part of the United States.

ANGLOMA'NIA designates, among the French and Germans, a weak imitation of English manners, customs, &c., or an indiscriminate admiration of English institutions. In German literature, an A. was especially prevalent in the 18th c., when translations of English books became numerous, and were read with great admiration. The Germans have ascribed the sentimental and affected style of some parts of their literature to the influence of the English literature of last century. But the A. was harmless in comparison with the GALLOMANIA, or imitation of French literature and customs, which prevailed in the time of Frederick II. of Prussia, and was developed in the writings of Wieland. A remarkable A. prevailed in France for some time before the commencement of the Revolution. It arose out of political considerations and admiration of English free institutions, but extended to trifles even of fashions and manners, and often became very ridiculous.

A'NGLO-SA'XON LANGUAGE AND LITERATURE. The term Anglo-Saxon is of quite modern origin, the ruling race in England before the Norman conquest, not known itself by any other name than Æ̂nglise or English. Mr. Freeman, Professor Stubbs, and other able scholars of the present day, argue stoutly for a return to the old and true name; and to all appearance the abolition of 'Anglo-Saxon' and the restoration of 'English' is only a question of time. English is one of the Low German family of Teutonic languages. We do not know it in its earliest form. Some centuries elapse after the invasions of the 5th century, before any literature was produced or recorded. During this time, the dialectic differences of the various Low German tribes who had come into the island were probably diminishing, while separation from their kinsmen on the continent must on the other hand have tended to develop new peculiarities. The result is, that the very oldest English is by no means the same as the very oldest dialects of Low German in the coast regions between the Rhine and the Baltic.

But it most nearly resembles the old Saxon of Rhenish Prussia and Westphalia, and the old Dutch and the old Frisian of the provinces of Holland, and to the last of these it has the closest affinity. It is not to be supposed, however, that at any time before 1066, Englishmen spoke or even wrote a single dialect. There is evidence of at least two being used—a northern and a southern—an Anglian by the people of Northumbria, and a Saxon by the people of Wessex. The former is the more primitive, and as Mr. Kington-Oliphant points out (*Sources of Standard English*, 1873, pp. 35—40), has more in common with old Norse and Frisian than its southern sister; e. g., the infinitive ends not in the *an* of Wessex English, but in *a*. The history of England during the six hundred years before the Norman conquest accounts both for the antiquity of the Northumbrian literature, and for the subsequent triumph of the Wessex dialect. In the 7th and 8th centuries, Northumbria was the strongest, the most civilized, and the most learned of the English states. Christianity had poured its benign influences over it in double measure. Paulinus and Aidan, Rome and Iona, had both striven successfully against paganism, and light flowed over the land. Cadmon and Bede and Alcuin were all Northumbrians. That so little of this Northumbrian literature has come down to us is owing to the destruction of the northern monasteries by the Danes. The influence of Alfred, 'king of the West-Saxons,' and the unification of government in the island under his successors, gave the dialect of Wessex an irresistible supremacy; so much so, that even most of the early northern literature only survives in a southern dress—e. g., we can only read Cadmon in a Wessex version of the 10th c. Yet, so strong was the impression left on its neighbor by the Anglian state, that not even the havoc made by the Danes of its literary monuments and its political prosperity could prevent its name from being given to the island, the people, and the tongue.

Wessex English, then—that is, the English of the court, of books, and probably in great measure of the schools, prevailed in England for more than 150 years before the Norman conquest, and is substantially what we mean when we speak of the 'Anglo-Saxon' language. There is no reason to suppose that it ever superseded the dialect of the north for ordinary purposes of inter-

course. Anglian lived on in the mouths of the people, and in later times has won an immortal fame in literature under the name of Lowland Scotch. Cadmon and Burns both used it, though in the unapproachable verse of the Ayrshire bard it has become utterly inorganic, and so remains. English, then, before the Conquest, differs from modern English in being an inflected language. Its inflections are not so rich, or various, or euphonious as those of Latin, or Greek, or Mœso-Gothic, that oldest and noblest of the Low-German dialects; but they are still sufficient to give it a distinct character, and to make it strange and almost unintelligible at first sight to one whose reading does not go back beyond Shakspeare.

Its nouns can be grouped into declensions, and classified according to gender, and faint traces of the terminations are preserved in the English of the present day. The *en* in 'children' and 'oxen' is the old *an* of the plural in nouns of the first declension; the *s* and *es*, the old *as* marking the plural of masculines of the third. Adjectives have both a definite and indefinite form. The article is as complete as in Greek, though everything has now vanished but a fragment of the neuter *thæt* (modern *the*). Some mutilated remains of the pronominal inflections still survive to puzzle school-boys, and delight the lovers of 'hoar antiquity.' Verbs are divided into 'strong' and 'weak' conjugations, as is still the case in German. The distinction between the indicative and subjective moods, though slight, is real; and we have not only an infinitive in *an*, but a gerund in *enne*, while the present participle in *ende* is not confused with the verbal noun in *ung*, as is unhappily the case with us who have made *ing* do duty for both. Of late years the study of the English tongue, particularly in its earliest stage, has become almost popular, and grammatical works are now numerous. Besides the fragmentary or discursive contributions to the subject of English grammar by Guest, Madden, Garnet, Grimm, Earle, Morris, Kington-Oliphant, we may specify Rask's *Angelsäksisk Sproglaere* (Stockh. 1817, with Thorp's translations of 1865); Marsh's *Lectures on the English Language* (1861); Koch's *Historische Grammatik der Englischen Sprache* (1863—1869); Mätzner's *Englische Grammatik* (1865); Latham's *English Language* (1855); March's *Comparative Grammar of the Anglo-Saxon Language* (1870); and Sweet's *Anglo-Saxon Reader* (1877).

Having thus indicated very briefly some of the salient features of English as it was spoken and written before the Conquest, we proceed to make a rapid survey of the contemporary literature. From what has been said above, one will naturally look to the north for the earliest examples. The *Runes* graven upon the Ruthwell's Cross, which was set up about 680 A.D., are now proved from the inscription itself to be the composition of Cadmon, and are the very oldest relic of Anglian poetry. Here we find Cadmon speaking his own speech, not, as in his other poems, speaking to us through a Wessex version. Other and later monuments of Northumbrian English are a *Psalter* (800 A.D.); the *Rushworth Gospels* (900 A. D.); the *Lindisfarne Gospels* (970 A. D.). But the great body of this early literature, whether produced in Northumbria, or Mercia, or Wessex, has come down to us only in the dialect of the last of these states; therefore, in referring to it, we shall consider, not the antiquity of the MS., but of the author. A good deal of it is poetical. The verse is alliterative, as in the Norse and in the oldest German poetry; and only in some of the later poems do we find a beginning of rhyme. The epic or narrative poems are remarkable for superabundance of often-recurring epithets, bold metaphors, and a certain pomp and magnificence of style. Of the genuine heroic poetry, however, there are few remains, the principal one being the poem of *Beowulf* (q. v.), a work which must have been composed before the Angles and Saxons quitted their original seats on the continent.

Other pieces produced in Germany, though only surviving in an English form, are the *Traveller's Song* and the *Battle of Finsburgh*. The introduction of Christianity gave a religious character to Anglo-Saxon poetry; and many narrative poems are extant on religious subjects, some of which may be seen in the *Codex Oxoniensis*, a collection edited by Thorpe (Lond. 1842). The *Song of Cadmon* (see CÆDMON), which is preserved in Alfred's translation of Bede, has been edited both by Junius and Thorpe; and a metrical paraphrase of parts of the Holy Scriptures, ascribed to the same author, has found editors in Thorpe (1832), Bouterwek (1847—1854), Grein (1858). Cadmon is said by Bede to have died about 680, so that both of the works in question must belong to the 7th c. Two poems from the *codex* which Dr. Blum discovered at Vercelli in 1832, have been edited by Jacob Grimm (Cassel, 1840), under the title of *Andreas und Elene;* a poetical calendar of the saints by Fox (Lond. 1830); and a version of the Psalms by Thorpe (Lond. 1835). Among the most important prose works must be mentioned the laws, civil and ecclesiastical, from the time of Ethelbert of Kent to that of Canute, of which the best edition is in Thorpe's *Ancient Laws and Institutes of England* (Lond. 1840). Of historical works may be mentioned Alfred's translations of Orosius and Bede; and the *Chronicle* carried on by different hands to 1154, of which the best edition, down at least to the Conquest, is Price's, in the *Monumenta Historica Britannica*, 1848, an earlier one being that of Ingram (Lond. 1823). It is in the province of theology that English literature before the Conquest is most rich, abounding particularly in legends and homilies. A collection of homilies made by Bishop Ælfric has been published by the Elfric Society (2 vols., Lond. 1847), a society instituted in 1843 for the promotion of the knowledge of the England and English language of those times. Ælfric did much to enrich it with translations, and began a translation of the Bible. He translated the first seven books, the book of Job, and the apocryphal Gospel of Nicodemus, and also a fragment of a poem on the history of Judith, of great celebrity (Oxf. 1698). The *Durham Book*, or St. Cuthbert's book, a very famous manuscript, now in the British Museum, contains an interlinear gloss of the gospels in the East-Anglian dialect, the text being probably of the 8th, and the gloss of the 10th c. Alfred translated the work of Boethius, *De Consolatione Philosophiæ*. The opinions of Englishmen before the Conquest on astronomy, natural philosophy, and medicine, are exhibited from their works by Wright in his *Treatises on Sciences written during the Middle Ages* (Lond. 1841), and Turner's *History of the Anglo-Saxons* (3 vols., 7th ed. 1852). Compare also Thorpe's *Analecta Anglo-Saxonica;* Marsh's *Origin and History of the English Language and the Early Literature it embodies* (1862); and Grein's *Bibliothek der Angelsächsischen Poesie* (1857–61), and his *Bibl. d. Angels. Prosa* (1864). See ENGLISH LANGUAGE.

ANGLO-SAXONS, the collective name generally given by historians to the various Teutonic or German tribes which settled in England, chiefly in the 5th c., and founded the kingdoms of the Heptarchy. They consisted for the most part of Angles, Saxons, and Jutes. The generally received opinion is, that the first of these invaders made their appearance in Britian in 449, having Hengest and Horsa as their leaders. But under the more searching scrutiny of later writers, these famous leaders have evaporated into mythical heroes of romance, common to most of the Germanic nations; and though the fact of a great Germanic invasion in the middle of the 5th c. is not doubted, it is believed that this was by no means the earliest period at which Germanic settlements were effected in England. Long previous to this period, a portion of the coast, extending from Portsmouth to Wells in Norfolk, was known as the *Littus Saxonicum;* but whether in reference to Saxons by whom it was settled, or to roving adventurers of that race by whom it was ravaged, is still a subject of dispute. Of the three tribes mentioned above, the Jutes are believed to have been the first comers. Their original settlements were in what is now the district of Schleswig; and the portions of England of which they possessed themselves were Kent, the Isle of Wight, and the opposite coast of Hampshire. The Saxons, who were the next invaders, settled chiefly in the southern and central parts of England—in Sussex, Essex, Middlesex, the south of Hertford, Surrey, the part of Hampshire not possessed by the Jutes, Berks, Wilts, Dorset, Somerset, Devon, and the portion of Cornwall which did not remain in the possession of its former Celtic inhabitants. The Saxons who invaded England probably belong chiefly to the portion of that great nation, or confederacy of nations, whose territories lay on the shores of the Baltic—occupying what are now the district of Holstein, the north of Hanover, and the west of Meeklenburg. The third tribe, whose name and nationality afterwards prevailed over the others—the Angles—did not arrive till a somewhat later period. Coming like the Jutes from the district of Schleswig, a corner of which is still called Angeln, they made, from 527 to 547, a succession of descents on the coasts of Suffolk and Norfolk, and latterly, on the country to the north of the Humber, and the southern part of Scotland between the Tweed and the Forth. Eventually, the Angles obtained possession of the whole of England, except the portions already mentioned; that is to say, of all the part to the north of the Avon, on the one side, and the Thames on the other—Essex, Middlesex, and part of Hertford excepted. The union of different bands of these conquerors amongst themselves, with their countrymen who had preceded them, and with the Celtic population which, though conquered, there is no reason to suppose was exterminated, gave rise to the so-called Heptarchy (q. v.)—the kingdoms of Northumbria (originally Bernicia and Deira), Kent, Sussex, Wessex, Essex, East Anglia, and Mercia.

The various independent states into which England had till then been divided, were united by Egbert, king of Wessex, in 827, into the one kingdom of England (the land of the Angles). The royal family of Wessex, which was thus raised to what, for the first time, probably, is entitled to be called the kingly dignity, never again lost its supremacy, except, indeed, during the Danish period (1017 to 1042), till the Norman Conquest; and to it Alfred the Great (q. v.) belonged.

The English constitution, the origin of which is sometimes ascribed to Alfred (849—901), was not framed by him, though he restored it and improved it after the deliverance of the country from the Danes. It was essentially the same as that of other Germanic nations. At the head of the government was the *cyning* or *cyng-*

The kingly office, among the Germanic nations in early times, had reference solely to the tribes or peoples governed, and never to the land which they occupied. During this period, it was naturally elective; but after the idea of great territorial possessions came to be inseparable from it, it became hereditary, though a form of election, or color of ascertaining the national will, was still retained. The life of the king, like that of every other man, was assessed at a fixed price (*Weregild*, q. v.), which was that of an *æthel-ing*, or person of royal blood, with a sum superadded as the price of his royalty. The first of these sums went to his family, the second to the people. The king possessed the power of calling together the Witenagemôt (q. v.), and of laying before them propositions for the public weal; but he had not the power of dismissing the assembly, so that in England, from the first, the real center of power seems to have been in parliament. Neither was the convocation of the Witenagemôt at the option of the sovereign, for there is every reason to believe that his power was all along limited by the necessity of consulting the principal members both of the clergy and laity of the kingdom; nor, it would seem, could he impose taxes, or declare peace or war, without their consent. The sons and other near relations of the king constituted an aristocracy of birth, called ethelings or æthelings (the same word with the German *Adel*, noble). Out of the great officers of the state, or immediate servants of the king, was gradually formed a hereditary aristocracy, closely corresponding to that which subsequently existed in feudal times. Of these, the person next in rank to the king was the *ealdorman* ('elderman,' Lat. 'senator') or *heretoga* ('army-leader'). But inasmuch as the ducal functions, in the Anglo-Saxon polity, were by no means confined to service in the field, the peculiar title of heretoga is very rarely met with, being for the most part replaced by ealdorman or aldorman, which denotes civil as well as military pre-eminence' (Kemble, *ut sup.* ii. 126). Though the word is derived from an adjective signifying age, in practice, no such meaning attached to it, more than to senior, which is the original form of the word seigneur.

It was to the same class of officials that subsequently the Danish title of *eorl* or earl came to be applied. The powers of these officers probably varied in the different kingdoms, whilst they remained separated; but we shall form, on the whole, a pretty accurate conception of the position of the ealdorman, if we regard him as the governor of the *gá* or shire, the *scirgerefa* or sheriff being his deputy. Much difference of opinion exists as to the rank and position, social and political, of the thane; and all that can be said with confidence is, that before the Conquest, it was not convertible with ealdorman, or equivalent to baron, as it came to be after the Conquest. The office seems to have implied subordinate landed tenure, similar to that by which the lands of the vassal were held of the lord in feudal times; and thus, whilst the king's thanes were frequently ealdormen, these, in their turn, had thanes of a lower rank, who appear to have been very numerous. This view is strengthened by the derivation of the term from *thegnian* or *thenian*, to serve, which is the same word as the modern German *dienen*, and from the fact of its frequently being translated *minister* in the Latin charters of pre-Norman times. The whole class of ordinary freemen or commoners were called *ceorls*, afterwards *churls* (a word preserved in the German *Kerl*, and in the lowland Scotch *carle*), and were generally associated under the protection of some person of rank and influence, who was called the *hlaford* (our 'lord,' but *lit.* 'bread-winner,' or rather 'bread beginner'). This, however, was in itself no recognized title, and up to a very late period the Anglo-Saxon laws knew no other distinction than that of ceorl and eorl. The Britons, who retained some degree of freedom, constituted a lower class, called *wealhas* or 'Welsh' (*lit.* 'foreigners,' as they seemed to the conquerors). The number of slaves (*theowas*) was not very great, nor does the character of the servitude imposed on them seem, comparatively speaking, to have been oppressive. Different rights and privileges belonged to the different ranks of the Saxon people, and, as we have already said, a different *Weregild* (q. v.), or pecuniary estimation, was fixed for each rank, as the penalty for homicide. The great districts or shires were subdivided into tithings (*teothunga*), each containing *ten* free heads of families, who were held mutually responsible for each other. Ten tithings formed a *hundred*, which had a court subordinate to the court of the shire. In important matters, the ealdorman of the shire could not decide without the concurrence of an assembly (*Scírgemôt*, Assembly of the Shire) of thanes of the shire and representatives of townships, which met half-yearly, and corresponded to the *Witenagemôt* (Assembly of the Wise), or *Micelgemôt* (Assembly of the Great) for the whole kingdom.

Christianity was introduced among the newcomers in the end of the 6th, or beginning of the 7th c. by St. Augustine, a missionary sent by Pope Gregory I., called the Great. Augustin became the first archbishop of Canterbury; and before the close of the 7th c., the whole of *Engla-land* was a Christian country under one metropolitan. Ethelbert, king of Kent, was the first sovereign who embraced the Christian doctrine.

Bringing with them the traditions and feelings of the empire, the whole influence of the clergy was thrown into the scale of monarchy, and greatly tended to its consolidation. A Christian church, however, already existed in Scotland and the north of England; and the influence of the Culdees (q. v.) long prevailed against the efforts of the southern prelates to establish uniformity of worship and complete conformity to Rome. But in truth, the English clergy in general were not very submissive to the authority of the popes, who did not succeed in reducing the land to complete subjection till after a long struggle. St. Dunstan (q. v.) gained for them their final victory in the 10th c. During the time of its comparative independence, the English Church was distinguished for the learning and laboriousness of its clergy. Bede (q. v.) is the most eminent author whom it produced. Between his time and that of Alfred, a very great degeneracy had taken place both in the learning and efficiency of the clergy, which that active and enlightened sovereign labored to restore, but only with partial success. St. Boniface (q. v.) and many other English and Scottish missionaries labored with success in the propagation of Christianity in Germany.—Besides the works already referred to, see Freeman's *History of the Norman Conquest*, and *Old-English History*, and Green's *Short History of the English People* (1875).

ANGO'LA, a name often applied to the whole of the West African coast from Cape Lopez de Gonsalvo in lat. 0° 44′ S., to San Felipe de Benguela in 12° 14′ S.; but, in a more restricted sense, the name of a kingdom in Lower Guinea dependent upon Portugal, and extending from the river Coanza on the south, in lat. 9° 20′ S., to the Danda on the north, in 8° 20′ S. The natives generally call it Donga. The interior is very imperfectly known, and the boundaries uncertain; but A. is supposed to contain about 250,000 inhabitants. The country being well watered, is covered with a most luxuriant vegetation. The heat being moderated by the sea-breeze, the orange and other fruits of the warmer temperate climates are produced, as well as those which are strictly tropical. There is a great abundance and variety of wild animals, and the mouths of the rivers swarm with sharks and crocodiles. The principle rivers are the Coanza and Danda. Much of the country is mountainous. The mountains are covered with forests, and are rich in metals, particularly copper, iron, and silver, which, with wax and ivory, are the principle legitimate exports, although the great trade, almost to the present day, has been in slaves. Fetichism is the prevailing superstition, and circumcision is general among the natives. A. might easily be rendered very productive, both of sugar and cotton, but the manner in which it has been governed by the Portuguese has not tended to develop its resources. They discovered it in 1486, and have had settlements in it since 1488; but the number of resident Portuguese is very small, and they are almost entirely confined to a few spots—forts and commercial establishments called *feiras* or fairs. The capital is Loando, or San Paulo de Loando (q. v.).

ANGON, a barbed spear used by many early nations. The Franks, in the 7th c., employed angons both for thrusting and hurling. The staves were armed with iron, so as to leave but little of the wood uncovered; the head had two barbs. When hurled or thrust at an opponent, the head of the A. became fixed in the flesh by means of the barbs. This form of spear was much adopted by the Anglo-Saxon and other Teutonic nations.

ANGO'RA, the Ancyra of the ancients, capital of the Turkish vilayet of the same name, in the mountainous interior of Asia Minor,

Angora Goats.

and distant from Constantinople about 220 miles east-south-east. It is said to have been built by Midas, the son of the Phrygian Gordius; was a flourishing city under the Persians; became the capital of the Gallic Tectosages, who settled in Asia Minor about 277 B. C.; was a principal seat of eastern trade under the Romans; and was made the capital of the Roman province of Galatia Prima. It was the seat of one of the early churches of Galatia, and the scene of two Christian councils held respectively in 314 and 358. A decisive battle between the Turks and Tatars was fought near

A. in 1402, in which Timur defeated and took prisoner the sultan Bajazet I. A temple of white marble was erected by the citizens of Ancyra to the Emperor Augustus, who had greatly beautified the city, and his deeds were recorded in inscriptions upon a number of tablets and the columns of an altar. These inscriptions, the *Monumentum Ancyranum*, discovered by Busberg in 1553, are important for the elucidation of ancient history. They were first printed in Schott's edition of Aurelius Victor (Antw. 1579), and have recently been edited with notes by Franz and Zumpt (Berl. 1845). The present A. is said to contain not more than 40,000 inhabitants, of whom one-third are Armenians. It is famous for its breed of goats, with beautiful silky hair, eight inches long. Of this goat-hair, a kind of yarn is made, known as *Turkish yarn* or *camel yarn*, and of which also a manufacture of *camlets* is extensively carried on in A. itself. Of the skin of the A. goat, the fine Oriental Morocco leather is made. Many of the animals in this region are characterized by the length and softness of their hair, especially the dogs, rabbits, cats, &c. This peculiarity seems to depend on the climate, and soon disappears in Europe. The A. goat is bred for its hair at the Cape, and is now the source of a large revenue. It has also been introduced into Victoria.

ANGORNOW′, or NGO′RNU, a town of Bornu, Central Africa, on the south-western bank of Lake Tchad, 15 miles south-east from Kukawa. The surrounding country is very level and monotonous, but fertile. The waters of Lake Tchad are usually some miles distant from the town, yet the whole intervening plain is sometimes covered with water, and the town in itself is liable to destructive inundations. It is a place of considerable commercial importance; the principal articles of trade are slaves, cotton, amber, coral, and metal. The pop. is supposed to be about 30,000.

ANGOSTU′RA, or CIUDAD BOLÍVAR, a seaport town of Venezuela, in lat. 8° 8′ N., and long. 63° 55′ W., on the right bank of the Orinoco, about 240 miles from its mouths. It is built at a point or pass (*angostura*), where, on both sides, the river is narrowed by rocks to a width of 3134 feet, after having measured three miles across at thrice the distance from the sea. The site of A. is only 191 feet above the sea-level—an elevation which, on the intermediate distance as above, yields an average of less than ten inches to the mile. In fact, the bottom of the river in front of the town is lower than the surface of the sea, for, even in the lowest state of the water, it is said to be 200 feet deep, with a margin for floods to the amount of fifty or sixty feet more. Under these circumstances, the bed of the stream must be about 250 feet under the level of the city, or about 60 feet under the level of the sea. When the river does rise to its highest, there are at least portions of the city inundated; and instances are believed to have occurred in which careless people were devoured by alligators in the very streets. Chiefly, as is supposed, through the free access of the trade-winds over the flat surface of the country, A. enjoys, in proportion to its latitude, a singularly temperate climate. Even in the hottest season of the year, the thermometer is said seldom to show more than 86° F.; while, between the beginning of November and the end of April, it ranges from 77° by day to 69° by night.

The situation of A. is highly favorable, in a commercial view. The basin of the Orinoco, which lies nearly all above the town, and is estimated to contain about 250,000 square miles, or more than twice the area of the British Isles, is particularly rich towards the north. On that side it reaches very nearly to the coast-line, so as to comprise some of the very best parts of Venezuela. Towards the south, again, it consists, in a great measure, of boundless plains, traversed by countless herds of cattle. Over the whole of this vast basin, and that almost equally in both directions, the main stream and its affluents are, with hardly any interruptions, navigable to near the foot of the mountains. Owing to the impetuosity of the currents and the obstruction of shoals, sailing-vessels are said to take fifteen days to sail up to A.; but with steam navigation these impediments would in great measure disappear.

With such advantages of position, A. was a flourishing mart before the commencement of the war of independence; but the civil broils materially interfered with its prosperity. As far back as 1807, A. had 8500 inhabitants; ere twenty years elapsed, the population had been reduced to little more than a third part of the number. According to later information, however, it was rapidly approaching its former amount.

ANGOSTURA BARK, or ANGUSTURA BARK, the aromatic bitter bark of certain trees the natural order *Rubiaceæ*, and tribe *Cuspariex*, natives of the tropical parts of South America. It derives its name from the town of Angostura, where it is a considerable article of commerce. It was first brought to England in 1778. It is used in medicine as a remedy for weakness of digestion, diarrhœa, dysentery, and fevers. It is tonic and stimulant. The most important of the trees producing it is the *Galipea officinalis*, which grows upon the mountains of Columbia and near the Orinoco. It is a tree of 12—20 feet high, and 3—5 feet in diameter, having a gray bark, trifoliate leaves, with oblong leaflets about ten inches long, which, when fresh, have the odor of tobacco, and flowers about an inch long, in racemes, white, hairy, and fragrant. The bark contains a chemical substance not yet sufficiently examined, called *Angosturin*, *Cusparin*, or *Galipein*, to which its medicinal efficacy is ascribed. It is supposed that a variety of A. B. is produced by *Galipea Cusparia* (called by some *Bonplandia trifoliata*), a majestic tree of 60—80 feet in height, with fragrant trifoliate leaves more than two feet long. A. B. is believed to be one of the most valuable of febrifuges; but its use is at present very limited, and has, indeed, in some countries of Europe, been prohibited, in consequence of its frequent adulteration with the poisonous bark of the *Strychnos Nux Vomica*, or the substitution of that bark for it. This poisonous bark is sometimes called *False A. B.* It differs from the true A. B. in having no smell, in its much greater weight and compactness, in its inner surface being incapable of separation into small laminæ, and in the effects which are produced upon it by acids and other tests, particularly in its outer crust being rendered dark-green, or blackish, by nitric acid, whilst that of the true A. B. is rendered slightly orange-red.

ANGOULEME, the capital of the department of Charente in France, and formerly of the province of Angoumois. It is situated on the Charente, and has narrow and crooked streets, a number of paper-mills, manufactures of woollen stuffs, linen, and earthenware, &c., and a population (1876) of 28,665. It possesses a royal college, a museum of natural history, and several other useful institutions. In the center of the town stands the remnant of the ancient castle of A., in which was born the celebrated Marguerite of Navarre, the authoress of the *Heptameron*, and other works. The railway from Paris to Bordeaux passes through it. Much saffron and wine are produced in the neighborhood. The province of Angoumois was in early times a county; but the heir of it, in the beginning of the 14th c., being an adherent of the English, Philip the Fair took possession of it, and it became an apanage of younger branches of the royal family. It was made a duchy by Francis I., and was sometimes bestowed upon natural sons of the French kings. Charles de Valois, Duke of A., a natural son of Charles IX., was a distinguished general in the reigns of Henry IV. and Louis XIII.

ANGOULEME, Louis Antoine de Bourbon, Duc d', the eldest son of Charles X. of France, and Dauphin during his father's reign, was born at Versailles on 6th August 1775. He retired from France along with his father at the commencement of the Revolution, and spent some time in military studies at Turin. In August 1792 he entered Germany at the head of a body of French emigrants; but the ill success of the campaign, and his own unfitness for military command, led to his seeking tranquillity along with his father at Edinburgh. Till 1814 he continued an exile from France, wandering from one place to another on the continent, and latterly resident with the other members of his family in England. On the entrance of the allies into France, he appeared at the British head-quarters at St. Jean de Luz, and thence issued a proclamation to the French army. He entered Bordeaux under protection of the British on 12th March, and made liberal promises in the name of his uncle, Louis XVIII., among which was that of complete religious liberty. He was again in the south when Napoleon returned from Elba. He was appointed lieutenant-general of the kingdom, and hastened with such forces as he could collect to oppose the emperor; but although he obtained some advantages at first, he was soon deserted by his troops, was for some days detained a prisoner, and at last sent away in a Swedish merchant-vessel to Barcelona. After the second restoration, he was sent by Louis XVIII. to the southern provinces to repress the political and religious movements there; and in 1823 he led the French army into Spain, to put an end to the constitution. A man of phlegmatic disposition and mean abilities, he was, in all political matters, a tool of the ultra-royalists and the priests. When the revolution took place in July 1830, he signed, along with his father, an abdication in favor of his nephew, the Duc de Bordeaux; and when the Chambers declared the family of Charles X. to have forfeited the throne, he accompanied him into exile to Holyrood, to Prague, and to Görz, where he died, 3d June 1844.

ANGOULEME, Marie-Therese-Charlotte, Duchesse d', the daughter of Louis XVI., was born at Versailles on 19th December 1778, and early displayed much quickness of intelligence and energy of character, with the most tender sympathy in the distresses of others. Having passed through the horrors of the Revolution, and endured a long imprisonment, she was exchanged, on 25th December 1795, for some French prisoners in the hands of the Austrians, and lived at Vienna till her marriage, in 1799, with her cousin, the Duke d'Angoulême, whose subsequent fortunes she shared. She survived him seven years, and died October 19, 1851.

ANGRA, the capital of the Azores, a seaport at the head of a deep bay on the south coast of the island of Terceira, lat. 38° 38′ N., long. 27° 14′ W. It is a station for ships between Portugal and Brazil and the East Indies; but the harbor is very much ex-

posed. It is the seat of the Portuguese governor-general of the Azores and of the bishop; is well built, but dirty; strongly fortified, and protected by a citadel at the foot of Monte de Brazil; contains a military college and arsenal, several scientific and literary societies, a cathedral and numerous churches; and (1878) 11,263 inhabitants. There is a considerable export of wine, cheese, honey, and flax. This city furnished an asylum for the Portuguese regency from 1830 till the taking of Oporto, in 1833, by Don Pedro.

A'NGRI, a town of south Italy, in the province of Salerno, and 17 miles north-west from Salerno, not far from the Naples and Nocera Railway. The surrounding country abounds in vineyards and cotton plantations. Pop. 6921.

ANGUILLA. See EEL.

ANGUILLA, or LITTLE SNAKE, one of the West India islands, so called, perhaps, from its long and narrow figure. Next to Anegada, it is the most northerly of the Lesser Antilles, lying almost due east of the eastern extremity of Porto Rico, in lat. 18½° N., and in long. 63°—64° W. It belongs to England, having an area of 35 square miles, and a population (1871) of 2773. It is low and wooded; but its cleared spots produce cotton, tobacco, and sugar. Its harbor, such as it is, is beset with reefs; but there is said to be good anchoring-ground in the channel between A. and the isle of St. Martin to the south.

ANGUIS. See BLIND-WORM.

A'NHALT, one of the oldest principalities of Germany, and now a state of the Germanic empire, is situated on the Elbe, the Mulde, and the Saale. It consisted formerly of three duchies—A.-Dessau, A.-Bernburg, and A.-Köthen. A. contains 896 sq. m. Pop. (1875) 213,689; (1880) 232,592. A. is almost entirely surrounded by the Prussian territories, which intermix with it and divide it into portions. Dessau, Zerbst, Bernburg, and Köthen are the principal towns. The country is level and fertile, producing wheat, flax, rape-seed, hops, and tobacco. Wine is produced on the Saale. Agriculture is the chief employment of the people, who are generally Protestants. Part of the former duchy of A.-Bernburg approaching the Harz Mountains possesses mineral wealth in iron and other mines. A. began to be an independent principality in the first half of the 13th c. It has been repeatedly, in the course of its history, divided amongst branches of the reigning family. The division into three duchies dates from the beginning of the 17th c. It was divided originally into four parts, but the line of A.-Zerbst has become extinct. The three duchies were independent of each other; but a family compact connected the reigning lines, which often led them to take public action conjointly. Some of the princes of A. have been eminent in the political, military, and ecclesiastical history of Germany.

ANHY'DRIDES is the term now commonly given to the compounds formerly known as anhydrous acids, which was a very unsatisfactory name, seeing that these bodies do not present any of the ordinary properties of acids. In some cases, they are the result of the dehydration of acids, and in all cases they represent in their composition the acid *minus* water. One of the most eminent French chemists, Professor Wurtz, lays down the following general principles: '(1) The anhydrides of monobasic acids (*a*) contain the elements of two molecules of a monobasic acid, *minus* one molecule (which corresponds with two atoms) of water; (2) the anhydrides of bibasic acids (*b*) contain the elements of a molecule of a bibasic acid, *minus* a molecule of water; (3), the anhydrides of tribasic acids (*c*) contain the elements of a tribasic acid, *minus* water.' Thus, using the modern formulæ and the type theory, we give a case of each form of acid:

Nitric Acid. Nitric Anhydride.

(*a*) $2\left(\begin{matrix}NO_4\\H\end{matrix}\right\}O_2) \quad - \quad H_2O_2 \quad = \quad \begin{matrix}NO_4\\NO_4\end{matrix}\Big\}O_2$

Sulphuric Acid. Sulphuric Anhydride.

(*b*) $\begin{matrix}S_2O_4\\H_2\end{matrix}\Big\}O_4 \quad - \quad H_2O_2 \quad = \quad S_2O_4.O_2$

Phosphoric Acid. Phosphoric Anhydride.

(*c*) $2\left(\begin{matrix}PO_2\\H_3\end{matrix}\right\}O_6) \quad - \quad 3H_2O_2 \quad = \quad 2(PO_2.O_3)$

The reader who may not at once be able to interpret these formulæ, will readily see that $\left(\begin{matrix}NO_4\\H\end{matrix}\right\}O_2) = NO_6.HO$, the old formula for nitric acid, that $\begin{matrix}S_2O_4\\H_2\end{matrix}\Big\}O_4 = 2(SO_3.HO)$, the old formula for sulphuric acid, which is now universally placed amongst the bibasic acids; and that $\left(\begin{matrix}PO_2\\H_3\end{matrix}\right\}O_6) = PO_5.3HO$, the old formula for tribasic phosphoric acid. According to the old system, the three anhydrides would be represented by NO_5, SO_3, and PO_5 respectively. We might have taken organic acids, as, for example, acetic acid, succinic acid, in place of nitric and sulphuric.

The anhydrides of the monobasic acids are formed in various ways; thus, hypochlorous anhydride is formed by the action of chlorine on oxide of mercury; nitric anhydride is formed by the action of chlorine on nitrate of silver, &c. By the action of ammonia, the anhydrides of monobasic acids are converted into amides; thus, benzoic anhydride ($C_{14}H_6O_3$) + ammonia (NH_3)= benzamide ($C_{14}H_7NO_2$) + water (HO). The anhydrides of tribasic acids are often formed by the mere action of heat on the acids, as is the case with lactic and tartaric acids.

The anhydrides present no uniformity of appearance; for example, carbonic anhydride (commonly known as carbonic acid, which in reality is $CO_2.HO$) is a gas; phosphoric anhydride is a white powder; nitric anhydride occurs in crystals; sulphuric anhydride is a ductile wax-like substance; while the anhydrides of the organic acids are oily bodies heavier than water.

The most important property of this class is their conversion into the corresponding acids, under the influence of water.

A'NHYDRITE, a mineral, consisting of anhydrous sulphate of lime, with some slight addition of sea-salt, appears in several varieties, as, 1. Granular; found in concretions with a foliated structure: 2. Fibrous; easily broken with a fracture in delicate parallel fibres: 3. Radiated; translucent: 4. Sparry, or Cube Spar: 5. Compact, of various shades, white, blue, gray, red. A. is converted into gypsum by combination with a certain proportion of water, and where it is found in large masses, as on the south of the Harz Mountains near Osterode, the surface consists of gypsum. For building, A. has no great value, on account of its tendency to this change; but some of its varieties, especially the Siliciferous or Vulpenite, found at Vulpino, in Upper Italy, are used for sculptures, and take a fine polish. When burned and reduced to powder, it is used as a manure, resembling gypsum in its effects.

ANHY'DROUS is the term applied to a chemical substance free from water. Thus, ordinary lime-shell as it comes from the kiln is simple lime. (CaO) without any water, and is called *anhydrous* lime; but when water is thrown upon the lime-shell, the liquid disappears by combination with the lime, which very much increases in volume and becomes *hydrated* lime (CaO,HO). Again, ordinary stucco, before being used by the modeler, contains only lime and sulphuric acid ($CaOSO_3$), with no water, and is therefore anhydrous; but when water is added, and the stucco sets into its mould, it combines with two equivalents of water, and becomes hydrated stucco ($2HO.CaOSO_3$). Examples of A. substances are also found amongst liquids; thus, alcohol free from water is called A. Alcohol; and in like manner we speak of A. Acetic Acid, A. Nitric Acid, &c.

A'NILINE is now universally regarded as, in a technological point of view, one or the most important organic compounds yet discovered (see DYE-STUFFS). Its chief physical and chemical characters are described under the head of *Phenyl* (q. v.), an organic radical, represented by $C_{12}H_5$, which, if aniline is (as Hofmann believes) a derivation of ammonia, replaces one of the atoms of hydrogen, yielding $\begin{matrix}C_{12}H_5\\H\\H\end{matrix}\Big\}N$, or $C_{12}H_7N$, which is the formula for this compound. There is one salt of aniline which requires notice, because its therapeutic value has been highly praised—viz., the sulphate of aniline, which is prepared by saturating a certain amount of aniline with dilute sulphuric acid, evaporating to dryness, and extracting the residue with boiling alcohol, which, on cooling, leaves white silvery scales of sulphate of aniline. To obtain the salt quite pure, it may be dissolved and separated a second time, after which it must be preserved in well-stoppered bottles. The importance which the aniline manufacture as a dye-stuff has acquired during the last few years has led to the study of its physiological, therapeutical, and toxicological properties, and hence to the hygienic precautions which should be adopted in the chemical works devoted to its preparation, as well as to the influences which the aniline colors may exert on those who employ them in dress, &c.

The *physiological* action of aniline has been recently studied by nearly a dozen independent observers, and the following are the principal results at which they have arrived: (*a*) When administered internally in a *moderate* dose, this substance causes a considerable muscular excitement, lasting for some minutes, and then gradually disappearing. When given a *poisonous* dose, it causes the immediate flow of viscid saliva, from which the animal tries to free itself by rubbing its mouth on the ground; in about ten minutes it becomes quiet and dull, and coldness supervenes, which continues and increases till death. The other most apparent symptoms are convulsive spasms, which first affect the hind legs, but soon extend to the anterior extremities. The eyelids are widely separated, while the pupils are somewhat contracted; and the tumultuous beating of the heart and the hurried respiratory movements show that the convulsive state of the other muscles has extended to those which regulate the most important vital functions. From ten to fifteen drops of aniline will thus prove fatal to a rabbit or to a dog of medium size. In still larger doses the poison

causes the animal's head to be convulsively drawn backwards, and death rapidly ensues. On examination after death, an odor of aniline is found to be given off by the blood, whose globules, when microscopically examined, are found to be partially disintegrated and deprived of their red pigment. (*b*) Its effects on animals, as well as those of nitro-benzine, from which it is produced, when *inhaled in a state of vapor*, have been carefully studied by M. Bergerow, whose experiments were so arranged as to imitate the conditions to which workmen are exposed in the aniline manufactories.

As might be expected, the effects of aniline are slower and less marked than when the substance is introduced into the stomach but are of the same character—the spinal chord and muscular system being more or less *excited;* while the vapor of nitro-benzine, which seems to act primarily on the brain, causes stupor. On the whole, the experiments tended to show that aniline, notwithstanding the terrible spasmodic symptoms which it excites, is less serious in its consequences and more transient in its action than nitro-benzine. The phenomena observed in experiments on animals closely correspond with those which have been observed in cases in which man has been exposed to the noxious vapor. The following case recorded by Mr. Knaggs seems well to illustrate the effects of inhaling a large dose of aniline vapor. A workman broke a carboy containing a large quantity of this liquid, which fell over him without entering his mouth. In trying to wipe up the aniline, he respired the vapor for some time, felt giddy, and complained of his head and chest. When seen some hours afterward, his face and body were of a livid leaden blue; the lips, gums, tongue, and eyes of a corpse-like bluish pallor; he was breathing by gasping, and appeared at the point of death. There was then no convulsion, and he was quite sensible. His pulse was small and irregular. Under very energetic treatment (alcohol, ammonia, chloric ether, internally, and cold affusions and sinapisms externally), he recovered. According to Dr. Letheby, who has reported a similar case, the aniline undergoes changes in the blood similar to those which it undergoes in the formation of the dyestuffs; and the mauve, magenta, &c., that are thus formed in the circulation, occasion the blue or violet color which the gums and mucous membrane of the mouth present in these cases.

The symptoms observed in the various experiments on animals led several physicians to try its therapeutic action in diseases of the nervous system. Sulphate of aniline was the form selected, and chorea the disease on which it was especially tried, although it has also been administered in epilepsy and other nervous diseases. The results are contradictory; and till further evidence of its value is adduced, it is not likely to supplant other medicines of the same class.

The workmen employed in the fabrication of nitro-benzine and aniline (for the two are prepared in the same works) suffer, for the first day or two after commencing this occupation, from severe supra-orbital headache, frequently accompanied with nausea and vomiting. While some persons suffer so severely that they are compelled to seek another employment, most, after a fortnight's experience, cease to feel the ill effects except accidentally, as after extra work or intense heat. Till they become seasoned, most suffer from vertigo, which rapidly disappears on exposure to a current of fresh air; and sometimes the vertigo is succeeded by loss of consciousness. Sometimes the face becomes congested, the patient staggers and falls to the ground in a semi-comatose state like a drunken man; in the course of an hour or two he wakes up, suffering only a feeling of fatigue.

In other cases, regular epileptiform convulsions of the limbs and tetanic spasms of the neck are observed, the patient often remaining in this state for an hour or more before recovery. Such may be regarded as the *acute* symptoms exhibited by new hands. Those who have become seasoned, complain of great general languor, a partial loss of sensation in the upper extremities, and constipation of the bowels; and they almost always present a decolorization of the skin and mucous membranes, in consequence of the impoverished state of their blood, which is said to be rapidly restored by making the patient inhale oxygen gas or compressed air. In reference to the influence of the aniline colors on the health of those who use them, it may be remarked, that even if they were poisonous, they adhere so tenaciously to the stuffs that are dyed with them, that there is no fear of the detachment of a noxious powder, as in the case of the arsenical greens. But fortunately they seem perfectly harmless even when taken internally, according to Sonnenkelb, provided they are completely freed from the arsenic, lead, mercury, or other poisonous metal that has been employed in the oxidation of the aniline. Hence, when they are quite pure, fuchsine and the allied pigments may be safely employed in coloring sweetmeats, liqueurs, confectionery, ices, &c., which it is very satisfactory to know, seeing how largely they are at the present day employed.

ANIMA, Con, in Music; with animation, in a spirited manner.

A'NIMA MUNDI literally signifies 'the soul of the world.' The doctrine contained in this phrase was a favorite one with the early philosophers, who conceived that there resided in nature a force immaterial, yet not intelligential, which was the source of all physical and sentient life. Plato held it impossible for pure spirit —the atmosphere in which alone eternal and archetypal ideas could exist—to bear any relation whatever to matter, and he therefore supposed the latter to be operated upon by an inferior agency, the *A. M.* In the system of the Stoics, the *A. M.* was conceived to be the sole vital force in the universe; it usurped the office of pure spirit, and the doctrine became indistinguishable from Pantheism (q. v.). The notion does not seem to have been entertained by the schoolmen, but it reappears in the writings of Cornelius Agrippa, Paracelsus, and Van Helmont, and, in a modified form, was held by More, Cudworth, and others.

ANIMAL AND ANIMAL KINGDOM. The popular classification of all bodies into three kingdoms—the animal, the vegetable, and the mineral—only assumed authority in comparatively recent times, and has done much mischief in exaggerating the apparent differences between plants and animals on the one hand, and in obscuring the fundamental distinction between these and minerals on the other. There are in reality only two kingdoms of nature, the living and the non-living—the organic and the inorganic. The famous aphorism of Linnæus, 'Stones grow; plants grow and live; animals grow, live, and feel,' is no longer satisfactory, for growth is of two distinct kinds. While growth in minerals takes place merely by *accretion*—addition of new particles to the external surface, that of living matter is by *intussusception*—the interposition of new molecules between those formerly present. Again, living matter, or *protoplasm*, is clearly distinguished by its chemical composition, it being composed of very highly complex compounds, or mixture of compounds of carbon, nitrogen, hydrogen, oxygen, and sulphur, together with water and salts. During life, it is incessantly *disintegrating* and combining with the oxygen of the atmosphere, many products of change, chief among which is carbonic acid, being evolved; and *reintegration* must therefore take place by intussusception, for which purpose new matter containing the necessary elements must be taken up, either from other organisms, or from the inorganic world. Certain *cyclical changes* are also exhibited by all forms of living matter—that is to say, each arises as a detached portion of some previous organism; develops into a similar form to that from which it arose; tends to reproduce itself; and, finally, ceasing to live, its protoplasm breaks up, and its elements ultimately return in a highly oxidized state to the inorganic world. Finally, certain conditions of temperature, pressure, presence of oxygen, &c., variable only within comparatively slender limits, are essential to the maintenance of life.

While living bodies are thus clearly distinguishable from inorganic, every attempt to erect a similarly sharp distinction between plants and animals completely breaks down. Vast numbers of animals are destitute of the power of locomotion, so that, for instance, corals were unhesitatingly referred to the vegetable kingdom until about a century ago; while diatoms, and many embryonic algæ and fungi, which possess marked powers of locomotion, would thus require to be ranked as animals. Nor is sensibility a purely animal characteristic; the well-known sensitive plant, the sun-dew and Venus fly-trap, exhibiting it in the most marked degree. Cellulose, again, which forms the coating of the vegetable cell, was regarded as completely characteristic of this; but many algæ and fungi are naked at some period of their lives, while the thick external tunic of those degraded vertebrates known as Ascidians has the chemical composition of plant cellulose. Chlorophyll, the green coloring matter of plants, is absent from fungi and from many flowering parasites, and is yet present in infusorians, in Hydra, and some other invertebrates, which are thus enabled to vegetate in sunshine, forming starch and evolving oxygen. Animals thus do not necessarily feed; while the well-known insectivorous plants (see DIONÆA, SUN-DEW) capture animals, and frequently digest them.

The attempt to establish a difference in structure is equally unsuccessful; for although the students of higher forms have no difficulty in grouping their flowers and ferns, their birds and beasts, into distinct series, the microscopist finds that these two great stems arise from a common root. It has therefore repeatedly been proposed to divide living forms into three groups—Animals, Plants, and *Protista*—a solution which, however, raises two new difficulties—that of distinguishing on the one hand between Protists and Animals, and on the other, between Protists and Plants. And thus every attempt to limit and define its forms has really resulted in proving the fundamental unity of life. The general study of these constitutes the science of Biology, of which the sub-sciences are : (1) Morphology, dealing with the structure of organisms, and including Anatomy and Embryology; (2) Distribution, dealing with the time and place of their occurrence on the earth; (3) Physiology, dealing with the study of their functions; (4) Ætiology, dealing with the explanation of the preceding facts by the rival hypotheses of Creation and Evolution.

These subjects are divided between botanist and zoologist, and their labors, while starting, as has been shown, from a common point, thence diverge widely. The results of Animal Morphology are outlined in the articles ZOOLOGY, VERTEBRATA, &c.; and those of the study of Animal Physiology under the heads of the separate functions, DIGESTION, REPRODUCTION, NUTRITION, &c. (q. v.). See also GEOGRAPHICAL DISTRIBUTION, EVOLUTION, &c.

ANIMAL CHE'MISTRY. The objects of animal or physiological chemistry are, to investigate the composition and properties of protoplasm and its various modifications which form the tissues and organs of living beings, and to ascertain the precise nature of the constructive and destructive changes which take place in those tissues and organs during the performance of their functions.

Protoplasm is always found to contain much albuminous or proteid matter, together with smaller quantities of amyloids and fats, and its molecule is conjectured to include representatives of all these three classes. Much water is also present, together with small quantities of numerous products of functional activity. We may briefly refer to these.

Proteids (q. v.) are at present classified as follows: (1) Native Albumens (egg, serum, &c.); (2) Derived Albumens (acid and alkali albumens, casein); (3) Globulins (globulin, myosin, vitellin, &c.); (4) Fibrin; (5) Coagulated Proteids; (6) Peptones; (7) Lardacein. Certain nitrogenous bodies allied to proteids are mucin, chondrine, gelatin, keratin, nuclein, &c., which form the principal components of mucus, cartilage-matrix, connective tissue, epidermic structures and cell nuclei respectively.

The *Amyloids*, or carbo-hydrates, from their far less complex structure, are much better understood. The most important of these are grape-sugar, (glucose, dextrose, diabetic sugar ($C_6H_{12}O_6 + H_2O$; milk-sugar (lactose), $C_{12}H_{22}O_{11} + H_2O$; muscle-sugar (inosite), $C_6H_{12}O_6 + 2H_2O$, glycogen or animal starch, $C_6H_{10}O_5$; and dextrin, $C_6H_{10}O_5$.

The fats, with their derivatives and allies, form very complete series, acid, neutral, and nitrogenous, of which the composition is tolerably well known. The acetic acid series ($C_nH_{2n}O_2$) is best represented, including formic (in blood and many tissues, also secreted by ants, &c.); acetic (in stomach during fermentation of food, in diabetic urine, &c.); propionic (in sweat, &c.); butyric (in milk, also sweat, urine); valerianic (in fæces); caproic, caprylic, and capric (in butter); lauro-stearic and myristic (in spermaceti, &c.); palmitic and stearic acid (in human fat). Of the oleic series, $H(C_nH_{2n-3})O_2$, many members are known. Human fat is a mixture of oleic, palmitic, and stearic acids in combination with glycerine. The glycolic acid series is represented by lactic acid, the oxalic series supplying oxalic and succinic acids. Cholesterin is abundant in nervous tissue and in bile, &c. The complex nitrogenous fats are lecithin, neurin, cerebrin, &c.

The most important product of nitrogenous waste in mammalia is urea $(NH_2)_2CO$, which forms the chief solid constituent of urine, and occurs in traces in blood and most tissues, except muscle, which, however, contains intermediate products of decomposition. Little is yet known of its relations to the proteids, from which it arises; but Schützenberger has succeeded in decomposing albumen into carbonic anhydride and ammonia in the same ratio as urea, and therefore concludes that the molecule of albumen is a complex ureide. Uric acid ($C_5H_4N_2O_3$) predominates in the urine of birds and reptiles, but it is also present in small quantities in that of mammals, and its salts form gouty and urinary concretions. Kreatin, kreatinin, and sarkin occur constantly in muscle; xanthin, guanin, &c., in urine; glycocoll and taurin, in combination in the bile acids, &c.; leucin and tyrosin, as products of pancreatic digestion.

Most of the preceding substances, though seldom constant, appear to be of exceedingly wide distribution throughout the animal kingdom. A few substances, including several of the more important proteids, grape-sugar, muscle-sugar, peptic and diastatic ferments, are also of frequent occurrence in the vegetable kingdom; while some of the most important and characteristic vegetable compounds also occur incidentally among animals, e. g., cellulose, chlorophyll, and starch. The whole progress of research tends to show the fundamental unity not only of the composition of animal and vegetable protoplasm, but also of most of the processes of waste and repair in animals and plants alike. Thus, for instance, it has very recently been proved by analysis that allantoin, a body analogous to urea, and known as an important waste product of the vertebrate embryo, is also found in quantity in opening buds in spring.

See BLOOD, BONE, MUSCLE, &c.; DIGESTION, NUTRITION, RESPIRATION, &c.; also FAT, UREA, ALBUMEN, PROTEIN, &c. Gamgee's *Physiological Chemistry*, and Foster's *Text-book of Physiology*.

ANIMAL HEAT. Living protoplasm is constantly in progress of disintegration and oxidation, and these processes are accompanied by evolution of heat. The greater the activity of change, the higher does the temperature tend to become. Not only, therefore, are the so-called cold-blooded animals really warmer than the surrounding atmosphere, but even plants recognizably evolve heat, and the temperature of certain flowers, where protoplasmic activity is highest, may sometimes almost reach that of the human body. See ARUM.

Even the infusoria evolve heat, as is shown by the slowness with which the surrounding water freezes. John Hunter showed that worms and leeches, slugs and snails, were all one or two degrees warmer than the air. Fishes generally are only two or three degrees warmer than the water they inhabit; but in some of the more active, like the bonito and tunny, a temperature of 99° F. has been observed, while the surrounding water was at 80½°. So, too, the frog, which usually averages about 1° warmer than the air, is 2° or 3° warmer while breeding; while in certain lizards and snakes, a difference of as much as 15° to 20° F. has been recorded. Newport's researches on insects show that while the temperature of the larva may vary from ½ to 4° above that of the atmosphere, that of the pupa is almost imperceptibly higher, and that of the perfect insect may rise enormously; a difference of from 2° or 3° at rest, to from 9° to 20° in excitement, having been observed in individual bees, and a much more marked elevation in the temperature of the whole hive, which has been observed to reach 102° F. Among the animals commonly termed warm-blooded, the temperature, although generally higher in birds than in mammals, varies from species to species, yet is very nearly constant during health in each. Thus, while the average temperature of the human body is about 98·4° F., that of the wolf is 3° or 4° lower, and that of the arctic fox 5° or 6° higher. In birds, the temperature varies from 100° in the gull and other aquatic birds, to nearly 112° in the swallow, while, on the other hand, a hybernating mammal like the lemming becomes temporarily cold-blooded, its temperature during the winter sleep being comparatively little above that of the atmosphere.

From the preceding details, it will be seen that while cold-blooded and warm-blooded animals thoroughly agree in evolving considerable amounts of heat, the difference between them lies in this, that in the former the means of loss of heat by the skin, &c., are great as compared with the normal production of heat, while in the latter the loss and production of heat are kept balanced.

Physiologically considered, the animal body is a machine for converting the potential energy supplied by food, into the actual energy of heat and mechanical work. Knowing the quantity and chemical composition of the food, it is easy to calculate the amount of energy furnished to the body. The average income of energy of the human body on normal diet is about 1,000,000 metre-kilogrammes, of which about 150,000 units can be expended in muscular work, the remaining 850,000 leaving the body in the form of heat. As to the channels by which heat leaves the body, Helmholtz has calculated that fully 2½ per cent. leaves the body with the fluid and solid egesta, about 5¼ per cent. is spent in warming the expired air, about 14¾ in evaporating the water expired by the lungs, and the balance, about 77½ per cent., by the skin, in conduction, radiation, and evaporation.

These general considerations once grasped, the apparent anomalies and variations in the temperature of different animals present no difficulty. See TEMPERATURE OF THE BODY, &c.; also any Manual of Physiology.

ANIMAL MAGNETISM, MESMERISM, or HYPNOTISM. From time immemorial, Egyptian conjurers and sorcerers have been accustomed to produce artificial somnambulism, usually by inducing their subject to gaze intently for a few minutes at certain cabalistic signs marked on the center of a white plate. The Yogins, a Hindu sect, also practise similar arts; while the peculiar states of trance or ecstasy into which the Mount Athos monks and other religious fanatics were accustomed to throw themselves, are of kindred nature. So too, many allusions in the works of classical authors relate to phenomena more or less of this kind.

About the middle of the 17th c., while the phenomena of terrestrial magnetism were attracting considerable attention, one Valentine Greatrakes, in London, professed to cure diseases by stroking with the hand. A century later, Gassner, a Swabian priest, employed a similar mode of treating disease, which he ascribed to demoniacal possession. About 1774, Mesmer, a Viennese physician, commenced to treat diseased organs by the application of artificial magnets. The phenomena exhibited by his patients, especially the more nervous of them, led him to adopt the view that the magnets operated not as special sources of influence, but as conductors of a magnetic fluid which he could communicate at will to the patient, even at a distance. Four years later, he commenced practice in Paris, with great success. His usual methods were to seat his patient with his back to the north, to press the pit of the stomach and make passes with his hands in front of his face, meanwhile fixing his patient's eye, and soothing him by the aid of music. Sometimes too he placed his

patients in connection with 'magnetized' trees, or set them in a circle around a covered vessel from which he professed to conduct the invisible fluid, thus inducing peculiar nervous conditions. In 1785 a Royal Commission was appointed to examine Mesmer's pretensions. These investigators found that the same phenomena could be produced in Mesmer's more nervous patients when blindfolded, by merely inducing them to suppose themselves in the neighborhood of any of Mesmer's magnetic appliances, though none were really present; while conversely, magnets and magnetic tree were alike powerless, if the patient were kept unaware of their proximity. The Marquis de Puységur at the same time discovered that he could induce artificial somnambulism without the aid of magnets, by passes alone; but unfortunately for further investigation, the subject fell into the hands of the arch-quack, Cagliostro (q. v.), and thus became extremely discredited by physiologists. Despite the unfavorable report of the French Commission of 1785, as well as of a later one in 1831, and other subsequent exposures, vague theories of magnetic influence, odylic force, new imponderable substance, electrobiology, or the like, kept constantly recurring, since science had nothing with which to replace them, until the investigations of James Braid, a Scottish surgeon settled in Manchester. In 1841 he went to a mesmeric séance, which seemed to him a mere triumph of imposture over credulity; but returning on another occasion to watch the details more narrowly, he was struck to find that the patient was really unable to keep his eyes open. After some reflection, he concluded that by continuous staring, the eyes with their nerve centers became fatigued, and the balance of the nervous system was thus destroyed. Resorting to experiment, he at once succeeded in throwing his servant and others into thorough mesmeric sleep by simply inducing them to gaze intently for a few minutes at the mouth of a bottle placed above, but close to the eyes. He thus proved the absolute dependence of the mesmeric phenomena upon the physiological condition of the patient, not on that of the operator; and found that he had henceforth to deal with a new order of cerebral states, henceforth to be classed with those of sleep, somnambulism, and insanity. He therefore proposed the word hypnotism, which now so advantageously replaces the terms animal magnetism and mesmerism. Braid continued to investigate the subject with great thoroughness and success for some years, and attempted the treatment of certain diseases by inducing hypnotism. Unfortunately, however, the evil reputation which the subject had so naturally obtained, prevented the due appreciation of Braid's discoveries, and it was not until about 1875 that the subject commenced to be thoroughly investigated by physiologists. Preyer and Heidenhain in Germany, and Richet in France, have confirmed and extended Braid's results, and we may therefore briefly sum up their results, premising that no scientific observer has ever confirmed the statements of mesmerists as to clairvoyance, reading of sealed letters, influence on unconscious persons at a distance, or the like; and, as above stated, the influence of the mesmerizer is unnecessary, and in all cases unimportant.

The physiological changes which are set up are usually as follows: A spasm of the accommodating apparatus first takes place, the pupils meanwhile dilating, and the eye-balls being protruded, while the eyelids droop. Respiration and circulation become greatly accelerated, and perspiration frequently ensues. Finally, profound stupor may ensue. A very remarkable degree of insensibility to pain exists, so that even surgical operations may sometimes be performed as well as under chloroform. The reflex irritability of all the voluntary muscles is greatly increased (indeed for days after the experiment), so that stroking an area of skin produces a spasm of the subjacent muscles, which may even spread over the whole body, producing a perfectly cataleptic rigidity, so that Heidenhain indeed considers the hypnotic state as nothing more than an artificially produced catalepsy. These considerations indicate the danger of repeatedly subjecting the same person to hypnotic experiments, lest the abnormal state should be rendered permanent. Moreover, since in some persons the hypnotic state begins with general convulsions, the non-medical reader is warned against attempting to hypnotize.

During hypnotism, consciousness is diminished or dormant. The patient may, if only slightly affected, remember what has happened; if more fully hypnotized, he has no remembrance of his actions until hints are given; in the most complete state, he has no remembrance whatever.

In hypnosis, however, sensory perceptions take place; but these are not converted into conscious ideas—in other words (as constantly happens in a 'brown study'), the sensation is present, but the power of directing the attention towards it is temporarily lost. Reflex action, however, goes on all the more freely in the absence of the inhibiting will; and thus movements made before a hypnotized person are perceived by the imperfectly closed eyes, and the stimulation of the organ of sense sets up a material change in the central nervous system, which liberates movements, apparently voluntary, yet not really so. Thus the patient may be induced to imitate every movement, however absurd or trivial, which is presented to him. The tendency to mimicry, so common, especially in children, monkeys, parrots, &c., is thus intensified, or rather the stimulus of the sensory impression is allowed to work unchecked.

As sometimes in ordinary sleep, but with ease and certainty, dreaming may be induced. Thus the medium may be conducted through all the stages of a journey, may be plunged into grief or raised to exuberant happiness by a few judicious suggestions. This state is nearly related to that of 'automatism at command,' where the medium obeys orders like a docile dog. Thus, as a crucial experiment, Heidenhain ordered his brother, a young medical student, to cut off his whiskers, the product of a year's assiduous cultivation, to the unbounded vexation of the unfortunate youth on awaking. So too, placing the body in a given position calls up the appropriate actions. A pillow, properly placed in the medium's arms, is nursed like a baby; music makes him dance; and so on. In all cases, the spoken command, the position of the limbs, or the sensory stimulus, sets up the impulse to the actions indicated, without either intelligence or volition being awakened.

The patient never falls down, and the power of co-ordinating the movements of walking, &c. is nearly perfect; his attitudes have often an unusual grace, and in the lighter stages of hypnotism he may converse freely and even with unwonted intelligence and emotion, due, doubtless, partly to freedom from the restraint of a knowledge of the surroundings, partly to the concentration upon a single train of thought.

Very sensitive patients may be hypnotized by monotonous sounds like the ticking of a watch, or even by expectant attention, when alone.

Numerous other remarkable phenomena have been described. Thus, by gentle pressure on the neck of a patient, he can be induced to repeat words spoken in his presence, especially when the sounds are directed to a sensitive area just below the sternum. Automatism at command is greatly facilitated by imposition of the operator's hand on the patient's head. By passes on one side, catalepsy or paralysis of the opposite side only can sometimes be induced. Remarkable disturbances of the sensation of color may take place; and so on.

The state of the brain during hypnosis is not as yet well understood. The activity of the ganglion-cells of the cerebral cortex (with which the functions of consciousness are believed to be specially associated) appears to be inhibited by the gentle prolonged stimulation. The cerebral arteries are not contracted. Additional light is being obtained by experiments upon animals, of which many can be thrown into a state closely resembling, if not identical with the hypnotic.

Hypnotism is again coming into use in medical and surgical practice, and its facts have also very important bearings on the phenomena of reverie, trance, somnambulism, religious excitement, mania, spiritualism, &c. See Braid's *Magic, Animal Magnetism, &c.* (3d ed., Lond. 1852); Heidenhain's *Animal Magnetism* (Lond. 1880).

ANIMA'LCULE, a term which, although etymologically applicable to any very small animal, is limited in ordinary language to those which are microscopical. Animalcules exist in prodigious numbers, their size being such that myriads of them find ample space for all the movements of an active life within a single drop of water. Sea-water often contains them in enormous numbers, and the luminosity of the sea is often due to this cause (*Noctiluca*). Although, contrary to a widely diffused belief, they occur only in very small number in drinkable waters, they abound wherever water becomes stagnant, or contains decomposable organic matter. Thus rain-water allowed to stand long in an open cistern, or the water of a vase in which cut flowers are placed, soon becomes more or less turbid and offensive; and if a drop be placed on a slip of glass and examined even with a pocket lens, a multitude of living beings can be seen moving rapidly in all directions, while minute specks are also to be seen in motion between these.

On the application of higher microscopic power, new organisms come again into view, so that the variations of size between the invisible inhabitants of one drop are as great as those between whales and minnows. An immense variety of animalcules can very easily be studied by collecting impure water from a dozen different sources, and keeping it separate in open wide-mouthed bottles in a window, and observing from time to time, for not only do the contents of the different vessels differ from each other, but they also vary greatly with the season, so that an unending source of new surprises is thus open to the most inexperienced microscopist without leaving his room. Besides obtaining numerous varieties of microscopic algæ, diatoms, bacteria, &c. (see ALGÆ, DIATOMACEÆ, PROTOPHYTES), examples of all the leading forms of minute animal life are thus to be obtained; and these, at first supposed to belong to the same general type of structure, are now known to be extremely varied. The simplest form with which the observer will meet is a naked lump of jelly-like protoplasm, constantly flowing into new shapes, the *Amœba* (see PROTEUS); while other masses of jelly, the Foraminifera, may be found

possessed of coverings of sand, or even carbonate of lime, and only protruding their irregular processes (pseudopodia) through its openings. Others, again, the sun-animalcules of fresh water, and the Radiolarians, which inhabit the sea, are usually possessed of a beautifully marked flinty skeleton. These groups are usually united under the head of *Rhizopoda* (q. v.). Another great series, in which the form of the body is usually definite, the pseudopodia being generally replaced by vibratile threads or cilia, are termed the *Infusoria*. All these are the equivalents only of a single cell of higher animals, and are, therefore, grouped into the sub-kingdom Protozoa; but many animalcules are of far more complex organization. Thus the wheel animalcules (See ROTIFERA) are segmented, worm-like animals; and the larvæ of almost all marine and fresh-water invertebrates are at an early stage free-swimming and microscopic. From its extreme vagueness, therefore, the term A. is now disused by scientific writers.

Despite their apparent insignificance, certain animalcules, by virtue of their almost imperishable skeletons, are among the most important agencies which have built up the crust of the earth. The surface of the sea is largely inhabited by Radiolarians and Foraminifera, the former preponderating in cold, the latter in temperate and tropical waters. As they die, their skeletons sink to the bottom, and form mud or ooze, which through time and pressure becomes consolidated into rock. Many polishing stones, &c., are thus mainly composed of Radiolaria; while chalk is principally formed by the skeletons of Foraminifera, and greensand of internal siliceous casts of these. Many limestones, marbles, quartzites, &c., are probably of similar origin, although all trace of organic structure may have been eliminated by metamorphic change. See Carpenter *On the Microscope*, and the *Micrographic Dictionary*.

ANIMALS, CRUELTY TO. England has the honor of first making this a distinct subject of public attention by the formation of societies for its prevention, and by legislative enactments making it punishable. The English Society for the Prevention of Cruelty to Animals, founded in 1824, has become very influential and active; the Scottish Society, founded in 1839, differs slightly in its mode of prosecution. In the United States, above thirty branches of a similar organization were founded between 1866 and 1881; and the movement has extended into France and Germany.

ANIMALS, CRUELTY TO (in Law). This is an offence against the criminal law, and has frequently formed the subject of legislation, the chief act of parliament being the 12 and 13 Vict. c. 92 (passed in 1849). By this statute it is provided, that if any person shall cruelly beat, ill-treat, over-drive, abuse, or torture any horse, mare, gelding, bull, ox, cow, heifer, steer, calf, mule, ass, sheep, lamb, hog, pig, sow, goat, dog, cat, or any other domestic animal, he shall forfeit a sum not exceeding £5 for every such offence, recoverable before a justice of the peace in a summary way; and if by any such misconduct he shall injure the animal, or any person or property, a further sum not exceeding £10 to the owner or person injured. The acts also inflict penalties in the case of conveying cattle by railway without water-supply, &c., causing unnecessary pain or suffering; in the case of bull-baiting, cock-fighting, and the like; and regulates the business of slaughtering horses and cattle not intended for butcher-meat.

The act of 1839 forbids the use of carts drawn by dogs. The 39 and 40 Vict. c. 77 (1876) limits vivisection, and forbids painful experiments on animals, unless the operator is licensed by the Home Secretary. The object must be the discovery of knowledge or the prolonging of life; and the animal must be rendered insensible during the operation. The penalty is £50 for the first offence, £100 for the second. The Wild-Birds Protection Act (1880) provides a close time for birds between March and August.

Formerly, in Scotland, this offence was punishable at common law—that is, according to the Scottish legal principle, common law as distinguished from *statute* law. An act of parliament, however, passed in the year 1850, put the law on this subject in Scotland on the same footing as it is in England. See ANIMALS, Cruelty to, in AM. SUPP.

ANIMALS, WORSHIP OF, a stage in the religious evolution, characteristic of many of the less cultured races, which has sometimes held its place in the higher stages of civilization. It originates in Animism (q. v.), or spirit-worship, which is a universal phenomenon of humanity. Among primitive peoples, all animals are supposed to be endowed with souls, which in many cases have formerly animated human beings.

Hence a likeness is often recognized between an animal and some deceased friend, and the animal is addressed as the person would have been, and honored with a kind of worship. The case of an ancestral soul, worshiped as incarnate in an animal body, thus forms a link between manes-worship and beast-worship; and we find this connection otherwise in the veneration of a particular species of animal by a particular family, clan, or tribe. Many tribes call themselves by the name of, and even derive their pedigree from some animal. Its cries become the omens of the tribe, and thus originate the divination and augury of more civilized nations. This curious and widespread belief in a descent from animals in connection with a belief in transmigration into other forms, goes far to explain such phenomena as lycanthropy (see WERE-WOLF) and the unions between animals and human beings so common in folk-lore, and has doubtless originated in totemism (see TOTEM). The division of a tribe into the families of the bear, crane, turtle, &c., indicates a time when families claiming descent from ancestors holding those names, have banded themselves together for the common interest; and that an ancestor should be called the bear, or turtle, or crane, indicates a time still further back, when the name was given him for some reason. Many ethnologists, notably Sir John Lubbock and Herbert Spencer, suppose these names to have been originally personal epithets, designating qualities or characteristics of the individual (thus, a slow man would be called a turtle, a very long-legged man a crane), which became family surnames, and eventually gave rise to myths of the families being actually descended from the animals in question as ancestors; while popular mystification between the great ancestor and the creature whose name he held and handed down to his race, led to veneration for the creature itself, and thence to full animal-worship. Though such nicknaming as this has occurred, totemism must have had a much broader and deeper foundation. Perhaps the best explanation is that suggested by the worship of personal deities, seen in its greatest development in the North American native races. The *manitou* of the Indian is almost always an animal, and is chosen by each individual at his coming of age, being pointed out to him in a dream, produced by the greatest religious act of his life—his first fast. This animal then becomes an object of worship, and its skin is carried about the person as a fetich, and its likeness painted on the body, or sculptured on the weapons. Thus arise tattooing and heraldry—forms of worship—and the superstitious fear the savage entertains of killing or eating his manitou, or patron-animal. The manitou develops into the totem, or sacred-animal, of the gens or family which descends from that person, and worship is paid to all representatives of its species. Equally strong evidence is obtained from the ancient nations. Some facts are preserved in the signs of the Zodiac, the majority of which are animals, and compounds of human and animal forms. There is nothing in the grouping of the stars to suggest animal forms, and the probability is, that in ancient as in modern times, stars, when named, were given names of distinction that commanded respect, if not veneration; therefore that the animals whose names were transferred to the stars were, on earth, highly, if not religiously venerated.

This is borne out by the legends of the transference to the heavens of particular animals. The frequency, also, of animal-names, and of representations of the same animals upon coins, point to the same conclusion. In the old Egyptian animal-worship, also, the theory of tribe-fetiches and deified totems is borne out. We find deities patronizing special sacred animals, incarnate in their bodies or represented in their figures; while many of the sacred creatures are worshiped in one locality, yet killed and eaten with impunity elsewhere. In the modern world, the most civilized people among whom animal-worship vigorously survives lie within the range of Brahmanism. Here the sacred cow is not merely to be spared; she is, as a deity, worshiped and bowed to daily by the pious Hindu. Siva is incarnate in Hanuman, the monkey-god; the divine king of birds, Garuda, is Vishnu's vehicle; and the forms of fish, and boar, and tortoise are assumed in the avatar-legends of Vishnu, which are at the intellectual level of those Red Indian myths which they so curiously resemble. Perhaps no worship has prevailed more widely than that of the serpent. It had its place in Egypt and among the Hebrews; in Greece and Rome; among the Celts and Scandinavians in Europe; in Persia and India; in China and Tibet; in Mexico and Peru; in Africa, where it still flourishes as the state religion in Dahomey; in Java and Ceylon; among the Fijians, and elsewhere in Oceania. And even within the limits of Christianity, we find the sect of the Ophites, who continued or renewed snake-worship, blended curiously with purer rites. It is evident, however, that although some animals may have received a preference, yet all had a share in the superstitious reverence of primitive peoples; and this broad universality of their worship militates against any other theory of its origin, except that based on the theory of the transmigration of souls. See Fergusson's *Tree and Serpent Worship* (1868); M'Lennan in the *Fortnightly Review* for 1869 and 1870; Herbert Spencer in the *Fortnightly* for 1870; Dr. Tylor's *Primitive Culture* (1871); Dr. Robertson Smith in the *Journal of Philology* (1880); and Dorman's *Origin of Primitive Superstitions* (Philadelphia, 1881).

A'NIME, a resin exuding from the trunk of the *Hymenæa Courbaril*, a large tree of the natural order *Leguminosæ*, sub-order *Cæsalpineæ*, a native of New Spain and Brazil. It somewhat resembles copal, but is more easily soluble in alcohol.—The name A., or Gum A., is, however, also given in Britain to a resin called in India copal, the produce of *Vatiria Indica*, a tree of the natural order *Dipteraceæ*; whilst the copal of Madagascar is produced by

Hymenæa verrucosa, and that in Brazil in great part by several species of *Hymenæa*, a tree of which the genus is also regarded as the probable source of the copal of Mexico.

ANIMISM, a term originally used to denote the theory of Stahl (q. v.), which regarded the vital principle and the soul as identical, but now used in the sense given to it by Dr. Tylor, as the general doctrine of spiritual beings. It is convenient to take the belief in spiritual existence as a minimum definition of religion. It appears among all low tribes with which we have any intimate acquaintance; and all travelers who have hitherto asserted the existence of races without it have been afterwards refuted by the facts. It may be considered to have arisen simply from the evidence of the senses, interpreted by the crude and child-like science of the savage. Two problems seem to have exercised the primitive mind. First, What is it which makes the difference between a living body and a dead one? what causes waking, sleep, trance, disease, and death? In the second place, What are those human shapes which appear in dreams and visions? The savage makes these two groups of phenomena each help to account for the other, by combining both in the conception of an apparitional or ghost soul, which is conceived of as an insubstantial human image, resembling a vapor or a shadow, the cause of life and thought in the individual it animates, capable of leaving the body and appearing to men waking or asleep as a phantasm separate from the body of which it bears the likeness, and able to enter into, possess, and act in the bodies of other men, of animals, and even of things inanimate. When the sleeper awakens from a dream, he believes that his soul has really been away, or that the souls of others have come to him. His body has been still, but his living self or soul, his phantom or image, has been active. And have not waking men, in broad daylight, sometimes seen these human phantoms in what are called visions or hallucinations; and after a man has died and been buried, has not his phantom-figure continued to appear to the survivors in dreams and visions? And what is his reflection seen in still water, or his shadow falling behind him, or the breath seen for a moment issuing from his lips like a faint cloud, but the man's ghost-soul becoming visible for a moment and vanishing again? In the thought of the savage as of the child, personality is ascribed not to the men and beasts only, but also to things. His ghosts do not come to him naked, but dressed in the well-known clothing worn in life. This is the explanation of one of the most wide-spread rites of animistic religion—the offering of funeral sacrifices for the service of the dead.

The phantasmal images of the objects offered pass into the possession of forms shadowy like themselves—the souls of the dead. These spiritual beings fill all nature, animate and inanimate, and their life is a continuation, and not a new life, in savage religion. They transmigrate into human beings, animals, plants and lifeless things, and they can avenge their past and present wrongs by bringing disease upon the individual. The man keeps after death the temper he had in life, and is powerful for good or evil according to his inclinations while alive. From this, and not from mere family affection, arises naturally the ancestor-worship, which has been from remote antiquity, and is still, the main faith of the larger half of mankind Above the commonalty of such spirits the primitive mind recognizes higher spirits, or gods. Sometimes, by an extension of the natural order of life, the souls of great chiefs and warriors continue the same superior rank into the unseen world, and rise to divine honors. And the idea of the divine ancestor may even be carried far enough to reach supreme deity, as when the Zulus, working back from ancestor to ancestor, reach Unkulunkulu, the Old-old-one, as the creator of the world, thus attaining to monotheism by a natural evolution. In the most rudimentary stages of religion, ethical conceptions are but feebly developed, and there is little trace of moral retribution after death. The gods require their worshiper to perform his duty towards them, but do not necessarily concern themselves with his doing his duty to his neighbor. Yet the practical effect of religion on men's lives early begins to show itself. The worship of the dead naturally encourages good morals, for the ancestor who, while alive, saw that the members of his family did right by one another, and whose condition in the spirit-world is a continuation of his earthly character and rank, will naturally insist on this being continued when he is a divine ghost, powerful to favor or to punish. Traces of the antagonism between good and evil are found also in the lower races. The world is regarded as the battle-ground of good and evil spirits, and thus arises the idea of a dualism, or contest between these ranged under a supreme good and evil deity, which attains so great development in the ancient religion of Persia.

Animism, then, appears to the savage, on the evidence of his senses, to be a rational and fairly consistent philosophy, and it has maintained its place in higher civilizations. It is taught by Lucretius, when he makes his theory of film-like images of things (*simulacra* and *membranæ*) account both for the apparitions which occur to men in dreams and the images which impress their mind in thinking; and when Democritus explained the facts of perception, by declaring that things are always throwing off images of themselves (*eidola*), which enter the recipient soul, he was simply answering the fundamental question of metaphysics, by turning to a new purpose, as a method of explaining the phenomena of thought, the savage doctrine of object-souls. Animism is not a degeneracy from a higher culture.

In it we find no survivals which show inconsistencies with it; whereas, in all higher cultures, there occur survivals of primitive superstition, wholly inconsistent with the more advanced beliefs. Most primitive superstitions are found surviving, in modified form, in poetry and folk-lore, and often in common words and phrases, which have a meaning deeper than metaphor. Animism is not itself a religion, but a sort of primitive philosophy, which not only controls religion, but the whole life of the natural man. It represents a stage in the religious evolution which is still represented by the so-called Nature-religions, or rather by the polydæmonistic magic tribal religions, early developed among civilized nations into polytheistic national religions resting upon a traditional doctrine.—See Tylor's *Primitive Culture* (2 vols. 1871), on which this article is mainly founded; also *The Origin of Primitive Superstitions* (Philadelphia, 1881), by Rushton M. Dorman.

ANIONS. See ANODE.

A'NISE (*Pimpinella Anisum*), an annual plant of the natural order *Umbelliferæ*. The genus *Pimpinella* has compound umbels, usually without involucres. Two species are natives of Britain; they are commonly known by the name of Burnet Saxifrage, and have no properties of importance. A. is a native of Egypt. It is an annual plant; the stem is 1½ to 2 feet high, dividing into several slender branches; the lower leaves roundish-heart-shaped, divided into three lobes, and deeply cut; those of the stem pinnate, with wedge-shaped leaflets. The umbels are large and loose, with yellowish-white flowers. It is much cultivated in Egypt, Syria, Malta, and Spain, and even in Germany, especially in the district around Erfurt, where a large quantity of the seed is annually produced. Attempts were made, more than 200 years ago, to cultivate it in England; but the summers are seldom warm enough to bring it to perfection. It is occasionally sown in gardens for a garnish or for seasoning. A.-seed (*aniseed*) is used as a condiment and in the preparation of liquors; also in medicine as a stimulant stomachic, to relieve flatulence, &c., particularly in infants; and it has been used in pulmonary affections. It has an aromatic, agreeable smell, and a warm, sweetish taste. It contains a volatile oil, called *Oil of A.*, which is nearly colorless, has the odor and taste of the seed, and is employed for similar purposes. One hundred-weight of seed yields about two pounds of oil, which is obtained by distillation; but at Erfurt the oil is made from the stems and leaves, the whole plant being aromatic. *A.-water*—water flavored with the oil, and sugared—is much used in Italy as a cooling drink.

STAR ANISE, or CHINESE ANISE, is the fruit of *Illicium anisatum*, a small tree of the natural order *Magnoliaceæ*. See ILLICIUM. It received its name from the star-like form of the fruit, which consists of a number (6—12) of hard, woody, one-seeded carpels. The tree has evergreen leaves, somewhat like those of the common laurel. The whole plant is carminative, and is used by the Chinese as a stomachic and as a spice in their cookery. The qualities of the fruit so much resemble those of the common anise, that it may be used instead of it, and by distillation it yields an oil which is very generally substituted for oil of anise, and is imported into Europe in considerable quantity, to be used instead of it. Star aniseed is also imported, chiefly from China and Singapore.

A'NJOU, a former province in the north-west of France, of about 3080 square miles in extent, now forming the department of Maine-et-Loire, and small parts of the departments of Indre-et-Loire, Mayenne, and Sarthe. Its capital was Angers. The ancient inhabitants of A. were the *Andegavi*, who long and resolutely resisted the Roman arms.—The male line of the Counts of A., who took their name from it, having become extinct in 1060, their title and possessions passed by the female line to the powerful House of Gatinais; and from one of this family, Godfrey, Count of A., spring the Plantagenets. He conquered the greater part of Normandy; assumed the title of duke; and in 1127 married Matilda, the daughter of Henry I. of England, and widow of the Emperor Henry V. Through her, his son inherited the English throne, which he ascended in 1154 as Henry II. A. now became one of the possessions of the kings of England; but in 1204, the French acquired it by fortune of war; and it was bestowed as a fief upon Philip, the son of Louis VIII., and afterwards upon his brother Charles, who became the founder of that House of A. which gave kings to Naples, Sicily, and Hungary. Charles II. of Naples gave A. to his daughter Margaret on her marriage with Charles of Valois, the son of Philip IV. Her son ascended the throne of France as Philip VI. in 1328. King John, in 1360, made A. a duchy, and gave it to his son Louis, and he succeeded to the crown of Naples, it remained a possession of the kings of Naples till the overthrow of that dynasty, when René II., the last of his family,

was deprived of it by Louis XI., who permanently annexed it to the French crown in 1484. Since that time, it has merely given an honorary title to princes of the royal family. The last who bore it was the grandson of Louis XIV., who became Phillip V. of Spain.

ANKARSTROM, JOHN JACOB, the assassin of Gustavus III., king of Sweden, born in 1761, the son of a lieutenant-colonel. He came very early to court, in the capacity of a page, and next entered the army; but having obtained the rank of captain, left it in 1783; married and settled in the country. He was a man of violent feelings and rough manners, and much opposed to the measures taken by the king for curtailing the power of the senate and of the nobles. Implicated in certain intrigues in the island of Gothland, he was accused of treason, but released for want of positive evidence. His hatred to the king was increased by the harsh usage he met with in the course of his trial. In 1790, he went to Stockholm, and together with General Pechlin, Counts Horn and Ribbing, and others, planned the assassination of the king. A. begged that the execution of the deed might be left to him; but Horn and Ribbing disputing the point, they drew lots, and the lot fell upon A. In 1792, the king convoked the Diet at Gefle, and the conspirators hoped upon that occasion to carry out their purpose; but being thwarted in this, they had to wait till the 15th of March, when Gustavus was to attend a balmasqué, during which A. shot at and mortally wounded him. He was instantly apprehended, and at once confessed his crime, stoutly denying, however, that he had any accomplices. On the 29th of April, he was condemned to death, publicly flogged for three successive days, and then beheaded. He went to the scaffold with perfect composure, rejoicing to his last moment in the success of his crime.

A'NKLAM, or ANCLAM, a town of Prussia, in the province of Pomerania, 44 miles north-west from Stettin, on the right bank of the Peene, and 4 miles from its mouth in the Kleine Haff. The river is navigable to A., which carries on a considerable commerce, and has long been a place of commercial importance, having been admitted into the Hanseatic League in 1319. It has manufactures of linens and woollens; it has also several breweries, soap-works, and tanneries, and ship-building is actively prosecuted. During the middle ages A. suffered more than almost any other town from fire and pestilence; and in the wars of the 17th and 18th centuries, it was again and again besieged and sacked. On the close of the Seven Years' War, in 1762, its fortifications were happily dismantled. It is still, however, surrounded by an old wall with three gates. It contains many interesting specimens of the Hanseatic or North German architecture, very like the Flemish. Pop. (1875) 11,847; (1880) 12,361.

ANKO'BAR, the capital of the kingdom of Shoa, in Abyssinia, is built 8198 feet above the sea-level, on the ascent of the table-land, in lat. 9° 34′ N., long. 39° 35′ E. The higher portion of the town is fortified in a very primitive way, by means of a palisade constructed of stakes, with intertwisted branches of trees. The royal palace, unlike the most of the buildings, which are chiefly of wood, is built of stone and mortar, although the roof is thatched. The vegetation around the place is extremely rich, and the air is both cool and pure, so that A. is a very agreeable residence, and is consequently favored with the presence of the court during a portion of the year. Pop. 10,000.

ANKYLO'SIS (Gr. *ankulosis*, bending or crooking; *ankule*, stiff-joint), is a term used in surgery to imply a stiffness in any joint. It is usually the result of disease, which, having destroyed the articular cartilages, leaves two bony surfaces opposed to each other. The reparative powers of nature cause a union to take place by means of granulations between them. This bond of union may become osseous, so as to render the joint perfectly rigid, or it may continue membranous, allowing of a certain amount of motion. Some joints, especially the elbow, are very apt to become ankylosed; and in the knee or hip-joints, this osseous A. is reckoned the most favorable termination to disease, as the limb can then afford a rigid support for the trunk. Joints, stiff through a membranous A., may be forcibly bent, and the bond of union ruptured, so as to restore mobility, or allow of their being placed in a convenient position. A. of the joints between the ribs and the vertebræ is common in advanced age; and there are some cases on record of universal A. of all the joints. A case occurred in 1716 of a child only twenty-three months old with all its joints thus stiffened; and there are in various museums specimens of adult bodies in this condition.

ANN, or ANNAT, in Scotch law, signifies the half year's stipend payable for the vacant half year after the death of a clergyman, to which his family or nearest of kin have right, under an act of the Scottish parliament passed in the year 1672. It is a right that does not belong to the clergyman himself, but to his next of kin absolutely, and therefore can neither be assigned or disposed of by him nor attached for his debts. Compare ANNATES.

ANNA, ST., according to tradition, was the daughter of Mathan, priest of Bethlehem, and the wife of St Joachim. After twenty-one years of barrenness, she is said to have given birth to the Virgin Mary, the mother of the Saviour. Nothing positive is known regarding her life; her name does not occur in the Scriptures, nor even in the writings of the Fathers during the first three centuries. The first who mentions her is St. Epiphanius, in the 4th c.; but towards the 8th, she was all but universally invoked. Her body was believed to have been transferred from Palestine to Constantinople in 710 A.D.; and her head to Chartres, by Louis de Blois, about 1210 A.D. The inhabitants of Duren (Duchy of Juliers, Germany) also pretend to have a head of St A.; and a third is believed to be in possession of the church at Ursitz, in the diocese of Würzburg, although numerous other churches claim to be equally favored. The Roman Catholic Church has a festival in her honor on the 26th of July; the Greek, on the 9th of December. In Austria, Bavaria, and other Catholic countries, this festival is one of great importance. In honor of St. A., a fraternity, called the Fraternity of St. A., was instituted in the 13th c. After the Reformation, it was organized anew by the Jesuits; and in modern times, has manifested some vitality in Bavaria and Catholic Switzerland.

A'NNABERG, a town of the kingdom of Saxony, in the district of Zwickau, on the right bank of the Selm, 18 miles south from Chemnitz. It is situated 1800 feet above the level of the sea, in a mining district; the surrounding hills containing mines of silver, tin, cobalt, and iron. It has extensive manufactures of lace and of silk ribbons. The ribbon manufacture was introduced here by Protestant refugees from Belgium, who fled from the persecution carried on by the Duke of Alva. Pop. (1880) 12,956.

ANNA CARLOVNA, regent of Russia during the minority of her son Ivan, was the daughter of Charles Leopold, Duke of Mecklenburg, and of Catharine, sister of the Russian empress, Anna Ivanovna (q. v.). In 1739, she married Anthony Ulric, Duke of Brunswick-Wolfenbüttel. Her son, Ivan, born August 20, 1740, was nominated by the empress Anna Ivanovna as her successor. This was done at the instigation of Biron (q. v.), the empress's favorite, whose object was to secure the regency for himself: and the empress, on her deathbed, actually appointed him regent, but he continued in power only for a short time. She died on October 28, 1740, and his overthrow took place on the 18th of November in the same year. A. C. now proclaimed herself Grand-duchess and Regent of Russia; but she showed no capacity for managing the affairs of a great country, spent her time in indolent enjoyments, and resigned herself very much to the guidance of one of the ladies of the court, Julia von Mengden. A conspiracy was formed by a party desirous of raising to the throne Elizabeth, daughter of Peter the Great and of Catharine, and this was accomplished on December 6, 1741. The infant Ivan was sent to the castle of Schlüsselburg, where he was afterwards murdered; Anna and her husband were condemned to imprisonment for life, and conveyed to Cholmogory, a town upon an island in the Dwina, near the White Sea. Here she bore two children, and died in childbed in 1745. Her husband remained a prisoner for thirty-nine years, and died in 1780.

ANNA COMNE'NA, a learned Byzantine princess, author of one of the most valuable works to be found in the collection of the Byzantine historians, was the daughter of the Emperor Alexius I. (Comnenus), and was born on December 1, 1083. She received the best education that Constantinople could give, and early displayed a fondness for literary pursuits; but was also habituated from her childhood to the intrigues of the court; and during the last illness of her father, she entered into a scheme, which her mother, the Empress Irene, also favored, to induce him to disinherit his eldest surviving son, John, and to bestow the diadem on her. Failing in this, she framed a conspiracy against the life of her brother (1118); and when her husband, Nicephorus Bryennius, a Byzantine nobleman, either from timidity or virtuous principle, refused to join in it she passionately lamented that she had not been born a man, and upraided him as having the soul of a woman. Her brother spared her life, but punished her by confiscation of her property, which, however, he soon after generously restored. Disappointed and ashamed, she withdrew from the court, and sought enjoyment in literature. On the death of her husband (1137), she retired into a convent, where she died in 1148. Her life of her father, entitled *Annæ Comnenæ Alexiados libri* 19, is full of professions of careful inquiry and a supreme regard for truth, but 'the perpetual strain of panegyric and apology awakens our jealousy.' The style is characterized by an elaborate affection of rhetoric. The best edition is that of Schopen (2 vols. 1839). See Oster's *A. Comnena* (1868—71).

ANNA IVANO'VNA, Empress of Russia, was born on the 8th February 1693, and was the second daughter of Ivan, the elder brother of Peter the Great. She was married in 1710 to the Duke of Courland, the last of his race, who died in the following year; and she obtained the duchy of Courland for her favorite, Biron, a

Courlander of low birth. The throne of Russia was offered to her by the Supreme Council on the death of Peter II. in 1730, on conditions which greatly limited the power of the monarchy, but which she soon broke. Her elevation to it was very much owing to the intrigues of the Chancellor Ostermann, who had had the charge of her education, but who was disappointed in finding her not grateful and tractable, as he expected. For three years, however, her rule was mild, humane, and equitable. The army was reformed, greater liberty was allowed to the landed gentry, government debts were paid up, and the poll-tax for the serfs lessened; but her paramour, Biron, having determined to govern the nation as well as the empress, a sudden and deplorable change ensued. This man, a blood-thirsty and avaricious wretch, established something like a reign of terror through the land. He is said to have banished not less than 20,000 persons to Siberia; numbers were knouted, had their tongues cut out, or were broken alive on the wheel. Eleven thousand perished in this way. Prince Basil Dolgoruki, and others of his family, suffered the ignominy of the scaffold. At length the health of the empress gave way. She died on October 28, 1740, and left the throne to her grand-nephew, Ivan, with Biron as regent. See RUSSIA and BIRON.

ANNALS. These were at first books which contained a record, in chronological order, of the principal events occurring in one or more years. The name is derived from the oldest historical documents of the Romans, the *Annales Pontificum*, or *Annales Maximi*, the duty of drawing up which devolved upon the *Pontifex Maximus;* but these were all destroyed by the Gauls at the sack of Rome, some hundreds of years before the time of Christ. After the second Punic War, A. similar to the former ones were composed, not, however, by the priests, but by educated members of the Roman laity, such as Fabius Pictor, Calpurnius Piso, &c. At a still later period, the term was applied to any historical work that followed the order of time in its narrations, separating them off into single years—as, for instance, the *Annals* of Tacitus.

ANNAMABOE′, a small seaport town, protected by a strong British fort, on the gold coast of Africa, in lat. 5° 5′ N., long. 1° 5′ W., 10 miles east of Cape Coast Castle. In 1807, the inhabitants took part with the Fantees against the Ashantees, in consequence of which the town was attacked by an overwhelming force of the latter, and most of the inhabitants were slain. There is little trade in anything but gold. The present population is between 4000 and 5000.

ANNAN, a seaport, and royal and parliamentary burgh, in the county of Dumfries, on the river of the same name, near its entrance into the Solway Firth. It is neat and well built; among the chief industries are tanning and bacon-curing. The river, which affords excellent salmon-fishing, is spanned by a bridge of three arches, and is navigable to within half a mile of the town for vessels of 250 tons; while considerably larger vessels can enter the mouth of the river, half a mile below. There is regular communication by steamers with Liverpool and Whitehaven; and the Glasgow and Southwestern and Caledonian Railways connect the town with Edinburgh, Glasgow, and Carlisle. The burgh unites with Dumfries, &c., in returning one member to parliament. Pop. in 1881, 3366.

ANNANDALE. See DUMFRIESSHIRE.

ANNA′POLIS, a seaport of Nova Scotia, in lat. 44° 40′ N. Pop. (1871) 2127. It stands on a river of the same name that runs into the Bay of Fundy. Its harbor is excellent, though somewhat difficult of access. A. is the oldest European settlement to the north of the Gulf of Mexico, having been established, in 1604, by the French as the capital of their province of Acadia, under the name of Port Royal. Acadia having been conquered by the English in 1710, and ceded by the French in 1713, Port Royal changed its name in honor of Queen Anne, continuing to be the seat of government, till, in 1750, it was superseded by the newly founded city of Halifax on the outside coast of the peninsula—the new capital, with its better position and superior haven, having diverted most of the trade of the place. Since then, A. has rather decayed than otherwise; and it would have done so more decidedly, had not its river been navigable for boats during nearly the whole of its course of 70 miles.

ANNAPOLIS, a city and port of entry, founded in 1649, the capital of Maryland, U.S., and of the county of Anne Arundel. It stands on the south bank of the river Severn, 2 miles from its entrance into Chesapeake Bay, and 37 miles E. by N. of Washington, 30 miles S. by E. of Baltimore—lat. 38° 58′ 50″ N., long. 76° 29′ W. The A. and Elkridge Railway, 21 miles long, connects the port with Baltimore and Washington. A. contains an imposing state-house, a bank, and six churches. It is the seat of St. John's College, and a naval academy, established in 1845, supported by the U.S. government. Three newspapers are supported by the citizens. Pop. (1870) 5744; (1880) 7000.

ANN ARBOR, a flourishing city of Michigan, capital of the county Washtenaw, on the Huron river and Michigan Central Railway, 38 miles west of Detroit. The state university, founded 1837, is attended by nearly 1000 students. It possesses a library of 9000 volumes, an astronomical observatory, and a capital chemical laboratory. The three colleges, literary, law, and medical, are well attended. The city has an active trade, and contains manufactories of wool, iron, ploughs, and flour. There are in it 10 churches and 6 school-houses; also 5 mineral springs, a hydropathic establishment, and 4 weekly papers. Pop. (1870) 7363; (1880) 7849.

A′NNATES, or FIRST-FRUITS, in the ecclesiastical law of England, means the value of every spiritual living for a whole year (hence the name from the Latin word *annus*, a year), which the Pope, claiming the disposition of every spiritual benefice within Christendom, reserved out of every living. This impost was at first only levied from persons appointed to bishopries; but it was afterwards extended to the inferior clergy. The value of these A. was calculated according to a rate made under the direction of Pope Innocent IV. (1253 A.D.), but which was afterwards increased by Pope Nicholas III. (1292 A.D.). The valuation of Pope Nicholas is still preserved in the Exchequer. This papal exaction was abolished by the act 25 Henry VIII. c. 20, and by an act passed in the following year of the same reign (26 Henry VIII. c. 3), the right to A. or First Fruits was annexed to the crown. The various statutes subsequently passed on this subject have all been consolidated by an act (the 1 Vict. c. 20), regulating the collection of the moneys so levied. See FIRST FRUITS, QUEEN ANNE'S BOUNTY.

ANNATTO. See ARNOTTO.

ANNE OF AUSTRIA, daughter of Philip II. of Spain, was born in 1602, and in 1615 became the wife of Louis XIII. of France. The marriage was so far from being a happy one, that the royal pair lived for 23 years in a state of virtual separation—a result due chiefly to the influence of Cardinal Richelieu, whose fixed determination to humble the House of Austria, led him to spare no means for alienating the affection of Louis from his queen, by representing her as ever involved in the most dangerous conspiracies against his authority. The naturally grave and phlegmatic disposition of the queen was not calculated to counteract the hostile influence of the great minister. On the death of the king in 1643, A. became queen-regent, and evinced her discernment by choosing as her minister Cardinal Mazarin, by whose able management the young king (Louis XIV.) came, on attaining his majority, into possession of a throne firmly established on the ruins of contending parties. The character of A. had much influence in moulding that of her son. She displayed the same cold and haughty temper, combined with the power to charm by a condescending grace, the same love of pomp and power, and the same skill in the choice of able instruments, thus compensating for the want of genuine personal greatness. She died in 1666. Two curious personal peculiarities of this queen are mentioned by biographers—her antipathy to roses, so strong that while passionately fond of flowers and perfumes, she could not endure even the picture of a rose; and the extraordinary delicacy of her skin, which made Mazarin remark, that 'if her majesty were condemned to the infernal regions, her hell would be to sleep in brown hollands.'

ANNE, Queen of Great Britain and Ireland, and the last British sovereign of the House of Stuart, was born at Twickenham, near London, on 6th February 1664. She was the second daughter of James II. of England, and VII. of Scotland (who at the time of her birth was Duke of York), by his first wife, Anne Hyde, the daughter of the famous Clarendon. When she was about seven years of age, her mother died; and her father soon after professed himself a member of the Church of Rome; but he permitted his daughters to be educated in the principles of the Church of England, to which A. always retained an ardent if not a very enlightened attachment—seldom manifesting, in the whole course of her life, so much resolution and independence of mind, as in her resistance to the attempts of her father, after his accession to the throne, to induce her to join the Church of Rome, accompanied, as these were, with the offer that she should be preferred in the succession to her sister Mary. To advance his own popularity, her father gave her in marriage, in 1684, to Prince George of Denmark, brother of Christian V., an indolent and good-natured man, who concerned himself little about public affairs, and was endowed with no capacity for taking part in them. A.'s own weakness of character and that of her husband gave opportunity to Lady Churchill, afterwards Duchess of Marlborough, her early playfellow, to acquire an influence over her, which, during many years, was almost supreme and absolute. During the reign of her father, A. lived in retirement, taking no part in politics. On the landing of the Prince of Orange, she seems at first to have hesitated, and even to have been inclined to adhere to the cause of her father, whose favorite daughter she was; but Lord Churchill had made up his mind to an opposite course, and his wife induced the princess to adopt it.

She consented to the act by which the throne was secured to the

Prince of Orange in the event of his surviving her sister Mary; but quarrelled with her sister about questions of etiquette, and was afterwards drawn into intrigues in which the Churchills were engaged, for the restoration of her father, or to secure the succession of the throne to his son. She even entered into a secret correspondence with her father. She was herself childless when, on the death of William III., on 8th March 1702, she succeeded to the throne. She bore, indeed, seventeen children; but only one, the Duke of Gloucester, survived infancy, and he died in 1700, at the age of 11. The influence of Marlborough and his wife was most powerfully felt in all public affairs during the greater part of her reign. The strife of parties was extremely violent, and political complications were increased by the queen's anxiety to secure the succession for her brother. In so far as she had any political principles, they were opposed to that constitutional liberty of which her own occupancy of the throne was a sort of symbol, and favorable to absolute government and the assertion of royal prerogative according to the traditions of her family. These principles and her family attachment, tended to alienate her from the Marlboroughs, whose policy, from the time of her accession, had become adverse to Jacobitism, and who now, along with Godolphin were at the head of the Whig party. The duchess also offended the queen by presuming too boldly and haughtily upon the power which she had so long possessed. A. found a new favorite in Mrs. Masham, a relation of the duchess, whom she herself had introduced into the royal household. To Mrs. Masham's influence the change of government in 1710 was in a great measure owing, when the Whigs were cast out, and the Tories came into office, Harley (afterwards Earl of Oxford) and St. John (Lord Bolingbroke) becoming the leaders of the ministry. But, although concurring more or less in the queen's design to secure the succession of the throne to her brother, the new ministers had quarrels among themselves which prevented its successful prosecution, and it oozed out sufficiently to alarm the nation, and to alienate many of their political supporters. A dispute between Oxford and Mrs. Masham, carried on for hours in the queen's presence, and which terminated in her demanding his instant resignation, seems to have brought on the attack of apoplexy of which she died 1st August 1714. The Elector of Hanover succeeded her as George I.—The public events of her reign belong to the history of Britain; but the union of England and Scotland, in 1707, may be mentioned in its personal relation to herself, as she was the last sovereign who reigned over these as separate kingdoms, and the first sovereign styled of Great Britain.—Queen A. was of middle size, and comely, though not beautiful. She was virtuous, conscientious, and affectionate, more worthy of esteem as a woman, than of admiration as a queen. Her reign is often mentioned as a period rendered illustrious by some of the greatest names, both in literature and science, which her country has ever produced; but literature and science owed little to her active encouragement.

ANNEA'LING is the process of tempering resorted to in the manufacture of glass and the preparation of several of the metals, whereby these substances acquire a hardness combined with tenacity which renders them much stronger, and consequently more durable. In the making of glass vessels by the glass-blower, they are of course quickly reduced in temperature whilst the fused glass is being modelled into the desired shape. The atoms of the glass thus rapidly compelled to assume a position, do not seem to be properly and firmly arranged together, and the vessel is very liable to be broken, either by a slight but smart blow, or a sudden increase or decrease in temperature. This brittleness is very observable in the *lacrymæ vitreæ*, or glass tears, known as *Prince Rupert's Drops*, obtained by allowing molten glass to fall into water, when the glass forms pear-shaped drops, which are so brittle, that if they be scratched with a file or the end be broken off, the whole bursts asunder and falls down into a fine powder of glass. The same brittleness is exhibited in *Bologna jars*, or *phials* which are small and very thick in the glass; and yet, if a minute angular fragment of any hard substance be dropped into the jar, the latter flies to pieces.

In the A. of glass vessels, they are arranged in iron trays, and placed in a long oven, where they are gradually raised in temperature to near their fusing-point, by the trays being drawn along to the hottest part of the oven; and thereafter, the trays, with their contents, are very slowly drawn into a cooler and cooler part, till they become cold. The A. operation generally takes twelve hours for small articles such as wine-glasses; but days, and even a week or two, are required to anneal completely large vessels. Many articles of glass, such as tubes for steam-gauges, lamp-glasses, &c., are annealed by being immersed in cold water, which is very gradually raised to its boiling-point, and thereafter cooled.

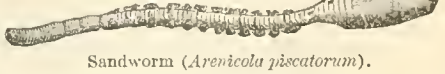
The metals are often subjected to the process of A. When medals are repeatedly struck by the die-stamper, the gold or other metal, by the concussion, becomes brittle, and requires to be now and again heated and annealed. In wire-drawing, also, the metal becomes so hard and brittle, that it requires A. to prevent its breaking into short lengths. Boiler-plates, which have been drawn out by rolling, require to be annealed before they are riveted together. The brazier, in hammering out copper and brass vessels, must stop now and again, and anneal the metal. Articles of tin, lead, and zinc can be annealed in boiling water. The tempering of steel is just a process of A. The steel is placed in an oil-bath, or surrounded by a metallic mixture which has a low fusing-point; and according to the temperature to which it is subjected, a steel with various degress of softness and strength is obtained. Parke's table of metallic mixtures capable of being used in the tempering or A. of instruments made from steel, is as follows:

	Alloy. Lead.		Tin.		Fusing-point °F.
Lancets	7	parts	4	parts	420°
Razors	8	"	4	"	442
Penknives	8½	"	4	"	450
" large	10	"	4	"	470
Scissors, shears	14	"	4	"	490
Axes, plane irons	19	"	4	"	590
Table-knives	30	"	4	"	530
Watch-springs, swords	48	"	4	"	550
Large springs, augers	100	"	4	"	558

The theory of A. is very imperfectly understood. A certain re-arrangement of the atoms of the glass or metal no doubt takes place, and an absorption of heat occurs. It is possible that as the crystalline structure is indicative of brittleness, and the fibrous texture characteristic of strength, that the passage of glass or metal from a brittle to a non-brittle material may be due to the development of a fibrous structure, where a crystalline one was originally present.

ANNECY, a town of the dep. of Haute Savoie, France, at the north-western extremity of the Lake of Annecy, and 21 miles south from Geneva. The Lake of Annecy is 1426 feet above the sea, and is surrounded by magnificent mountain scenery. It is about 9 miles long and 2 miles broad. Its waters flow by the Fieran to the Rhone. In the 12th c., A. was called *Anneciacum novum* to distinguish it from Old A., *Anneciacum vetus*, which occupied the slopes of a neighboring hill, and was a place of some consequence in the times of the Romans. In the earlier part of the middle ages, A. belonged to the Counts of Geneva, and on the extinction of that House, it passed to the House of Savoy, in whose possession it remained, except for a brief period under the French Empire, until the transference of Savoy to France in 1860. It has manufactures of linens, cotton-yarn, glass, sulphuric acid, and steel-wares. Its linen bleachfields have subsisted since 1650. The town is clean, and has an air of respectable antiquity. The shops in many of the streets are under arcades. The most remarkable buildings are the château, once the residence of the family of Genevois-Nemours, the old bishop's palace, the cathedral, and the modern church of St. Francis, the latter of which boasts of possessing the relics of St. Francis of Sales and La Mère Chantal. Pop. (1876) 10,630.

ANNE'LIDA (Lat. *annulus*, a ring), a class of Worms (q. v.; and for new classification of the orders see under *Vermes* in ZOOLOGY). They have a more or less elongated body, which is always composed of numerous rings. The first of these rings assumes, in most of them, the characters of a head, but in some there is no proper head. They have no articulated limbs, but most of them are provided with bristles and hairs, often in numerous bundles, which are of use to them in locomotion; some, which want these, are furnished with suckers at the extremities, and employ them for this purpose; some remain fixed in one place. Their bodies are always soft, and without external or internal skeleton; but some of them form for themselves a calcareous covering by exudation, others form coverings partly by exudation



Sandworm (*Arenicola piscatorum*).

and partly by agglutination. Their blood is generally red, but not from red corpuscles, as in the vertebrate animals; sometimes it is greenish or yellowish. Their nervous system is simple. Many of them have eyes, and many have tentacula. Most of them live in water, and of these the greater part inhabit the sea. Those who live in water breathe by gills, which are variously formed and placed; some which are terrestrial, as earthworms, have, instead of gills, numerous small respiratory sacs. They are all hermaphrodite; most of them, however, requiring mutual fecundation, and most of them are oviparous. They feed in general upon other animals, and some of them live by sucking blood. They are now divided into four orders: 1. *Dorsibranchiata*, having gill-tufts disposed regularly along the body, and composed of animals of comparatively active habits; 2. *Tubicolæ*, having gill-tufts near the head, and provided

with shelly or other coverings; 3. *Terricolæ*, destitute of all external appendages except minute bristles, and breathing by respiratory sacs; 4. *Suctoria*, destitute even of bristles, and provided with suckers.

ANNOBON, or ANNABON, an island in the Gulf of Guinea, about 1½ degrees south of the equator, and belonging to Spain. Its basaltic, trachytic, and volcanic mountains render A. picturesque. It has an area of 6 square miles, and a pop. of about 3000.

ANNONAY (anc. *Annonœum* or *Annoniacum*), a town of the dep. of Ardèche, France, at the junction of the Deaume with the Cance, which unite in the center of the town, 37 miles south from Lyon. It is an active and prosperous manufacturing town, the chief manufacture being that of paper, of which 300,000 reams are produced annually. There are also manufactures of glove-leather, mostly from kid skins, and of silk and cotton twist, and woollen cloth. The paper-mills of A. were established by the father of the celebrated aëronauts, Montgolfier (q. v.), who were born here, and to whom there is a monument in the Grande Place. The situation of the town is picturesque and remarkable; the houses are placed among rocks, and some of the streets are very steep. A large quantity of silk is produced in the neighborhood. Pop. (1876) 13,738.

A'NNUAL, in Botany, a term employed to denote that the duration of the life of a plant is limited to a single year; within which the germination of the seed, all the functions of vegetation, the ripening of new seed, and the death of the plant, are included. The whole duration of life in the plants thus designated is indeed generally much less than a year, and in temperate and cold climates, falls within the brief period of the summer months. They, as well as the plants generally called biennial, produce flowers and fruit only once. Some species are generally A., and others generally biennial; but whether an individual plant is A. or biennial, often depends upon the accidental circumstance of the season at which the seed germinates, and may therefore be artificially determined by the time of sowing. Peculiar circumstances also sometimes convert A. into biennial, or even perennial plants; and those which are mere annuals in one climate, are perennial, or even shrubby, in another, of which the Castor-oil plant affords a notable example. Most kinds of corn are the produce of A. grasses; some of which, however, as wheat, in certain circumstances, prove of longer duration. The *annuals* cultivated in our flower-gardens are very numerous; and many species, both native and foreign, are among our most beautiful flowers.

A'NNUALS, the name given to a class of pleasant and graceful publications, which for some years enjoyed an extraordinary amount of public favor, intended for Christmas, New-year, and Birthday presents, in imitation of the Gift-books so popular among the Germans. They were illustrated by exquisitely engraved prints, from paintings by artists of the highest talent, and contained prose and poetry by most of the best writers of the day. The first of them, the *Forget-me-not*, edited by Frederick Shoberl, was begun in London in 1822. The idea, and even the title were adopted from Germany by the Messrs. Ackermann, the London publishers. The following year, two others made their appearance—*Friendship's Offering*, published by Smith and Elder, which had for successive editors, Mr. T. K. Hervey, Mr. Pote, Mr. Thomas Pringle, Mr. W. H. Ainsworth, and Mr. Leitch Ritchie; and the *Graces*, containing a series of elegant poems on the Months by the Rev. Dr. Croly. All three, in addition to their literary and pictorial contents, had at first the blank paper for memoranda, cash accounts, &c., which were customary in the Gift Pocket-books of previous times. The *Literary Souvenir*, commenced in 1824 by Mr. Alaric A. Watts, was the first to discard these, and to exhibit a vast improvement on this class of embellished works. Thenceforth, the several publishers vied with each other in their efforts to render their respective A., every succeeding year, more and more attractive. The *Literary Souvenir* was followed by the *Amulet*, started by Mr. S. C. Hall, and edited by his wife; the *Winter's Wreath*, a provincial annual, and the *Keepsake*, the latter commenced in 1827 by Mr. Charles Heath, an eminent engraver. Up to this time, the price of all the A. was 12*s.* each: the *Keepsake*, however, was published at a guinea. Its first editor was Mr. W. H. Ainsworth. The following year, the editorship was offered to Sir Walter Scott, with a salary of £800, and payment besides for his contributions to its pages, but was declined by him. It was then placed under the charge of Mr. F. M. Reynolds, who continued to superintend it for many years.

The *Keepsake* always maintained a high aristocratic character, the contributors preferred being those who could boast a title. In 1840, it came out under the editorship of Lady Emmeline Stuart Wortley. It was afterwards edited by the Countess of Blessington. So popular did A. become, that in 1829 no fewer than seventeen were published. In 1840, the number had dwindled to nine. The *Book of Beauty*, long one the best of the series, was begun in 1833 by Mr. Charles Heath. The first volume was written by Miss Landon (L. E. L.), the engravings being principally after drawings by Frank Stone. The volume for 1834 was placed under the editorship of the Countess of Blessington, who conducted it to the close of her life. Mr. Heath had also the *Picturesque Annual* and the *Children of the Nobility*—the latter commenced in 1838. The *Juvenile Album*, an annual for children, was published by the Messrs. Ackermann. Scientific A. also made their appearance, and the musical world had its *Musical Bijou*. Thomas Hood started the *Comic Annual*; and among other popular publications of the class were Fisher's *Drawing-room Scrap-book*, edited at first by Miss Landon, afterwards by Mrs. Howitt, and latterly by the Honorable Mrs. Norton; and Fisher's *Juvenile Scrap-book*, edited by Mrs. Ellis; the *Oriental Annual*, the *Historical Annual*, and the *Gift* and *Token*, American productions. At first, the A. were all bound up in tinted paper, and enclosed in a case; but competition produced a great improvement in their external appearance, as well as in their inside attractions. Paper gave place to silk; then followed morocco bindings, and afterwards velvet. The sums of money expended on the several departments were enormous. Mr. Heath's outlay for the literary portion alone of the second volume of the *Keepsake* amounted to no less than £1600. Of this sum, Sir Walter Scott received £500 for the liberty of printing in it his juvenile drama of the *House of Aspen*, *Aunt Margaret's Mirror*, and two other little tales. To many engravers, the illustrations formed almost their sole employment. Sums varying from 20 to 150 guineas were paid to artists for the loan of pictures for engravings, of the size of 4 inches by 3; and engravers frequently received 150 guineas for the production of one plate. For several years, nearly £100,000 per annum was expended on the production of the A., and 150,000 copies of them were yearly sold. The sale of the *Forget-me-not* alone was at one time 20,000 copies. In their most flourishing period, a calculation of their expenses and profits was made, which may be here quoted. For 150,000 volumes, including the guinea-books, of which there were always two or three, the public paid about £90,000, thus distributed: Authors and editors, £6000; painters, £3000; engravers, £12,000; copperplate printers, £4000; printers, £3500; paper-makers, £5500; binders, £9000; silk manufacturers and leather-sellers, £4000; advertising, &c., £2600; incidental expenses, £1000; publishers' profits, £10,000; retail booksellers' profits, £30,000—Total, £90,000.

After 1840, the demand for the A. began to decline. At the best there had been a sickly sentimentalism in the bulk of their articles; and at all events, this class of works had been mainly addressed to the refined and affluent. Better tastes in literature now began to prevail, and there was a feeling that A. had had their day. Deserted by public favor, the character both of their engravings and their literary contents became greatly deteriorated, and they ceased to have any attraction, either as literary productions or works of art. Publishers no longer found them safe speculations, and gradually discontinued them. They dropped out, one by one, like spent stars from the literary firmament. The *Literary Souvenir* had been discontinued in 1834, after the publication of ten volumes. The *Forget-me-not*, the first in the field, saw its 22d year. The *Book of Beauty* and the *Keepsake* (of 1856) were the last of their race. Innumerable *Christmas Annuals* are now published; but these are cheap collections of tales and poems, illustrated with wood-cuts. They are accordingly quite unlike the old annuals, and are similar to the extra Christmas numbers issued by many of the monthly magazines.

ANNUAL REGISTER. The first volume of the useful work which bears this name appeared in 1759. Various publications of a similar character had previously existed, such as Boyer's *Political State of Europe*, which was published in monthly numbers and yearly volumes from 1711 to 1739; and the *Historical Register*, a quarterly publication, begun in 1716, and concluded in 1738. The *A. R.* differed from these in being published once a year, in containing a more full and able historical narrative, and in the addition of a literary and miscellaneous department, including notices of new books. The undertaking was projected by Robert Dodsley the bookseller, assisted by Edmund Burke, who for some years wrote the historical narrative, and assisted to some extent in the preparation of the *Register* during most of the subsequent part of his life. Indexes to the work have been published at various periods, and the work still goes on under the publishing care of Messrs. Rivington. A rival work, entitled *The New A. R.*, was started in 1781 by Dr. Kippis. It was edited after his death by Dr. Morgan, and came to a close in 1825. The *Edinburgh A. R.* was commenced in 1808 and terminated in 1827. The historical narrative was for some years written by Sir Walter Scott, and afterwards, for a considerable time, by Southey. A similar work was commenced at Paris in 1818 under the title of *Annuaire Historique*, and continued till 1849. The earlier volumes were compiled with much care, but latterly the work fell off. Its place was supplied by the *Annuaire des Deux Mondes*, a publication connected with the well-known review of that name. The *American A. R.* is published at New York.

ANNU'ITY, from the Latin *annus*, a year, is a sum of money paid annually. The term, in its full meaning, expresses an obligation on one party to pay, and a right in another to receive the amount. The different kinds of annuities that may exist are as various as the conditions and fancies of those concerned in them; and it is impossible to define them all. An A. may be for the life of any person, however long that may be, becoming extinguished only by his death. It may be perpetual, so that as each enjoyer of it dies, his heirs may succeed to it. It may be on the life of the survivor of any number of persons—for instance, a father may leave to his five daughters an A. of £500 a year from his estate, to be enjoyed by the latest survivor, so that while the five are alive, they have £100 each; after the first death among them, the lapsed share is distributed among the survivors, giving them £125 each; and so on, the last survivor enjoying the whole £500. On the other hand, each might have a separate A. terminating at her death; and again, instead of either of these simple arrangements, there might be, and often is, a more complex adjustment, giving the survivors on each death a certain proportion only of the deceased's A. An A. may begin immediately, and stop on a contingency, such as the death of a person to whom the annuitant is heir. It may be 'deferred,' so as to begin to be payable only after the lapse of so many years; and then it may either be payable absolutely in perpetuity, or for a given number of years, or it may be payable to an annuitant only for the remaining years of his life, if he survive the contingency.

It will thus be seen that there is infinite variety in the nature of annuities, and consequently, in the calculations regarding them. The fixed elements of such calculations, independently of this variety, are in themselves double, being vital statistics, and the profit or interest of money. As to the former, they can only apply, of course, to the adjustment of annuities on a large scale. If a person should sell a single A.—that is to say, engage for a sum down to pay a certain person an A. for life—no study of vital statistics could make his bargain other than a chance; and though he went on the most approved tables, it might occur either that the annuitant dies immediately, leaving the whole purchase-money as his profit, or that the annuitant lives to extreme old age, and renders him a great loser by the bargain. But on a large, and especially on a national scale, the rate of mortality and the value of life may be so nicely rendered in statistics, that a market may be opened for the purchase and sale of annuities at their exact value—that is to say, at such a rate that the sum paid in from time to time by persons purchasing annuities, shall just serve to pay each annuitant's annual claim. Such vital statistics, however, can only be obtained through a very accurate and long continued Registration of Births, Deaths, and Marriages (q. v.); and it is known that the government having adjusted the price of annuities by the celebrated Northampton Tables, contracted a losing bargain with their annuitants as a body, and, without being conscious of it until afterwards, sacrificed a considerable amount of public money.

The second element, besides vital statistics, in the calculation of annuities, is the profit or interest of money. If this did not require to be considered, an A. of £1 a year for ten years would just cost £10. But while paying the A., the person who has engaged for it is drawing the interest of the money. If he sold an A. of £1 a year for ten years for £10, he would be drawing the interest of £10 for the first year, £9 for the second, and so on; and the annuitant's bargain would be to a like extent disadvantageous. As the interest of money may be various, so may this element of the calculation of an A.; and to calculate it with reference to future indefinite variations, is of course impossible. It will be seen at once that when the variety of kinds of A. have to be adjusted to different rates of profit, an immense field is opened for calculation. It is, in fact, a province of algebraic science in which several men have achieved reputations.

The interest, as it is termed, of the national debt is virtually a multitude of perpetual annuities. In a country where there is so much superabundant wealth, there is so vast an amount of capital for which people only want interest, that although the lenders of the money are not repaid by the government, yet when any one has invested in the funds, if he wants his money back, he is sure to find a person to take his place at something near to the price paid by him. This would not be the case were the quantity of these annuities in the market disproportioned to the number desiring to invest in them, and hence it is that when there is depression of trade, and money wanted to meet obligations, the funds fall. The government have the largest field of operation, and therefore it is natural to infer that their annuities are more closely adjusted to their actual value than those of insurance companies and other parties dealing in annuities can be. It may be mentioned, however, that, for the encouragement of the working classes to save and provide for old age and contingencies, government, through the savings' banks, grants small annuities on terms advantageous to the purchasers—that is, at less than their market value (see SAVINGS' BANKS.

Many complicated sets of tables have been prepared to facilitate the calculation of annuities. The latest known to us are the *Commutation Tables for Joint Annuities and Survivorship Assurances, based on the Carlisle Mortality at 3, 3½, 4, 5, and 6 per cent.*, by David Chisholm, 2 vols., royal 8vo, 1858. The calculations are brought out in decimals. Taking the simplest of these tables—namely, those containing the value of an A. of £1, payable at the end of the first year, and thereafter annually during life—we find the following results, commuting the decimals into fractional money through Mr. Chisholm's decimal tables:

VALUE OF ANNUITY OF £1.

Age.	£	s.	d.	Age.	£	s.	d.
5	16	11	9½	45	12	12	11½
10	16	13	4½	50	11	14	2½
15	16	4	6½	55	10	7	11½
20	15	16	4½	60	8	18	9½
25	15	6	1	65	7	17	3¾
30	14	14	5	70	6	6	8½
35	14	2	6½	75	4	19	9½
40	13	7	9½	80	4	2	10¾

In political economy, annuities come within the class of payments which tend rather to consumption than to accumulation or reproduction. As the means of attaining a legitimate object, the establishment of an A. may be an advantage to the community in benefiting some individual member of it. For instance, a man is naturally extravagant—he would spend his heritage immediately, and come to want, if it were paid to him in capital. It is therefore vested in an A.; the man is kept in comfort, and society is not burdened with a needy member. Women are apt to mismanage by false investments or otherwise any capital sums left at their disposal, and therefore it is often advantageous to give them an equivalent in an A. In serving, however, these its legitimate objects, it will be seen that the money so spent is not in its character reproductive. People do save capital out of annuities, but, as a general rule, the object and effect of annuities are in the direction of consumption, as contrasted with accumulation. This is often overlooked in settlements, especially by men who have themselves been accumulators. The consumptive effect of an A. will depend much on its coming out of fixed or fluctuating property. Take, as an instance of the former, a landed estate. If the clear rent be paid on annuities, the estate will not be improved, and it will be stagnant in the proportion so paid. If, out of a thousand a year, nine hundred be thus paid, the owner out of his remainder of a hundred, is not likely to accumulate sufficient capital to improve the estate and double its value. But fluctuating property may not only be rendered stagnant, but may be destroyed by the burden of injudicious annuities. This is frequently exemplified in disposing of the profits of a business. Different members of a family are portioned off upon it, as if it were a fixed permanent estate; and consequently, there is not a sufficient balance left to induce any one to give his time and energies to the management of the business.

ANNU'ITY, in the law of England, is the right to the yearly payment of a certain sum of money, which is charged upon the person or personal estate of the individual bound to pay it. If it is charged upon real estate, the burden is called a rent, or rent-charge, and not an A. An A. may be created for a term of years, or for the life or lives of any persons named, or in perpetuity; and in the last case the A. is reckoned among incorporeal hereditaments; because, although the security is personal only, yet the A. may descend in the same manner as real estate. In 1854, the old statutes relating to annuities were repealed by 17 and 18 Vict. c. 90, and enrolment in Chancery of annuity deeds is no longer necessary to give them validity. But by another statute of 18 and 19 Vict. c. 15, s. 12, any A. or rent-charge granted after 1855, otherwise than by marriage settlement for one or more life or lives, or for any term of years or greater estate, determinable on one or more life or lives, shall not effect any lands, tenements, or hereditaments as to purchasers, mortgagees, or creditors, unless and until a memorandum or minute of the name, place of abode, title, trade, or profession of the person whose estate is intended to be effected thereby, and the date of the deed, bond, instrument, or assurance whereby the A. or rent-charge is granted, and the annual sum or sums to be paid, shall be left with the senior Master of the Common Pleas at Westminster, who enters the particulars in a book of alphabetical names. A fee of 2*s.* 6*d.* is paid to the officer; and any person may search the register for a fee of 1*s.* And when the A. is satisfied, and ceases to affect the lands, a memorandum is in like manner entered in this register (23 and 24 Vict. c. 115, s. 2). But this act does not require the registry of annuities or rent-charges given by will.

Many persons who have a small capital, and are desirous of obtaining the largest life income, may buy an A. from an insurance office, and government grants these in connection with the post-office.

An important feature of the law relating to annuities is, that they are considered as accruing from day to day, so that, whatever be the term or terms of payment, whether yearly, half yearly, quarterly, or monthly, whenever the annuitant dies, the payment of the A. is counted up to the day of the death, and the same remedy exists for recovering payment of the intervening days between the terms, as if the termly payment had then arrived.

A large number of annuities are created and kept alive by statutes relating to the public stocks, which are nothing else but annuities, not payable out of real estate, but granted to the holder and his heirs, and transferable by a short and easy method. The stocks in the funds are merely rights to receive certain annuities by dividends as they become due, subject to the right of the government to redeem such annuities on payment of a stipulated sum.

In Scotch law, an A., as such, may be charged on real estate as well as on personalty. In that system, it has been simply defined to be a right to a yearly payment in money; and it may be created either by the payment of the sum of money in the form of a purchase, or it may be secured over land, in which case the creditor, in the event of default of his A., may attach the land charged, claiming in his action for recovery a capital sum out of the land, sufficient to produce an annual interest equal to the A., which annual interest is paid until the expiration of the A., when the capital sum is restored to the debtor. The instrument by which, in Scotland, the A. is constituted in either of the above forms, is called a Bond of A.; and before the repeal of the usury laws (by a recent statute, 17 and 18 Vict. c. 90), this form of deed was frequently resorted to as a means of securing loans where a high rate of interest was charged; and the same practice prevailed in England. But the last-mentioned act renders all such expedients now unnecessary.

ANNU'ITY-TAX, a local impost for the payment of the salaries of the Established clergy of the city of Edinburgh. It was first established on a limited scale by an act of the year 1661; and was extended in its sphere of operation by an act of the legislature as lately as 1809. It amounted at one time to 6 per cent. on the rents of houses and shops within the royalty. It was a peculiarity of this tax that the members of 'the College of Justice,' including the lawyer class generally, enjoyed an exemption from it, as a relic of an ancient privilege by which they were induced to reside and hold the courts of law in Edinburgh. The tax was reduced in 1860; and under an act passed in 1870, it was redeemed by payment of £56,500 by the Corporation to the Edinburgh Ecclesiastical Commissioners.

A'NNULET (Lat. *annulus*, correctly *anulus*, a ring), a term in Architecture for a small fillet or band which frequently surrounds a column, &c. The A. is several times repeated in the moulding which surmounts the shaft of a Doric pillar.—A., a ring, a charge in Heraldry.

ANNULOIDA, ANNULOSA. See Worms.

ANNUNCIA'DA. 1. The religious Order of the Heavenly Annunciation, or of the Nuns of the Annunciation of Mary, was instituted by Victoria Fornare at Genoa in 1682, after the rule of St. Augustine. All the convents of the order in France, Germany, and the Netherlands have disappeared since the French Revolution. Some still exist in Italy. 2. Another Order of the Annunciation, or of Nuns of Mary's Announcement or the Ten Virtues, was endowed by John of Valois at Bourges in 1501, after its separation from Louis XII. In 1514, it was placed under the authority of the Franciscans. This order, which extended to fifty convents for the reception of poor gentlewomen, was broken up at the Revolution. 3. The Order of Knights of the Annunciation in Savoy (*Ordine Suprema dell' Annunciata*), known originally as the Order of the Neck-chain or Collar, was instituted in 1360 by Amadeus VI., Duke of Savoy. It received statutes from Amadeus VIII. in 1409; was renewed in 1518 under the name of the Holy Annunciation; and in 1720 was raised by Victor Amadeus to be the first order of the kingdom of Savoy. The king is always grandmaster. The knights who, since 1720, are not limited in number, must be of high rank, and already admitted to the orders of St. Mauritius and St. Lazarus. They compose only one class. The decoration is a gold medal, on which is represented the Annunciation, surrounded by love-knots. It is usually worn suspended by a simple gold chain; but the proper collar or chain of the order is composed alternately of love-knots and roses. On the roses are engraved the letters F. E. R. T., which some interpret *Fortitudo ejus Rhodum tenuit*, in allusion to the defence of Rhodes by Amadeus I., and which others hold to signify, *Frappes, entres, rompes tous*. Since 1680, the knights wear on the left breast a star embroidered in gold. The four supreme officers of the order—the chancellor (always a bishop or archbishop), the secretary (usually the Minister of Foreign Affairs), the almoner (usually the king's first almoner), and the treasurer—wear the decoration round the neck, suspended by a sky-blue ribbon, accompanied by a star on the left breast. For details of costumes, &c., see Burke's *Book of Orders of Knighthood*, p. 250, *et. seq.*

Star of the Order of the Annunciation.

Decoration of the Order of the Annunciation.

A'NNUS DELIBERA'NDI, in Scotch law, was meant to signify the period of a year allowed to an heir to deliberate whether he would accept the inheritance with the burden of his predecessor's debts. The year commenced on the death of the ancestor, unless in the case of a posthumous heir, when the year ran from the birth of the heir himself. But by a recent act of parliament—the 21 and 22 Vict. c. 76, sec. 27—it is provided that all proceedings 'against an apparent heir on account of his ancestor's debt or obligation, for the purpose of attaching the ancestor's heritable estate, and actions of adjudication against such heir on account of his own debt or obligation, for the purpose of attaching such estate, may be insisted on at any time after the lapse of *six months* from the date of his becoming apparent heir (23 and 24 Vict. c. 143, s. 16; 31 and 32 Vict. c. 101, s. 61).

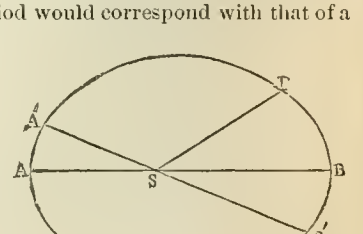
ANOBIUM. See Borer and Death-watch.

A'NODE [Gr. *ana*, upward, and (*h*)*odos*, a way], a term introduced into the science of electro-chemical decomposition (electrolysis) by Dr. Faraday to designate the positive pole, or that surface by which the galvanic current enters the body undergoing decomposition (electrolyte). The negative pole, or that surface by which the current leaves the electrolyte, is called in the same nomenclature the *cathode* [*kata*, downward, and (*h*)*odos*.] *Electrode* is the general term applied to either of these. The elements of electrolytes are called *ions* (*ion*, going). Such as go to the A. receive the name of *anions*, and those passing to the cathode, *cations*. Thus, in the decomposition of water by the passage into it of a galvanic current through two platinum plates, the water is the electrolyte; the platinum plate connected with the copper end of the battery is the A.; and the one connected with the zinc end, the cathode. The oxygen and hydrogen which are disengaged are the *ions;* the oxygen separating at the A. is the anion; and the hydrogen at the cathode, the cation. Anions and cations are more generally known under the name of electro-negative and electro-positive substances; but as these terms are considered by Dr. Faraday to imply certain supposed attractions for the positive or negative pole, the other terms have been employed by him to describe simply the part the substances play in electrical decomposition.

A'NODYNE (Gr. *a*, privative, and *odyne*, pain), a medicine given to assuage pain. Properly, the term is applied to medicines, such as opium, which act on the nervous system, so as to decrease sensibility and induce sleep.

ANOINTING. See Chrism, Coronation, Extreme Unction.

ANOMALI'STIC YEAR is the interval that elapses between two successive passages of the earth through its perihelion, or point of nearest approach to the sun. If the earth's orbit had a fixed position in space, this period would correspond with that of a sidereal revolution, or the time the earth takes after leaving any point of the heavens to return to it again; but the disturbing influence of the other planets causes the perihelion to advance slowly (11″·8 annually) in the direction of the earth's motion; so that the A. Y. is longer (4 minutes 39 seconds) than the sidereal. This will be better understood from the accompanying diagram, in which A′BB′ represents the elliptical orbit of the earth; S, the sun; A, the perihelion; and AB, the longer axis. When the earth, after leaving A, comes back to it again, after having completed a sidereal revolution, it finds the longer axis AB, and with it the whole ellipse, advanced to A′B′, and it has still to describe the arc of 11″·8 before it reaches its second perihelion A′. The length of the A. Y. is 365 days, 6 hours, 13 minutes, 49 seconds. It receives its name from the anomaly (q. v.).



Elliptical Orbit.

ANO'MALY (Gr. *anomalia*, irregularity), the angle measured at the sun between a planet in any point of its orbit and the last

perihelion. In the figure in the preceding article, if P be a planet, A′BB′ its orbit, S the sun, and A the perihelion, the angle ASP is the anomaly. It is so called because it was in it that the first irregularities of planetary motion was discovered. The anomaly was formerly measured from the aphelion, the opposite point of the ellipse; but from the fact that the aphelia of most of the comets lie beyond the range of observation, the perihelion is now taken as the point of departure for all planetary bodies.

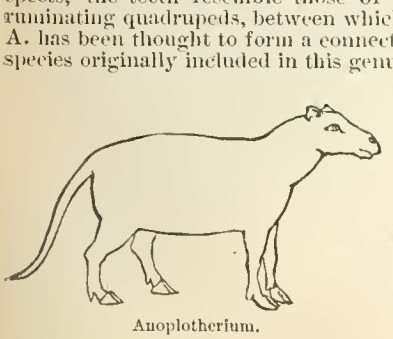
ANONA. See CUSTARD-APPLE.

ANONA′CEÆ, a natural order of Dicotyledonous or Exogenous plants, of which the type is the genus *Anona*. They are trees or shrubs, with alternate simple, generally entire leaves, destitute of stipules; flowers usually green or brown, axillary, solitary, or two or three together; the calyx of 3—4 persistent sepals; the corolla of 6 hypogynous leathery petals, in two rows. The stamens are generally numerous; the filaments short; the anthers adherent, turned outwards, and with a large 4-cornered *connective*. See STAMEN. The carpels are usually numerous, separate or cohering; the styles short; the stigmas simple; the ovules inverted. The fruit consists of distinct or united carpels, sometimes succulent; the seeds attached to the suture; their external covering brittle; the embryo minute, in the base of the hard albumen. —There are about 300 known species, mostly natives of tropical countries. They are generally aromatic and fragrant in all their parts, and some species are employed medicinally; the dry fruit of *Xylopia aromatica* is commonly used as pepper by the African negroes, and was formerly imported into Europe as ETHIOPIAN PEPPER or GUINEA PEPPER. The flowers of some species are of exquisite fragrance; others yield delicious fruits. See CUSTARD-APPLE and CHERIMOYER.

ANO′NYMOUS (Gr. nameless), a term applied to a book the author of which does not give his name; when an assumed name is given, the term PSEUDONYMOUS is used. Works of this class constitute one of the great difficulties of bibliography. French literature possesses an excellent *Dictionnaire des Ouvrages Anonymes et Pseudonymes* (2d ed., 4 vols. Par. 1822—1825) by Barbier, embracing the titles of about 24,000 works, with the names of those who are known or are assumed to be the authors. Mr Halkett, Keeper of the Advocates' Library, Edinburgh, commenced a similar work for English literature, which on his death in 1871, was continued by Mr. Laing, of the New College Library, Edinburgh.

In Great Britain, political articles are always A., as is also most of the periodical criticism; but on the other side of the Channel, this practice is far from common. It is generally admitted that anonymity secures the independence of the critic, and enables him to write with greater freedom, vigor, and power; but it is true that he often abuses his advantage, and gratifies, under the veil of the A., the worst passions of his nature. Perhaps the most intolerable abuse of anonymity is the anonymous letter. The miseries, anxieties, and terrors which this cowardly method of assailing people has occasioned, must excite against it the indignation and abhorrence of all honorable-minded men.

ANOPLOTHE′RIUM (from the Greek *a*, privative; *(h)oplon*, armor; and *therion*, a beast), a genus of extinct Pachydermatous quadrupeds (see PACHYDERMATA), established by Cuvier from bones occurring in great abundance in the gypsum strata of the Upper Eocene (q. v.) formation, near Paris. They are found also in the same formation in the Isle of Wight and elsewhere. The teeth differ from those of all other Pachydermata, extinct or recent. There are six incisors, two canines, eight præmolars, and six molars in each jaw—the dental formula thus agreeing with that of the fossil genus *Palæotherium* (q. v.); but the teeth are arranged in a continuous series without intervening vacancies—a circumstance very remarkable, as it does not occur in any existing quadruped, but now appears in man alone. The molars of the upper jaw are quadrangular, those of the lower marked with a double or triple crescent of enamel, which forms prominent ridges. In some respects, the teeth resemble those of the *Ruminantia* (q. v.), or ruminating quadrupeds, between which and the Pachydermata the A. has been thought to form a connecting link; but in some of the species originally included in this genus, and which are now sometimes ranked along with it under the name *Anoplotheroids*, the teeth exhibit peculiarities which have led to the supposition that their food may not have been exclusively vegetable. The snout is not much elongated, and it is evident that there was no proboscis. The feet are terminated by two toes, as in the Ruminantia; but they have always separate metacarpal and metatarsal bones, not a single *canon* bone. A considerable number of species of A. and of Anoplotheroids have been determined, differing in size from that of a small ass to that of a hare, or even of a guinea-pig; so that the smallest species must have been smaller than any hoofed quadruped now existing, or any known to have ever existed. They differ also considerably in general appearance, some having had comparatively long limbs and a light and graceful form, whilst some were firmly built and heavy. Their habits may be supposed to have differed accordingly. The true Anoplotheria were probably very similar in habits to tapirs. The powerful flattened tails of some are supposed to indicate an adaptation for aquatic life; others have smaller supplemental toes, besides the two hoofs. They form the genera *Dichodon*, *Dichobuné*, *Xiphodon*, and *Microtherium*.



Anoplotherium.

ANOPLU′RA, the name given by Leach to an order of insects called *Parasita* (q. v.) by Latreille, Cuvier, &c.—a part of the *Aptera* of Linnæus—of which the type is the genus *Pediculus* or Louse (q. v.).

ANOPSHEHR, a town on the Ganges, in the Meerut division of the N.W. Provinces, 65 miles from Delhi. Pop. (1872) 9366.

ANQUETIL-DUPERRON, ABRAHAM HYACINTHE, an oriental scholar, was born at Paris, December 7, 1731. He commenced the study of theology in his native city, and afterwards prosecuted it at Auxerre and Amersfort. But his love of oriental languages drew him back to Paris, where he was assisted by the Abbé Sallier, Overseer of the Manuscripts in the Royal Library. As he now possessed a tolerable knowledge of Hebrew, Arabic, and Persian, he enlisted as a private soldier for India in 1754, to gratify his passion for learning; but Malesherbes and the Abbé Barthélemy rescued him from this degradation, and enabled him, through the royal munificence, to proceed independently. After his arrival in India, he traversed a great part of the peninsula, but finally fixed his residence at Surat, where there was a colony of Parsees, or fire-worshipers, with whose priests he soon became so intimate, that they not only instructed him in the doctrines of Zoroaster, but also gave him some of their sage's books, written in Zend, in Pehlvi, and in Sanscrit. In 1762, he returned to Europe, having collected one hundred manuscripts, along with other curiosities. The Abbé Barthélemy now obtained for him a situation in the Bibliothèque Royale, and in 1763 he was elected a member of the Académie des Belles-Lettres. In 1771, he published his *Zend-avesta*, in 3 vols., which contained the results of his researches. It consists of a literal translation of the *Vendidad*, as well as other sacred books of the Parsees, preceded by a narrative of his travels. This work created a great sensation when it first appeared. Until then, our only knowledge of the doctrines of the ancient Persians had been obtained from Greek and Roman sources, hostile Mohammedans, and eastern nations of a later origin. But A. now presented to the investigation of Europeans the original records of these doctrines, or, at least, records of incontestable authority. Unfortunately, his zeal far surpassed his patience and sagacity. He had not a sufficient mastery over the languages from which he translated. His translations are, consequently, anything but accurate. Since A. wrote, great advances have been made in oriental scholarship, and his labors are now in a great measure superseded. Among his other works we may mention his *Legislation Orientale*, 1778; *Recherches Historiques et Géographiques sur l'Inde*, 1786; *La Dignité du Commerce et de l'état du Commercant*, 1789; *L'Inde en Rapport avec l'Europe*, 1790; *Oupnek'hat* (a selection from the theological portion of the Vedas), 1804. He died at Paris 17th January 1805.

ANSE, a name sometimes given to the handles of a cannon. These handles, especially in some foreign cannon, are cast in the forms of dolphins or serpents.

ANSELM of Canterbury, a scholastic philosopher, was born at Aosta, in Piedmont, in 1033. He led at first a dissipated life; and, like Abelard, wandered through France, after the fashion of the scholars of those days, disputing wherever he could find an adversary. Attracted by the reputation of Lanfranc, he went, in 1060, to study at the monastery of Bec, in Normandy. Three years after, he became prior, and in 1078, abbot of this monastery, the most famous school of the 11th c. Lanfranc, who in the meantime had gone to England, and become Archbishop of Canterbury, died in 1089; and the diocese remained four years without a successor, till, in 1093, A. was appointed. He was distinguished both as a churchman and a philosopher. His numerous embroilments with William Rufus and Henry I., and the unbending spirit which he displayed in these, even when subjected to banishment, indicate the vigor and resoluteness of his character, as much as his writings exhibit the depth and acuteness of his intellect. In 1720, Clement XI. expressly placed him in the list of church authorities. A. was a second Augustine, superior to all his contemporaries in sagacity and dialectical skill, and equal to the most eminent in virtue and piety. Embracing, without question, the doctrines of the church, mostly as stated by Augustine, and holding that belief must precede knowledge, and must be implicit and undoubting; he yet felt the necessity of a religious philosophy,

urged the duty of proceeding from belief to knowledge, and sought to reduce the truths of religion into the form of a connected series of reasonings. It was for this purpose he wrote his *Monologium sive Exemplum Meditandi de Ratione Fidei*. In his *Proslogium*, otherwise entitled *Fides quærens Intellectum* (Faith Seeking Intellect), he strove to demonstrate the existence of God from the conception of a perfect being. This ontological proof, however, has never been held satisfactory. His writings, *Cur Deus Homo*, and *De Concordiâ Præscientiæ et Prædestinationis*, made an epoch in Christian philosophy. A. may justly be reckoned the earliest of the schoolmen, although Alexander of Hales (q. v.) was the first who completely systematized in the scholastic manner the doctrines of the Catholic Church. He died 21st April, 1109, and was buried at Canterbury. The day of his death is observed in the Roman Catholic Church. See Rémusat's *Anselme* (1858) and Church's *A.* (1870).

ANSER. See ANAS and GOOSE.

A'NSGAR, or ANSCHA'RIUS, styled the Apostle of the North, on account of his labors to introduce Christianity into Denmark, Sweden, and Northern Germany, was born in Picardy about the year 801 A.D. Under the patronage of Louis le Débonnaire, he went, with his colleague Audibert, to preach the doctrines of Christianity among the heathen Northmen of Schleswig, where he suffered many persecutions; but had nevertheless such success that, in 832, the pope established an archbishopric in Hamburg, and A. was appointed the first archbishop. Here he passed through many difficulties, having to save his life by flight in 845, when the Northmen and Danes under Eric I. plundered Hamburg. He afterwards made several missionary tours in Denmark and Sweden, and died February 3, 864, at Bremen, where a church was named after him. The Roman Catholic Church has canonized him.

ANSON, GEORGE, LORD, ADMIRAL, born on 23d April 1697, at Shugborough, in Staffordshire. From an early period he manifested a predilection for a sea-life. In 1716 he served as second lieutenant under Norris; next under Byng in 1718, against the Spaniards; and was made a captain in 1723. In 1739, when war with Spain broke out, he was recalled from the Carolina station, on which he had been placed since 1724, and received the command of the fleet in the South Sea, with instructions to inflict whatever injury he could on the Spanish commerce and colonies, and sailed from England in September 1740. The preparations for this cruise had been made in the most slovenly manner. Both vessels and stores were bad, and the sailors were old Chelsea pensioners; yet A., in spite of these disadvantages, achieved a brilliant reputation by the heroism, prudence, diligence, and humanity he displayed. After his little fleet of seven vessels had been scattered by a storm, in doubling Cape Horn, he landed at Juan-Fernandez, where he was soon joined by three of his ships, which arrived in a dismantled condition. While he remained on this island, he exhibited his native tenderness of character by the assiduity with which he cared for the sick. Under these disadvantages he made several prizes, including a Spanish galleon from Acapulco, with a cargo worth £400,000. After this he returned to England; and arrived at Spithead, June 15, 1744, having circumnavigated the globe in three years and nine months. His perilous cruise greatly extended the knowledge of navigation and geography. As a reward for his services, A. was made Rear-admiral of the Blue (1744); and in 1747, having defeated the French admiral Jonquière, at Cape Finisterre, he was made Baron of Soberton; and four years later, First Lord of the Admiralty. In 1761 he was made Admiral of the Fleet. He died June 6, 1762. Few works have been so popular as Lord A.'s *Voyage Round the World*. It was written by Mr. B. Robins, from materials supplied by Lord A., who carefully supervised it.

A'NSPACH, or, more properly, ANSBACH, a town of Bavaria, the capital of the circle of Middle Franconia (*Mittel-Franken*), on the Rezat, 25 miles southwest from Nürnberg. It has manufactures of cotton and half-silken fabrics, tobacco, earthenware, playing-cards, cutlery, and white lead; also a considerable trade in wool, flax, and corn. The situation is pleasant, but there are no remarkable buildings, except the deserted palace of the former margraves of A., surrounded by gardens, and the church of St. Gumbert, said to occupy the site of a church erected in the 8th c., around which the town grew. The margraves of A. were a branch of the family of Hohenzollern. The last of them sold his possessions in 1791 to Prussia; and in 1806, Napoleon I. transferred A. to Bavaria. Pop. (1880) 14,195.

ANSTRUTHER (EASTER and WESTER), two contiguous royal burghs of Fifeshire, 9 miles S. of St. Andrews, with which along with Crail, Cupar, Kilrenny, and Pittenweem, they join in returning a member to parliament. Fishing, fish-curing, and tanning are the chief occupations. East A. is the birthplace of Dr. Chalmers, Tennant the poet, and Goodsir the anatomist. Pop. of both burghs (1881) 1842.

ANT (*Formi'ca*), a Linnæan genus of Hymenopterous insects, now divided into several genera, which form a family called *Formicidæ*. The English name is contracted from *Emmet*, still also occasionally used. Another old English name, not now in frequent use, is *Pismire*. The species are numerous, and are generally distributed over temperate and tropical regions. Their habits and instincts are extremely interesting, and have attracted attention from remote ages.

Ants are small insects, but of extraordinary muscular strength. They carry loads of ten or twelve times their own weight, and display great activity. They have a triangular head; the antennæ are geniculate; the jaws strong; the ligula or lower lip small, rounded, vaulted or spoon-like; the thorax compressed at the sides; the abdomen nearly oval, the pedicle which joins it to the thorax forming in some kinds a single, and in some, a double scale or knot.

They live in societies, often very large, which consist, as in bees, of *males*, *females*, and *neuters*. The neuters are females with imperfect ovaries, transformed at an early stage of their existence, and are distinguished into two classes, *workers* and *soldiers*, the former constituting the greater portion of each society, the latter somewhat differing from them in larger size, and larger and more powerful head. The ordinary work of the society is performed by the workers: the principal part in warfare, defensive or offensive, is taken by the soldiers. The males and females constitute but a small portion of each community. They have delicate glistening wings; but the neuters have no wings, and the thorax is smaller and more compressed. The males are smaller than the females, and the workers are rather smaller than the males. The females and neuters of some kinds (genera *Ponera*, *Myrmica Atta*, and *Cryptocerus*) are armed with stings; other kinds (*Formica* and *Polyergus*) have no sting, but have the power of ejecting a peculiar volatile acid, FORMIC ACID (q. v.), from a small sac in the abdomen; by this means effectually repelling many adversaries, to which the pungent fumes are intolerable. Small animals are soon killed by the vapor of an ant-hill; and a dog has been known to retire yelling from the effect upon his eyes, either of the vapor, or of a discharge of the fluid itself. It is said, that when those ants that are unprovided with a sting make use of their mandibles to inflict a bite, they curve round their abdomen, so as to be ready immediately to squirt this acid into the wound.

Atta barbara: A, one of the larger workers; B, one of the smaller workers; C, a male; D, a female—all natural size.

The winged ants mostly appear in autumn, and perish before the commencement of the cold weather; a few surviving to found new colonies and perpetuate the race. The neuters pass the winter in large numbers in a torpid state, and resume their activity on the return of spring. The nests of ants, after midsummer, are usually found to contain winged males and females mixed with the wingless neuters, which, however restrain them, and particularly the females, from making their escape into the air, until the pairing season, when they ascend into it in immense swarms, those from many ant-hills sometimes uniting their myriads, rising with incredible velocity in distinct columns, and soaring to a great height. 'Each column looks like a kind of slender network, and has a tremulous undulating motion. The noise emitted by myriads and myriads of these creatures does not exceed the hum of a single wasp. The slightest zephyr disperses them.' They occasionally, however, make their appearance in such prodigious numbers, that the air is obscured by them.—The pairing of ants is supposed to take place in the air. Some of the females which escape destruction by their enemies, or by the elements, found new colonies, in which at first they perform the work usually assigned to neuters. Some, however, are seized by the neuters of ant-hills near which they fall, and there is even reason to think that these go out to search for them; they are stripped of their wings, and forcibly conducted to the habitation, the number of whose inhabitants is to be increased by their multitudinous progeny. They are fed and treated with apparent respect, like the queen-bee among bees; but a society of ants, unlike one of bees, often contains numerous females, each thus treated and equally employed in the important work of laying eggs. Unlike the queen-bees, also, they are invariably denuded of all their wings; nor is this always done by the neuters, to prevent their escape, but the female ant, after fecundation, has been seen to denude herself of her own wings, as now superfluous appendages.

The eggs of ants are so small as to be scarcely visible to the naked eye. The mother drops them at random in her progress through the nest; but the workers, of whom some are always in attendance on her, immediately seize them, moisten them with their tongue, and lay them in heaps in particular apartments of the nest. They continue to watch them, and to remove them

from one quarter of the nest to another, apparently in order that they may always enjoy a suitable temperature, and perhaps in order to avoid any excess of moisture. In a few days the young larvæ are produced; and these require the unremitting care of the workers, which feed them, disgorging into their mouths, for this purpose, a viscid substance, supposed to be the ordinary food of the species, prepared for their use by a sort of half digestion. They are also extremely careful to keep the young brood clean, by constant application of their tongue and mandibles; and a great amount of labor is daily expended upon them, in conveying them from the inner apartments of the nest towards the surface after sunrise, when the weather is fine, and back again before sunset, or when the weather becomes cold, or there is a prospect of rain. The same care is extended to the pupæ. The larvæ and pupæ are the white objects which the workers are seen hastily seizing and carrying off to places of safety, when an ant's nest is broken open; and the resemblance of which, particularly of the pupæ, to grains of barley, is supposed to have contributed to the general belief, that ants amass stores of corn for winter food. The larvæ have no organs of locomotion. The pupæ are enveloped in delicate silken cocoons, and unlike those of other insects, require assistance to extricate themselves from them when they have attained their perfect state. This assistance also is afforded by the workers.

The whole supplies of food for the inmates of the nest are brought to it by the workers. The food of some kinds is exclusively or chiefly animal, that of others, vegetable. The provisions carried to their nests by the ants of Britain and other countries in which the winter is cold are apparently not intended for winter, when the creatures are entirely torpid, but only for present use; and few, if any of the species, feed on grain or seeds. But Colonel Sykes discovered at Poonah a species of ants (*Atta providens*), which not only store up provisions, but of which the stores consist of the seeds of a species of millet; and Mr. Moggridge has recently determined by careful observation that large stores of grain and seeds are laid up by some of the ants of the south of Europe, especially *Atta barbara* and *Atta structor*. The grain and other seeds stored up by ants seem, in some way not yet known, to be deprived of the power of germination. The ant has long been a sort of proverbal type, not only of industry, but of provident care for the future. Some ants, however, collect and carry to their nests substances which are not intended for food, but for the construction of the nest, and particularly for closing its apertures in cold or wet weather. In this way they gather together small heaps of chips of wood, bits of straw, small pebbles, &c.

The vegetable substance which ants seem chiefly to use as food is sugar; and to this, wherever it is to be found, they seem to be guided by a very acute sense of smell. *Honey-dew*, the saccharine excretion of the *Aphides* (see APHIS), is a favorite food of many species; and with this are connected some of their most extraordinary instincts; for not only do they climb the plants on which the aphides abound, that they may obtain this food, but they have been seen to wait beside them for new drops, and even to touch them with their antennæ, in order to cause the crops to flow, patting the abdomen of the aphis on each side alternately and rapidly; the ant, after the drop has been obtained, passing on to another aphis. The whole process has been likened to the milking of cattle. Even more wonderful things are asserted on this subject, as that particular ants seem to regard particular aphides as their own property, and are ready to fight in defence of their right to them—that, to secure them for themselves, they convey them from one place to another—and that the *Aphis radicum*, which derives its nutriment from the roots of grass and other plants, is actually kept in large numbers in the nest of the Yellow Ant (*Formica flava*), in order that there may be always at hand a copious supply of food, these aphides and their eggs sharing the solicitude of the ants equally with their own eggs and young. Things so wonderful are ascertained beyond dispute in regard to the instincts of ants, that even such statements as these must not be hastily rejected, as incredible, and certainly they express the beliefs of careful and scientific observers.

Ants which feed upon animal food render important service in clearing away every vestige of the flesh of dead animals, and so preventing corruption; and very beautiful skeletons of small animals have been obtained by burying the animal for a short time in an ant-hill. But ants also attack living animals: insects of comparatively large size fall a prey to them, and in tropical countries, birds, reptiles, and small quadrupeds are sometimes devoured by their vast swarms, which strip the bones of the animal perfectly clean with wonderful rapidity. Domestic animals, at least when sick, are not safe from them, and man himself regards them with dread. About a hundred years ago, vast numbers of a particular kind of Ant (*F. saccharivora*) appeared in the island of Grenada. This species makes its nest under the roots of plants, and the sugar-canes were so weakened and injured in consequence, that the plantations became nearly unproductive. 'They descended from the hills like torrents, and the plantations, as well as every path and road for miles, were filled with them. Rats, mice, and reptiles of every kind became an easy prey to them; and even the birds, which they attacked whenever they alighted on the ground in search of food, were so harassed, as to be at length unable to resist them. Streams of water opposed only a temporary obstacle to their progress; the foremost rushing blindly on certain death, and fresh armies instantly following, till a bank was formed of the carcasses of those which were drowned, sufficient to dam up the waters, and allow the main body to pass over in safety below. Even fire was tried without effect. When it was lighted to arrest their route, they rushed into the blaze in such myriads as to extinguish it.' A reward of £20,000 was offered in vain for an effectual means of destroying them; but in 1780 a hurricane which tore up the canes, and exposed their habitations to a deluge of rain, freed the island from this plague.

The habitations of ants are very curiously constructed, displaying great ingenuity, although with great diversity in the different species. The greater number of species form their habi-

Yellow Ants (*F. Flava*) and Nest.

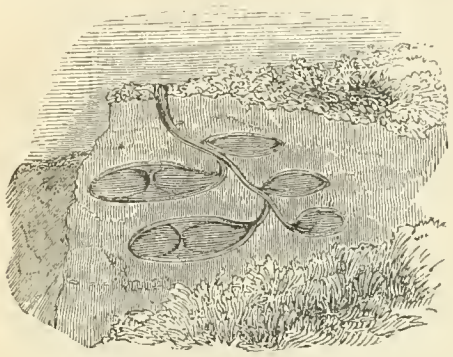
tations in the ground. These rise above the surface in the form of a dome; hence the name *ant-hills* commonly given them. The largest ant-hills formed by any British species are those of the large red or horse ants (*Formica rufa*), which are sometimes as big as a small haycock; but travelers in South America describe ant-hills of 15 or 20 feet in height. The nest of *F. rufa* is outwardly of rude appearance—a confused heap of such portable materials as were within reach; but within, it contains numerous small apartments, of different sizes, arranged in separate stories, some deep in the earth, some above its surface, and communicating with each other by means of galleries. Use is made of the earth excavated from below to mix with other materials in the construction of the upper parts of the fabric. Many species of ants, sometimes called Mason Ants, construct habitations by a still more elaborate masonry, making use, for this purpose, of soft clay, which they spread and mould by means of their mandibles and feet, appearing all the while to examine their work by their antennæ. The partition-walls of the galleries and apartments of the *Formica brunnea* are about half a line thick, and about half an inch high; the roofs are somewhat arched, and pillars are frequent in this marvelous architecture. M. Huber saw a working-ant of another species (*F. fusca*), without assistance, make and cover in a gallery which was two or three inches long, and of which the interior was rendered perfectly concave. There are other species, sometimes called Carpenter Ants, which make their habitations in the trunks of old trees, gnawing the wood into apartments and galleries, with floors and partitions as thin as card. *Formica flava* forms its partition-walls of a sort of *papier-mâché* of saw-dust, earth, and spider's web. *F. smaragdina*, an East Indian species, forms its nest of a thin silk-like tissue. *F. bispinosa*, in Cayenne, makes a felt of the down which envelops the seeds of the *Bombax Ceiba*. An East Indian species, *Myrmica Kirbii*, forms a globular nest of a congeries of tile-like *laminæ* of cow-dung, the interior exhibiting an assemblage of apartments and galleries.

Nest of Carpenter Ants.

Some Australian ants form their nests of the leaves of trees glued together, after being first brought into the proper position by the united strength of multitudes.

Of the ants which form their nests in the ground, some, instead of constructing ant-hills, seek the protection of stones, roots of trees, &c. This is the case with some of the British species, and also with the sugar ant of the West Indies, already mentioned.

Many interesting anecdotes are on record illustrative of the instincts of ants, and of the sagacity which they seem to possess. They appear also to have some power of communicating with each other, in which it has been supposed that the antennæ are chiefly employed. Some such power might be supposed to be necessary, if we could venture to reason from analogy upon such a subject, not only to their architectural and other ordinary operations, in which many must take part, systematically and conjointly, but also in their predatory and warlike excursions; for these also some of the species have. If, during the predatory excursions of the *Atta cephalotes* (a South American species), an intervening space occurs which they cannot cross, some of the creatures link themselves together—as monkeys, in like circumstances, have been known to do—forming a bridge over which the main body passes. Ants are, in general, both courageous and pugnacious. Many battles take place among them, both between individuals and large parties; and after a battle, combatants may be found locked in each other's arms, as having died together in the struggle. More extraordinary than anything of this kind, however, is the fact, sufficiently ascertained, that some species of ants go on regular forays to carry off the larvæ and pupæ of certain other species, which they carry to their own habitations to rear and employ them as slaves in the work which might be regarded as properly belonging to workers of their own race—a fact to which no other at all analogous has yet presented itself in natural history. The species known thus to make and keep slaves are *Polyergus rufescens* and *Formica sanguinea*, both sometimes called Amazon Ants. It has been noted as a curious circumstance that the kidnappers are red or pale colored ants, and the slaves jet black. The kidnapping excursions take place only at a particular period of the year, when the nests of the black ants contain the neuter brood. The army of red ants (*P. rufescens*) marches forth, the vanguard, which consists of eight or ten only, continually changing; and on their arriving at the nest of the negro ants, a desperate conflict ensues, which ends in the defeat of the negroes; and thereupon the red ants, with their powerful mandibles, tear open the now undefended ant-hill, enter it, and emerge, carrying the pupæ in their mouths, with which they return in perfect order to their own nest. The pupæ are there treated with great care, and spend their lives among the red ants, excavating passages, collecting food, carrying larvæ, &c., as if this had been their original destination. The amazon ants are not natives of Britain, although plentiful in some parts of Europe.



Section of Bank, showing Nests of the Mason Ant.

Formic acid has been employed as a stimulant in gout and paralysis, and is sometimes exhibited in continental practice by means of *ant-baths*, which are prepared by boiling crushed ants, or whole ant-hills, and immersing the diseased limb in the steam.

TERMITS (q. v.), WHITE ANTS, are very different from the true ants, and belong to the order *Neuroptera*. See Lubbock's *Ants, Bees, and Wasps* (1882).

ANTA'CIDS are medicines which correct abnormal acidity of the stomach and intestinal canal by directly combining with the free acid that may be present. Their action is obviously merely temporary, as, unless combined with other medicines, they do not correct the morbid condition which causes the undue acidity; and their too prolonged use must be carefully avoided, since at all events, some of these medicines, as the alkalies and their carbonates, are liable to induce a state of general anæmia, morbid deposits in the urine, and a series of symptoms not unlike those of scurvy. Antacids are best given in association with vegetable tonics; and for the reasons already stated, their administration must be carefully watched, and should be occasionally omitted. Dr. Neligan makes the following excellent remarks on the particular remedy to be employed for special forms of acidity: 'When the acid exists in the stomach in the gaseous state, ammonia or its carbonates should be preferred, as, in consequence of their volatility, a gaseous acid which would elude the action of the fixed alkalies, may be neutralized by them. If the acidity be present in the lower bowel, as in the cæcum or colon, magnesia or lime ought to be administered, as being less likely than the other antacids to be neutralized or absorbed before it reaches that portion of the intestinal canal. When the acid exists in the urinary organ, the alkalies will be found best adapted, as they have a tendency to act more directly on the kidneys; and when it is *lithic* (or *uric*) *acid* which preponderates in the urine, the preparations of lithia or potash should be preferred to those of soda, as the salts formed by the two former with the acid in question are much more soluble than those formed with the latter. In persons of a corpulent habit of body, potash is to be preferred to ammonia or soda when the use of an alkali is indicated. And finally, ammonia and its preparations are best adapted for the old and debilitated, as also for those of enfeebled constitution.' The antacids include solutions of ammonia, lime (commonly known as lime-water), potash, and soda, various carbonates of these substances, magnesia and its carbonates, and the carbonate and citrate of lithia.

Many of the medicines of this class possess other properties besides that of neutralizing free acids; but a notice of such properties does not fall within the scope of the present article.

ANTÆ. See PILASTER.

ANTA'LCIDAS, a Spartan politician, who made himself conspicuous in a very perilous crisis of the history of his nation by the skilful character of his policy. Some time after the Peloponnesian War, it seemed as if Athens were destined to regain the supremacy she had lost. The Greek states rallied round her; while Conon, an able and vigilant Athenian admiral, and his ally, Pharnabazus, the Persian, were everywhere victorious in their naval encounters with the Spartan fleet. It became necessary, therefore, that communications should be entered into with the Persian king, from whom the confederate Greeks drew their chief resources. A. was chosen ambassador to Tiribazus, satrap of Western Asia. On hearing this, the Athenians grew alarmed, and sent Conon to frustrate the schemes of the former; but Tiribazus took A.'s part, and the result was, that Conon was thrown into prison, and A. secretly received money to enable Sparta to continue the war. At first, Artaxerxes, the Persian monarch was dissatisfied with the conduct of his satrap, recalled him, and put Struthas, a friend of Athens, in his place; but through a complication of circumstances, which it is unnecessary to mention, A. was subsequently completely successful in securing the goodwill of Artaxerxes. He was now appointed admiral of the Spartan fleet, and assisted by Tiribazus, Ariobarzanes, &c., swept the seas until Athens became desirous of peace. For various reasons, so was Argos and Sparta herself. Tiribazus therefore assembled deputies from the Greek states, and, in the name of his master Artaxerxes, read the famous declaration or treaty of peace, to which all the members present agreed, and which is known in history under the name of 'the Peace of Antalcidas,' as being the result of the latter's able diplomacy. Its three great points were as follows: 1. That all the Greek towns on the mainland of Asia Minor, together with the islands Clazomene and Cyprus, should remain under the protection of the Persian king. 2. That all other Greek towns, large and small, should be independent; but that the islands of Lemnos, Imbros, and Scyros should belong to Athens. 3. That war should be declared against whatever state refused to accept these points. After this peace, the history of A. becomes doubtful and obscure. He seems to have lost favor with the Persians, and Plutarch even leads us to suppose that, sickened by misfortune and the loss of reputation, he voluntarily starved himself to death; but this story is not credited by scholars both on account of its intrinsic improbability and its apparent disagreement with the statements of other writers.

ANTANANARIVO, or TANANARIVO, the capital city of Madagascar, and seat of the government, has a population estimated at 80,000. It is situated on a hill, in an undulating district, at an elevation of 5000 feet above the level of the sea. It is exposed to fearful thunder-storms. The approach to it from Tamatave, the chief seaport, is extremely tedious and difficult, owing to the want of roads. It is, in spite of this, the seat of considerable trade and industry. The royal palace occupies the summit of the hill; adjoining are the dwellings of the chief officers of the government; and below these, covering the slope of the hill, and built on terraces, are the houses of the other inhabitants, constructed of mud and sun-dried bricks. The people exhibit a considerable aptitude for civilized usages; and, thanks to missionary enterprise, considerable progress has been made towards the adoption of European habits.—See the works on Madagascar by Mullens (1875) and Grandidier (1876); also *Three Visits to Madagascar* (1858) and *Madagascar Revisited* (1867) by Ellis. In the latter work will be found a plan of the city, showing the missionary churches, chapels, dispensary, hospital, &c., and views of the principal houses.

A'NTAR, or ANTA'RA, a celebrated Arab chief of the sixth century, one of the seven poets of Arabia, whose prize-poems, embroidered in golden characters on a silken ground, were hung

up on the gate of the Caaba, and thence called *Moallakat*—i. e., the Suspended. In the poem of his that has descended to our day, he paints his warlike deeds, and his love for Abla. His courage and heroism during a forty years' warfare between two Arab tribes, and his constancy in love, were long dear to the memory of his countrymen, and appear to have formed the groundwork of the voluminous romance called *Antar*, commonly ascribed to Asmai, and reduced to writing as early as the days of the Calif Haroun Alrashid in the 8th c. This work, which has come down to us in a later and much corrupted form, gives an attractive and faithful picture of Bedouin life, and is rich in epic interest, although too monotonous to satisfy the taste of the European reader. In the East, however, it still supplies the favorite themes of the professional story-tellers who haunt the coffee-houses. A poetical translation of it into English was made by Terric Hamilton in 1820.

ANTARCTIC OCEAN, the sea round the south pole, as the *Arctic Ocean* is the sea round the north pole. It is otherwise called the Southern Ocean, comprising all the sea to the south of the Atlantic, the Indian, and the Pacific Oceans. In this view the A. Ocean's northern limit may be conveniently divided into three straight lines—the *first* between Cape Horn in South America and Cape Agulhas in Africa; the *second*, between Cape Agulhas and the southern extremity of the Auckland Islands as an appendage of New Zealand; and the *third*, between the southern extremity of the Auckland Islands and Cape Horn. This appears to form the true boundary of the polar regions of the southern hemisphere. The most northerly isles which it encloses are New Georgia, at the mouth of the Atlantic, and Kerguelen's Land, at the mouth of the Indian Ocean. The latter tells its own story in its other title of 'The Island of Desolation;' and the former presented to Cook, even in the middle of summer, perpendicular cliffs of ice, and valleys covered with everlasting snow.

It is usual, indeed, to define the Antarctic Ocean and the corresponding ocean to the north, as being contained each within its own polar circle. But, with regard to both oceans alike, this definition appears to be inadmissible. It is only at two points — the head of the Pacific and the head of the Atlantic—that the Arctic Sea can possibly reach the Arctic Circle at all; while, in point of fact, it overlaps it at Behring's Strait by nearly a degree, and falls several degrees short of it between the northern half of Norway and the south-east shore of Greenland. The A. O., again, is nowhere practically limited by the definition in question: not a single voyager hesitates to use the expression long before he arrives at lat. 66° 30′ S.; nor yet is a single authority consistent in the use of the arbitrary nomenclature.

The A. O. has been explored, more or less satisfactorily, by various navigators, as far as 79° S. With a few exceptions, however, little of it is accurately known, the difficulties and dangers of its navigation rendering thorough and continuous investigation almost impracticable. The names that will recur in their proper places are New Georgia, Kerguelen's Land, Sandwich Land, New South Shetlands, New Orkneys, Enderby's Land, Graham's Land, Balleny, Sabrina, and Victoria Land.

Taken as a whole, these lands bear a very small proportion to the extent of an ocean which embraces half the latitudes and all the longitudes of the southern hemisphere, exceeding its kindred sea to the north, as a glance at the map will show by nearly half of Asia and North America, and the whole of Europe. Such of these lands as are realy accessible at all times, have been more or less valuable in connection with the whale and seal fisheries.

The features of the A. O. itself may be briefly stated to be constant fogs, battling currents, innumerable icebergs, and magnificent manifestations of the Aurora Australis. On the coast of Victoria Land, beyond the parallel of 70°, two mountains have been observed to be of a height altogether unequalled in such a latitude—Mt. Terror, of 10,000 feet, and Mt. Erebus, of 12,400. The latter is a volcano, being, it is apprehended, the only phenomenon of the kind in either of the frigid zones.

Of the two circumpolar oceans, the southerly one has excited much less interest than the northerly. The open passages round the two capes respectively into the Indian Ocean and the Pacific, have, from the very beginning, rendered unnecessary any such voyages as those which, for nearly three centuries, have developed so much patience and fortitude in the heroic explorers of the Arctic shores.

ANT-BEAR. See ANT-EATER.

ANT-CATCHER and ANT-THRUSH, names given to birds of tropical and sub-tropical countries, which feed chiefly upon ants. They are closely allied to the Thrushes (see THRUSH), and are included with them in the family *Turdidæ* or *Merulidæ* of recent ornithologists.—They are distinguished by a straight sub-cylindrical strong bill, hooked at the tip, slender legs, and very short tails. They form the genus *Myothe'ra* of Illiger, now subdivided into several genera, one of which, *Pitta*, contains the *Brèves* of Buffon —birds of brilliant plumage, natives of the south-eastern parts of Asia and the Malayan Archipelago. The true ant-catchers are mostly American, are of comparatively sober plumage, live among the huge ant-hills, seldom fly, and are remarkable for their sonorous voices, the power of which in some species is extraordinary. The largest species, known as the *King of the Ant-catchers* (*Grallaria Rex*), is about the size of a quail. Its legs are remarkably long.

ANT-EATER (*Myrmeco'phaga*), a genus of South American quadrupeds belonging to the natural order *Edentata*. The species are few. They are perfectly toothless, their food being insects, and particularly ants, which they procure in great numbers by thrusting among them a very long cylindrical tongue, covered with a viscid saliva, and then retracting it into the mouth. The head is

Great Ant-eater (*M. jubata*).

remarkably elongated, with a slender muzzle, and a small mouth. The tongue is doubled up in the mouth when not in use for catching prey. The ears and eyes are very small. The toes differ in number in the different species, but are united as far as the base of the claws, which are very large and strong, adapted to tearing up the habitations of ants. The Great A.-E. (*M. jubata*), a native of the warm parts of South America, and called in Demerara the A.-bear, is about 4½ feet in length from the snout to the origin of the tail, which is more than 2 feet long, and is covered with very long hair. The body is also covered with long hair, particularly along the neck and back. There are four claws on each of the forefeet, and five on the hind ones. The A.-E. spends much of its time in sleep, the long snout concealed in the fur of the breast, the hind and fore claws locked together, and the bushy tail thrown over all, as if for a shade from the sun.

It is very unsocial in its habits, and is regarded as a very stupid animal. It has great strength in its fore-legs and claws, and it is said to hug like the bear, so as to crush an enemy to death. The female produces one young one at a birth, and carries it about for some time on her back.—Another species, the Tamandua (*M. Tamandua*), having the same number of claws, has a less elongated snout, comparatively short hair, and a prehensile tail, is scarcely so large as a cat, and climbs trees in quest of its insect food.—The Little or Two-toed A.-E. (*M. didactyla*) differs from these species not only in the number of its toes, but in other anatomical characters.—Closely allied to this genus in structure and habits is the genus *Manis*, containing the PANGOLINS of Africa and India; but instead of hair, the body is covered with strong horny scales. See PANGOLIN.—The name A.-E. is given at the Cape of Good Hope to the *Orycteropus Capensis*, the Aard-vark or Earth-hog of the Dutch colonists, a quadruped of about the same size with the great A.-E. of America, belonging to the same natural order, and resembling it also in its elongated muzzle and extensile tongue, which it employs in the same way, but provided with grinding teeth and flat claws adapted for burrowing. It burrows with extraordinary facility, and it is in this way that it seeks to secure its safety when assailed. It has very short hair and little of it. The ears are moderately long. It is a nocturnal animal, and very timid.—The *Echidnæ* of New Holland are sometimes called Porcupine Ant-eaters, from their food and their similarity to the true ant-eaters in their sharp muzzle and extensile tongue; but they differ much in some parts of their structure. See ECHIDNA.

ANTECE'DENT, a term in Logic, Grammar, and Mathematics. Thus we call a proposition in Logic from which another is deduced, or a general principle which serves as the base and support of some particular proposition, the A. In Grammar, the A. is the word which precedes the relative—as, for example, 'The *man* who dies for his country should be held in honor.' Here 'man' is the A. In Mathematics, we speak of the A. of a ratio,—i. e., the first of two terms which compose the ratio. Thus, in the ratio of 4 to 3, 4 is the A. The word is also used in the plural in a peculiar sense. 'We know very little of his *antecedents*' i. e., of his previous character or conduct.

ANTEDILU'VIAN is the word used to denote whatever existed before the Flood. The A. ages are those which elapsed before the Flood, and, in theological language, the A. religion means the religion of the patriarchs from Adam to Noah. In Geology, the 'A. period' has no reference to the deluge recorded in the Mosaic

narrative, but only to the final transformation of the earth by means of water.

A'NTELOPE (*Antilope*), a genus of Mammalia belonging to the order of Ruminants (q. v.), and to the hollow-horned section of that order—in which the horns consist of an elastic sheath surrounding a bony process of the skull, and are permanent, not annually renewed. The antelopes have the bony nucleus of the horns solid, not occupied, as in those of goats, sheep and oxen, to a considerable extent, with cells communicating with the frontal sinuses.

They are also distinguished from the allied genus of goats by having the chin beardless, and from them and sheep by the horns not being longitudinally angled or ridged. The horns of antelopes are, however, very generally annulated, or surrounded with thickened rings. The body is slender and deer-like, the feet small and elegant, the tail short and tufted, the hair generally short, and the color often lively. Some species, however, have comparatively long hair; and a few which inhabit cold mountainous regions are clothed with wool intermixed with longer and coarser hair, particularly the CHAMOIS (q. v.) of the Alps, Caucasus, &c.; the ROCKY MOUNTAIN GOAT (q. v.) of North America; and the CHIRU (q. v.) of the Himalayas. Many species have infra-orbital sinuses or *tear-pits* like DEER (q. v.). The females of many species, as of deer, are destitute of horns; and if they alone came under observation, it would be difficult to say to which genus they belonged. The size is very various; the Guevei or Pigmy A. of Africa (*A. pygmæa*) is only 8 to 9 inches high at the shoulders, whilst the largest species measure 5 or 6 feet. Almost all the species of antelopes are peaceable, timid animals, and are distinguished by their agility and fleetness. Most of them are gregarious. Some inhabit plains; others are found only in the most inaccessible mountainous regions; whilst others dwell in jungles and deep forests. North America possesses two or three species, which depart considerably, as does the chamois of Europe, from the typical character of the genus. Europe produces only the Chamois and the Saiga (*A. Saïga*), the *Colus* of Strabo, which inhabits the southern plains of Poland and Russia. Asia has a greater number of species; but they are most numerous in Africa, and particularly in South Africa. The known species amount to more than eighty, which are arranged in sections or groups according to the peculiarities of the horns and other characters, but a satisfactory classification of them is difficult. Some naturalists make a family of *Antilopeæ*, and subdivide it into genera, but they are not separated by sufficiently marked characters. The flesh of all antelopes is used as food; hence they are much objects of the chase. They furnish also great part of the subsistence of beasts of prey in Africa, where some of the species exist in such numbers that, particularly when severe drought occurs in the regions which they ordinarily inhabit, dense and multitudinous herds occasionally appear in the interior of Cape Colony, to the terrible devastation of the crops. Even the saigas of the Tatarian plains congregate in herds of many thousands in the end of autumn.

The name A. is sometimes more particularly restricted to a species also known as the Common or Indian A., and as the Sasin. It is a native of India and the eastern parts of Asia, and is a beautiful animal, about 2½ feet high at the shoulder, with erect diverging horns, bent in a spiral of two or three turns. The hair is uniformly short, except that, as in many other species of A., there are small tufts of bristles on the knees. It inhabits open plains, and the herds exercise great watchfulness. Its fleetness is such that greyhounds chase it in vain; and it can easily bound over an enclosure of 11 feet in height, or over a distance of 10 or 12 yards. The flesh is held in small esteem, and the animal is less than many of its congeners an object of the chase.—The Saiga is a much less graceful animal; its horns are short, and, as in many of this genus, curved first outwards and then inwards, so that the whole outline formed by them resembles that of a lyre. They are used by the Russians and Chinese for the manufacture of many articles of domestic economy; and it is chiefly for their sake and that of the skin that the saiga is hunted, the flesh having a disagreeable taste, which is ascribed to the saline and aromatic plants of the steppes.—The Dzeren (*A. gutturosa*), sometimes called the Chinese A., and known among the Chinese by a name which signifies the Yellow Goat, is an inhabitant of the arid deserts of Central Asia, the flesh of which is highly esteemed, and which is therefore a chief object of the chase in these regions. It derives its specific name from a large movable goitre-like protuberance on the throat of the old males, produced by dilatation of the larynx.—The Addax, or Nubian A. (*A. Addax*), which was known to the ancients, and is mentioned by Pliny, has horns very similar to those of the Indian A., but is a larger animal, less graceful, with a slight mane on the neck, a tuft of long hair on the forehead, and large broad hoofs, adapted for treading on fine and loose sands. It inhabits the deserts of Central Africa, and, contrary to the usual habits of the genus, is said not to be gregarious, but to live in pairs. The Chikara and some other Indian species are distinguished by two additional rudimentary horns in front of the ordinary horns, and immediately over the orbits. The chikara inhabits thick forests and jungles. Like the addax, it lives in pairs; as do also the Stein-boc (q. v.) of South Africa, an extremely graceful species; and the Kleene-boc of the same country (*A. pygmæa*), a beautiful and active little creature, with very small horns. The kleene-boc is of a mild and gentle disposition, and extremely capable of domestication.

Head of Antilope Chikara.

The Gazelle (q. v.) of North Africa (*A. Dorcas*), one of the species known to the ancients, is very frequently domesticated; and from its gracefulness of form, its gentleness of manners, and its bright black eyes, has afforded to the Arabian poets one of their most favorite objects of comparison. The South African SPRINGBOC (q. v.) is another very beautiful species, and is frequently domesticated by the colonists at the Cape of Good Hope. Among the numerous species which that country produces may be mentioned also the Blauw-boc (*A. leucophæus*); the Riet-boc (*A. arundinaceus*); and the Caffrarian ORYX (q. v.), (*A. Oryx*), which somewhat resembles, but is quite distinct from, the Oryx of the ancients (*A. Leucoryx* or *A. Gazella*), also called the Algazel, a native of the countries on both sides of the Red Sea. Still more worthy of notice among the South African species, but in some measure departing from the strict A. type, is the ELAND (q. v.), the largest of all the antelopes—an animal which may yet probably be found very valuable in domestication. The KUDU (q. v.) is another noble species, allied to the eland. The NYL-GHAU (q. v.) of India, and the GNU (q. v.) of South Africa, are also among the largest antelopes, but depart still further from the generic type, particularly the latter, so that a separate genus (*Catoblepas*) has been constituted for it, having better claims to be recognized than the other genera into which it has been proposed that the antelopes should be divided. Less different from the ordinary type, but still with a marked approach to a bovine appearance, are the BUBALUS (q. v.) of the ancients, a native of the north of Africa, the Arabic name of which signifies wild ox, and the KAAMA (q. v.) or Harte-beest of the Cape of Good Hope, which is nearly allied to it. The PRONG-HORN (q. v.) and the ROCKY MOUNTAIN GOAT (q. v.) are the best known North American species; and both are found only in the western parts of the continent. It has been proposed to introduce the latter, as a wool-bearing animal, into the Highlands of Scotland.

Addax (*A. Addax*).

ANTE'NNÆ, in Zoology, jointed filaments with which the heads of Insects, Crustacea, and Myriapoda are furnished and which are evidently very delicate organs of touch. They are therefore sometimes called feelers. The name A. is derived from *ante*, before. The A. are placed on the anterior or superior part of the head; the animals appear to feel their way with them, and to them is ascribed the bee's power of working in the dark. Some suppose that they are also organs of hearing, and by means of them it would appear that many insects, as bees and ants, have the power of communicating with one another. They possess great flexibility, but differ very much in the number of joints which they contain (amounting sometimes even to 100), in the relative length and thickness of their joints, and also in their form, being filiform or thread-like, clavate or club-shaped, feathered, &c., in endless variety.

ANTEQUE'RA (the *Anticaria* of the Romans), an important town in the province of Malaga, Spain, is situated in a fertile plain, 45 miles west of Granada. Pop. 25,550. The inhabitants are engaged chiefly in agricultural operations, but also manufacture baize, silk, cotton, and paper. They are noted for their love of bright colors in dress. Although A. is clean and well built, it is rarely visited by travelers, on account of its lying considerably off the high road. As late as 1544, the place possessed, in almost perfect condition, an ancient palace and theater; but about that time the stones were plundered to build a convent, and only a few were spared, which are now imbedded in the walls of the town. A., like all the other cities of South Spain, was for a while in the hands of the Moors; but in 1410 it was retaken by the Regent Fernando, who is hence called *El Infante de A.* When the French took the place, during the Peninsular War, they converted a curious old mosque—a relic of Moorish sway—into a storehouse, and on their departure carried off with them the magnificent Moorish armory.

ANTHE'LIA (Gr. *anti*, opposite, and *helios*, the sun; Ger. *Gegensonnen*) are luminous rings, seen by an observer on a cloud or fog which lies opposite to the sun. They occur chiefly in alpine regions and in the polar seas, and are only seen when sunshine and cloud, or fog, occur at the same time. They appear in the following way: When, from an elevated position—as the mast of a ship, or the ridge of a hill—the shadow of an observer is projected by the sun on a cloud or fog, he sees the head encircled by a glory or luminous ring, diminishing in brightness as it leaves the head as a center. When the sun shines brightly, and the fog is dense, as many as four concentric rings of this nature are seen by the observer round the shadow of his head, having their common center in the point where a line from the sun through the eye of the observer meets the fog. When the phenomenon assumes this form, the rings are more or less colored—the colors of the two inner rings being generally brilliant, those of the third more faint, while those of the fourth are scarcely perceptible. This last has an angular radius of about 40°, and is very seldom seen. It bears frequently the name of the Circle of Ulloa or the White Rainbow. A phenomenon substantially similar to the A. occurs when, the sun being near the horizon, the observer sees an aureola surrounding the shadow of his head cast upon grass or corn moistened with dew. The occurrence of A. is generally attributed to the diffraction (q. v.) of light.

ANTHEM (Gr. *anti*, in return, *phone*, voice; a piece sung in alternate parts), a species of musical composition introduced into the service of the English Church after the Reformation, and appointed to be sung daily, at morning and evening service, after the third collect. The words of the A. are taken from the Psalms, or other suitable parts of the Scriptures, and the music is either for solo, soli, or chorus, or a mixture of all three. As a specimen of English music, it can only be heard to perfection in cathedral service. In its origin, musical construction, and use, it is similar to the motet of the Romish Church, which name has been retained by the Lutheran Church. See MOTETT; also ANTIPHONY.

ANTHEMIS. See CHAMOMILE.

ANTHER. See STAMEN.

ANTHERI'DIUM, the name given by some botonists to an organ in cryptogamous plants which they suppose to be analogous in its functions to the stamen or male organ of fructification in phanerogamous plants. Antheridia are variously situated on the surface of plants or within their tissue. Sometimes they are simple cells; sometimes they are composed of a number of cells, containing a mucilaginous fluid, and peculiar small bodies called *Phytozoa* (q. v.), which at a certain period exhibit active movements like those of animalcules. The antheridia finally discharge their contents through an opening; and it is supposed by some that their contact with another class of organs, to which the name PISTILLIDIUM (q. v.) has been given, is essential to the production of spores, the seeds of cryptogamous plants. But these names are to be regarded as at best only provisional, and these views as far from being sufficiently established.

ANTHO'LOGY (Gr. flower-collection) is the title usually given to a book consisting of an unconnected series of choice thoughts, whether in prose or verse, but generally in the latter. Of the collections of this kind made in ancient times, which consisted mostly of epigrammatic poems, the best known are the

Greek Anthologies.—The first Greek A. was compiled by Meleager of Gadara, in Syria, about 60 B.C. Besides this, there were three or four others belonging to periods considerably subsequent to the birth of Christ; but all these earlier anthologies are lost. What we now possess are two later collections, one by Constantine Cephalas in the 10th c., who borrowed largely from one of the earlier anthologies; and another by Maximus Planudes, a monk of Constantinople in the 14th c., who, by his tasteless selection from the A. of Cephalas, rather spoiled than increased the already existing store. The A. of Planudes was first issued in print at Florence in 1494 by a learned Greek, John Lascaris, and for a long time was the only one known. It went through successive editions, and received various improvements. The latest edition (with the Latin version of Grotius, a master-piece of latinity and rapid execution) was commenced by Boseh in 1795, and finished by Lennep in 1822. Meanwhile, Claude Salmasius had discovered in the Heidelberg Library (1606) the only extant manuscript of the older and richer A. of Constantine Cephalas, which he compared with that of Planudes, copying out the poems not found in the latter. During the Thirty Years' War, the Heidelberg manuscript was carried to Rome; but in 1797, after the peace of Tolentino, the French contrived to secure possession of it, and brought it to Paris. In 1816 it was returned to Heidelberg. After the important discovery of Salmasius, the work was often mentioned by the name of the Palatinate Manuscript, or the Vaticano-Palatinate. Portions of it were published by Jensius, Leich, Reiske, and Klotz. The entire collection, augmented by fragments of the older poets, and by epigrams found on monuments and in other works, was edited by Brunck at Strasburg in 1776, under the title *Analecta Veterum Poëtarum Græcorum* (Selections from the Old Greek Poets), and later by Jacob, under the title of *Anthologia Græca, sive Poëtarum Græcorum Lusus ex Recensione Brunckii* (Greek A., or Fugitive Pieces of the Greek Poets, from the corrected Text of Brunck), 1794—1814, at Leipsic. Since then, it has been published variously, in whole or part. It is impossible not to admire these gems. Nowhere is there to be found a richer variety of poetic life, greater delicacy of sentiment, a more joyous serenity, a greater abundance of wise, true, human thoughts, than sparkle in the pages of the Greek A. To the poet, it presents the most graceful images and the most exquisite conceptions; to the philosopher, maxims adorned with all the graces of style; to the historian, monumental inscriptions; to the philologist, the most varied forms of an imperishable language; to all, a charming revelation of antiquity.

Latin Anthologies.—In 1573, Scaliger published at Leyden, in imitation of the Greek A., a Latin A., under the title *Catalecta Veterum Poëtarum* (Gatherings from the Old Poets), and Pitthöus one at Paris, 1590. A larger collection was issued at Amsterdam (1759 and 1773) by Peter Burmann the Younger, under the title *Anthologia Veterum Latinorum Epigrammatum et Poëmatum* (A. of Old Latin Epigrams and Poems), a more correct and better arranged edition of which was published by Meyer in 1835.

Asiatic literature is extremely rich in anthologies, which consist sometimes of extracts from the best poets, arranged according to the subject, and sometimes of 'beauties' of their best poets, with biographical notices, which are either placed in chronological order, or according to the countries in which the authors lived.

1. *Arabic Anthologies.*—Abu-Temam published selections from the old Arabic songs previous to the time of Mohammed, arranged them in ten books, and named the entire collection after the first book, which consisted of war-songs, *Hamâsa*. Another famous A. is the *Divan* of the Hudhailites (an Arabic tribe), an edition of which was published by Kosegarten. Abu'l-Faraj of Ispahan (died 966) gathered together in his *Kitâb al-aghâni* (Book of Songs), all the ancient Arabic songs down to the first centuries of the Califate. It was published by Kosegarten in 1840. Abu'l-Faraj accompanied the work with a minute commentary, which makes it one of the most interesting of the old Arabic literature. But the richest and most complete A. of the later Arabic poesy is *Yatimat al-dahr* (the Pearl of the World), by Taalebi, in which the writers are arranged according to the provinces in which they lived. It has been continued and enlarged since the period of the original compiler. Besides these and similar national anthologies, collections have been made in almost every province where the Arabic culture and speech prevailed. Such, for example, are the numerous Arabico-Spanish ones, though these are but little known.

2. *Persian Anthologies.*—In the Persian literature, the best known works of this sort are *Taskarat al Shuara* (Lives of the Poets), by Daulet Shah (died 1495), the contents of which are to be found almost entire in Hammer's work on Persian *belles-lettres* (Vienna, 1818), and *Atesh Kedah* (the Fire Temple), by Haje-Lutf-Ali Beg, who lived about 1770. Both works give biographical notices of the Persian poets: the first, in chronological order; the second, in topographical order, with specimens from their works. An A. of the best Persian poetry, arranged according to the subjects, is given in the *Medshua al Shuara* (a Collection of Poets).

3. *Tatar Anthologies.*—Of the poets who have written in the Tatar —i. e., the East Turkish or Tshagatai dialect—we possess a collection comprising 441 biographies, with specimens of their poetry: *Madshalis alnasais* (Charming Company), by Mir-Alischir (died 1500), and the *Lives of the Tatar Poets*, by Sadiki, extending down to the 17th c.

4. *Turkish Anthologies.*—The number of anthologies in the West Turkish, or, as it is generally called, the Turkish language, is very numerous. The most famous are—*Hesht Behesht* (the Eight Paradises), by Sehi of Adrianople (died 1548); *Taskarat al Shuara* (Lives of the Poets), by Latifi (died 1582), and, under the same title, a similar work of Ashik Tshelebi (died 1571); and the great collection, *Subdat al-ashaar* (the Blossoms of Poetry), by Kassade (died 1621). The substance of these anthologies is to be found in Hammer's *History of West Turkish Poetry* (Pesth, 1836).

5. *Indian Anthologies.*—The literature of the Mohammedan population of Hindustan, which is a mere copy of Persian literature, has also several anthologies. The most important are—*Galzari Ibrahim*, by Ali Ibrahim, containing biographical notices of 300 Hindustani poets, with specimens of their writings; the collection called *Diwani Iihan*, by Beni-Narâyan; *Guldastai Nishât* (Garland of Pleasure), by Mann Lal (Calcutta, 1836); and *Guldastai Nâzninân*, by Kerim-ed-din (Calcutta, 1845). The substance of these works is to be found in Garcin de Tassy's *Historic de la Littérature Hindui et Hindustani* (Paris, 1839—1847), which, under the title of *Tabakâti Shuarâi Hindi*, was translated into Hindustani by Kerim-ed-din (Delhi, 1848). In the pure Hindi, we have a rich collection of songs, the *Ragd Sâgar*, by Krishnânanda (Calcutta, 1845).

6. *Sanscrit Anthologies.*—The Sanscrit literature is not so rich in anthologies as the other oriental literatures. If we do not consider the Vedic hymns, and the collections of poems which bear the

general title *Sataka* (a Century), anthological in the proper sense, there is only one work of this kind known—viz., the *Paddhati*, by Sarngadhara, towards the close of the 14th c., in which are gathered together 6000 detached strophes of the most famous epic, lyric, and dramatic poets of India, arranged under certain heads.

7. *Chinese Anthologies.*—From the earliest ages, the Chinese had the custom of sending, along with the yearly tribute to the emperor, copies of such songs as had acquired popularity. Confucius selected from a great number of these 311 of the most beautiful. These are preserved under the name *Shi-king* (Book of Songs), one of the canonical books of the Chinese. This is the oldest A. in the world. A Latin version, by Lacharme, was published at Stuttgart, 1830; a German one, by Rückert, at Altona, 1833. Besides this, there is *Tchao-ming-wen-siouen*, a collection of the finest poems of the time of the Liang dynasty (502—556 A.D.), and also *Thang-shi* poems of the time of the Thang dynasty (618—914 A.D.).

ANTHON, Charles, LL.D., a well-known editor of classics, was born in the city of New York in 1797. At the age of 14, he entered Columbia College, where he pursued his studies with ardor and success for four years. Having been originally intended for the law, he now passed through a preliminary practical instruction in his brother's office, and in 1819 was admitted to the bar of the supreme court of the state of New York. His time, however, was chiefly devoted to classical literature, for which he soon began to acquire a high reputation; and in 1820, when only 23 years of age, he was appointed adjunct-professor of Languages in Columbia College, which office he held for fifteen years. He now commenced that series of classical publications which has done so much to make available for popular purposes the erudite researches of European scholars. His first work was a new edition of Lempriere's *Classical Dictionary*, which was almost immediately re-issued in England. In 1830 appeared his larger edition of Horace, quite a novelty in its way, on account of the superabundant English notes which accompanied the text. In 1833, he issued a smaller edition, for the use of schools and colleges. Virgil, Cæsar, and other ancient writers have been illustrated in the same attractive manner.

A.'s editions of the classics have acquired an extensive popularity; but scholars are disposed to regard them with a kind of learned aversion, both because of the temptations they present to the school-boy to overlook the difficulties of a knotty passage, and of the superfluous and often unimportant matter which is dignified with the title 'commentary' or 'notes.' It cannot be doubted, however, that these works have given a healthy stimulus to the rudimentary study of the ancient authors. In 1831, A. received the degree of LL.D. from his Alma Mater. In 1835, he succeeded Professor Moore in the chair of languages. A. likewise published large works on ancient geography, Greek and Roman antiquities, mythology, literature, &c. He died July 29, 1867.

ANTHONY, St. See Antony, St.

ANTHOXANTHUM. See Vernal Grass.

A'NTHRACITE (Gr. *anthrax*, a coal), a mineral substance of the nature of coal, but consisting of carbon with a minimum amount of hydrogen. It is of a black color, conchoidal fracture, and imperfectly metallic lustre (hence called *glance-coal*). It burns slowly, and without flame, and hence is sometimes called *blind-coal*. Its vegetable origin cannot be doubted. Where strata of common coal have been broken through by trap dikes, the coal next the trap is found to be A., with a gradual transition into the ordinary state; hence geologists look upon A. as natural coke (q.v.), formed by heat or other process from ordinary coal. A. is used as fuel like coke. It is used for the burning of lime and bricks, the reduction of iron, &c. It occurs extensively in Ireland, in parts of Britain, and the Continent; but on the largest scale in the United States. See Coal in Am. Supp.

ANTHRAX. See Splenic Fever.

ANTHROPO'LATRY (Gr.), a term signifying, according to its derivation, the worship of man, and always employed in reproach. Thus, the early Christians accused the heathens of A., because, in their mythology, men were represented as exalted among the gods, although an *apotheosis* (q. v.) was in these cases alleged by their worshipers; and the heathens retorted the charge because of the worship of Christ; the reply to which was the assertion of his divinity. But the term is chiefly known in ecclesiastical history in connection with the employment of it by the Apollinarians (q. v.) against the orthodox Christians of the 4th and 5th centuries, with reference to the doctrine of the perfect human nature of Christ.

ANTHROPO'LOGY (from the Gr. *anthropos*, man), a term signifying that branch of science which has man for its subject. In its proper sense, it is very comprehensive, and of course includes Anatomy, Physiology, Psychology, Ethnology, History, Theology, Æsthetics, &c. The word has, of late, come into very common use. There is an Anthropological Society in London; and a separate anthropological section has been constituted in the British Association. See Anthropology in Am. Supp.

ANTHROPOMO'RPHISM (from the Gr. *anthropos*, man, and *morphe*, a form), the application, in a figurative way, to God, of terms which properly relate to human beings. Thus, in the Holy Scriptures, we read of the eye, the ear, the arm, the hand of God; and of his remembering, forgetting, &c. This A. appears to arise of necessity from our incapacity of forming conceptions of things spiritual, or finding any terms in which to express them, except by analogies derived from things cognizable by our senses, so that even the language of adoration is borrowed from the familiar things of this world. It must be evident, however, that A. employed in an unguarded manner, or too grossly understood, might lead to most serious errror; and a tendency has manifested itself at various times in the history of the Christian Church, to ascribe to the Divine Being a form and parts like those of men. Thus, the Audæans (q. v.) or Audians, a Syrian monastic sect which sprang up in the 4th c., were accused, and, it would seem, justly, of holding that God was possessed of a human shape, and that, when the Bible said that 'God created man in his own image,' the words are to be understood of this shape literally. The same error was at a later period ascribed to the Waldenses, but there is no evidence of the justice of the accusation. A tendency to A. may indeed be regarded as always existing, and so requiring to be guarded against in the mind of every man; but the instances have been rare and isolated, although they have from time to time occurred, in which anthropomorphite views have been fully adopted and openly expressed among Christians. The error of anthropomorphites, has, however, found countenance from the speculations of philosophers. Hobbes, Forster, and Priestley ascribed to the Divine Being a sort of subtile body. Fichte, on the other hand, rejected the very doctrine of the personality of the Divine Being as anthropomorphic, and represented God as the *moral order of the universe;* and Schelling, Hegel, Feuerbach, and Schleiermacher substituted for the objective personality of God a subjective consciousness of God in the human soul.—The term *Anthropopathism* is sometimes employed to denote the ascription to God of human affections and passions, although A., in its most general sense, includes this. The language of Scripture, in the many instances of this kind, must be interpreted according to the same general principles which are applicable in those of A. strictly so called, with the same discrimination of the figurative from the literal, and the same constant recognition of the absolute spirituality and unchangeableness of God; yet so that important truths conveyed by means of such language, and which it is probable could only be conveyed to us by such language, in accordance with our mental constitution, may not be rejected or obscured. And here, it must be confessed, there is greater difficulty than with regard to A. strictly so called.

ANTHROPO'PHAGI. See Cannibal.

ANTHUS and ANTHIDÆ. See Pipit.

ANTHYLLIS. See Kidney Vetch.

ANTIARIS and ANTJAR. See Upas.

ANTI'BES (anciently *Antipolis*), a fortified seaport in the department of the Alpes Maritimes, in the S.E. of Provence, France, lat. 43° 34′ N., long. 7° 8′ E. Pop. (1876) 5546. It stands on the east side of a small neck of land called La-Garoupe, lying west from the mouth of the Var, in a fertile district. The harbor is only serviceable, however, for small craft. It is a military station of the third rank, possesses a naval school, and has considerable trade in olives, dried-fruits, salt-fish, &c. The anchovies prepared at A. are held in high estimation. The environs of the town are beautifully adorned with gardens, vineyards, and orchards.

A. is a very old place, having been founded by a colony of Greeks from Massilia (Marseille), of which it was a dependency. In the time of Augustus it was elevated to the rank of an Italian city, and many ruins still testify to its ancient prosperity. After the wreck of the old Roman empire, A. became subject to successive tribes of barbarians from the north. In the 9th c., it was destroyed by the Saracens; in the 16th c., it was fortified by Francis I. and Henry IV.; during the Austrian War of Succession, it sustained a siege of three months (1746). A. closed its gates against Napoleon on his return from Elba. The *Antibes Legion* was a body of foreign troops, chiefly French, kept by the Pope during the French occupation of Rome. It was formed at Antibes.

A'NTICHLORE is the name given to commercial sulphite of soda by paper-makers. When the rags are reduced to a pulp, they are bleached by chloride of lime (bleaching-powder), which thoroughly soaks the pulp, and is very difficult to wash out. The traces of chlorine thus left in the pulp pass into the manufactured paper, and tend to bleach the writing-ink which may be traced thereon. To free the pulp from the residue of the chlorine, some sulphite of soda is employed, and hence the name A., which literally signifies 'against (*anti*) chlorine.'

A'NTICHRIST (from Gr. *anti*, against, and *Christos*, Christ). The general notion of A. as a power opposing itself to the reign

of the Messiah, may be traced back beyond the Christian era. Its origin is perhaps to be found in the prophecy of Ezekiel concerning the doom of Gog and Magog. In accordance with the old saying, 'When need is sorest, help is nearest,' the Jews conceived that, immediately previous to the Messiah's reign, national adversity must be experienced in an extreme degree, and that an agent of Satan would appear, who must be overcome before prosperity could be restored. This was A. The idea is adopted in the New Testament, although the term A. occurs in no place of Scripture, except in the First and Second Epistles of John. From such passages as the prophecy of the Saviour, Matt. xxiv. and Mark xiii., it has been inferred by some that probably the great truth which this conception was intended to shadow forth was similar to that illustrated in the life of 'the Man of Sorrows'—that only through tribulation and strife could the reign of the Messiah be established, that Christ's kingdom, like Christ himself, could be made perfect only through suffering. And with this the language of John in his epistles, and of Paul in passages which seem to embody the same idea, is supposed to accord. Nor is it regarded as a fatal objection to this opinion, that in the Apocalypse the Antichristian power or element is associated with the great heathen capital Rome, symbolically designated Babylon.

But this opinion neither has been nor is generally prevalent. The idea of A. became early associated with that of the Millennium (q. v.), retaining a form very similar to that which it had among the Jews before the advent of the Messiah; and popular opinion has always sought to find for it some actual and definite embodiment. In the 5th c., a popular delusion prevailed, founded on the passage in the Apocalypse, xvii. 8, that Nero was not dead, and would return in the character of A. Since the 16th c., the prevalent opinion among Protestants has been that A. is the Roman Catholic Church; an idea entertained even at an earlier period, as, for instance, by Ludwig of Bavaria, regarding Pope John XXII., by Occam, Wickliffe and his pupil Cobham, and the Bohemian reformer Janow, and which seems to have prevailed to a considerable extent among the Hussites and other opponents of Rome. This opinion has of course been strenuously opposed by Roman Catholic writers, as by Bossuet, who, in his comments on the Apocalypse, ably advocates the opinion that Pagan Rome was A. The opinions of Roman Catholics, however, are much divided upon this subject, many of them maintaining that A. is yet to come and 'to raise the last persecution,' as 'no one has yet appeared to whom we can apply the character which the infallible Word of God declares shall be that of the real A.'—*Keenan's Catechism of the Christian Religion.*

The opinion prevalent among Protestants depends upon the identification of A. with the mystical Babylon of the Apocalypse, and with other symbolic representations in that book, of a power opposed to the cause of Christ, and also with the 'Wicked' one, the 'Man of Sin,' and 'Son of Perdition,' in 2d Thess. ii. Thus it is maintained that a definite embodiment of the idea of A. is to be sought in history, and that this is to be found in the Church of Rome or in the Papal power. And Protestants refer to the gradual growth and development of the errors which they regard as culminating in the Church of Rome, as accordant with the declaration of Paul in 2d Thess. ii., that 'the mystery of iniquity doth already work,' and with that of John, 'even now are there many antichrists.'

There have been, however, among Protestants eminent opponents of this opinion, among whom may be named Grotius. His own opinion was singular, that Caligula, the Roman emperor, was A. In the Greek Church, the term A. has been understood as especially applicable to Mohammed, or to the dominion of the Turks and Saracens. Almost every great or striking event—the arrival of the year 1000; the beginning of the Crusades; the 'black death' and other plagues in the 14th c.; the career of Napoleon in 1805; and even the political movements of 1848 and 1849—has suggested new interpretations of the passages of Scripture regarding A. See REVELATION OF ST. JOHN. See also ANTICHRIST in AM. SUPP.

ANTI-CORN-LAW LEAGUE, the name adopted by an association which concentrated the efforts of the free-trade party in Britain, and enabled them to carry the repeal of the corn-laws, and establish in practice the principle of free-trade. The results thus accomplished will have to be considered under other heads, as CORN-LAWS, FREE-TRADE, &c. This statement is limited to a brief account of the League itself, and its method of working. Associations to obtain the repeal of the corn-laws existed in several places before the embodiment of the League—one especially was founded in London in 1834. In 1838, Mr. Cobden and others took the opportunity of the periodical assemblages of the Manchester Chamber of Commerce for exposing the deleterious influence of the restrictive commercial policy on the manufactures and trade of the country. The friends of free-trade, at the same time, occasionally met in Manchester to discuss and promulgate their views; but it was in the beginning of 1839 that the strength of the party was first drawn to a focus, by the appointment of delegates from the manufacturing districts to proceed to London, and press their principles on the legislature. Mr. Charles Villiers, afterwards President of the Board of Trade, undertook the leadership of their cause in the House of Commons, of which Mr. Cobden, who subsequently served it so effectively, was not then a member. On the 19th of February, Mr. Villiers moved that the House resolve itself into a committee of inquiry on the corn-laws; and again, on the 12th of March, he moved that certain manufacturers be heard by council at the bar of the House against the corn-laws, as injurious to their private interest.

The former motion was rejected by 342 to 195; the latter, by 361 to 172. Immediately on the return of the delegates from their unsuccessful effort, the League was formed. Its constitution dates from the 20th March 1839, when resolutions were adopted, at a meeting in Manchester, for 'the formation of a permanent union, to be called "The Anti-corn-law League," composed of all the towns and districts represented in the delegation, and as many others as might be induced to form anti-corn-law associations, and to join the League.

'Delegates from the different local associations to meet for business from time to time at the principal towns represented.

'With the view to secure unity of action, the central office of the League shall be established in Manchester, to which body shall be intrusted, among other duties, those of engaging and recommending competent lecturers, the obtaining the co-operation of the public press, and the establishing and conducting of a stamped circular, for the purpose of keeping a constant correspondence with the local associations.'

It was resolved that, in addition to the funds which local associations might provide for their own district purposes, £5000 should be put at the disposal of the central body, and that every person or collection of persons, contributing £50, should have one vote in its deliberations. The League collected and distributed large sums of money. Just before its principles became triumphant in the free-trade legislation of 1846, it demanded a quarter of a million, which would have been supplied had it been necessary.

It is of the greatest moment that the cause of the success of the League should not be misunderstood: it triumphed not by possessing money, but by teaching a scientific truth. It was a great organization for educating the country in political economy. The leading principles of this science were so little known when the League began, and had been so effectually promulgated before its end, that a majority of the parliament who, in 1841, had been elected for the support of protection, were converted to free-trade, the conversion including the prime-minister, Sir Robert Peel. The key-note to the literature of the League was struck by the beautiful logical exposition of free-trade in General Thompson's *Catechism of the Corn-laws*, which, with other tracts, was profusely dispersed over the country, while a large staff of lecturers aided in the task of education. Thinking to serve their cause in the same manner, the Protectionist party, at a meeting held in the Duke of Somerset's house, on 17th February 1844, founded 'The Agricultural Protection Society of Great Britain.' This body had inexhaustible wealth at command, but in reality its exertions only helped to further the cause of free-trade, by promoting discussion, and prompting people to work out the question for themselves.

ANTICO'STI, an island in the Gulf of St. Lawrence, with lighthouses at different parts of the coast, between lat. 49° and 50° N., and long. 61°40′ and 64°30′ W. It is estimated to contain 2500 sq. m. Neither to the settler nor to the mariner is A. of any value. It is destitute of harbors, the north shore being mountainous, and the south low and beset by shoals; while, to increase the danger, the neighboring currents are said to be capricious. The climate is severe; while the surface is an alternation of rocks and swamps. The principal inhabitants are the keepers of the lighthouses. Pop. (1871) 102. The island is surrounded by considerable salmon, trout, cod, and herring fisheries. It is a valuable resort for seal and bear hunting. The most extensive peat deposits in the Dominion are found in A. Marl also exists in most of the small lakes and ponds along the coast.

A'NTIDOTE (Gr. given against), a counter-poison. See POISONS.

ANTI'GONE, a character of the heroic age of Greece, daughter of Œdipus by his own mother Jocasta, was sister to Eteocles, Polynices, and Ismene. She accompanied her father in his exile into Colonus in Attica, and after his death, returned to Thebes. Eteocles, the king, had banished his brother Polynices, who, coming back with an army, engaged him in single combat. Both fell, and Creon, who after their death had become tyrant of Thebes, issued an edict forbidding their interment. A. alone dared to disobey. She buried Polynices, and was in consequence seized by the monster, who shut her up, either in the same tomb with her brother, or in a subterranean cave, where she perished. This sentence threw Hæmon, son of Creon, who was betrothed to A., into such despair that he destroyed himself. A., as the ideal of feminine duty and filial devotion, has been immortalized by

Sophocles in his dramas of *Œdipus at Colonus* and *Antigone*.—A., daughter of Eurytion, and wife of Peleus, who hanged herself upon hearing a false report of her husband's marriage to Sterope, daughter of Acastus.—A., daughter of Laomedon, and sister of Priam, who, having offended Juno by comparing her own beauty to that of the goddess, had her hair turned into snakes, which so tormented her, that the gods, in compassion, changed her into a stork.

ANTI-FEDERALISTS. See PARTIES, POLITICAL, in AM. SUPP.

ANTI'GONUS. Of the numerous persons who bore this name, the most celebrated was the son of Philip of Elymiotis, and one of the generals of Alexander the Great. In the division of the empire which followed the death of his master, A. received the provinces of Phrygia-Major, Lycia, and Pamphylia. Being accused of disobedience by Perdiccas, who wished to gain possession of all the territories left by Alexander, A. entered into alliance with Craterus, Antipater, and Ptolemæus, and declared war against Perdiccas in 321 B.C. In the same year, Perdiccas was assassinated by his own soldiers; but A. carried on the war against Eumenes, to whom Perdiccas had given rule over Paphlagonia and Cappadocia. Eumenes, and afterwards Seleucus, who reigned in Syria, were deposed by A., whose ambition and cupidity now knew no bounds. He seized the treasures of Alexander kept at Ecbatana and Susa, which he refused to share with his allies, Ptolemæus, Cassander (son of Antipater) and Lysimachus. All the other generals now allied themselves against him, and a long series of contests took place in Syria, Phœnicia, Asia Minor, and Greece, which ended with the battle of Ipsus, in Phrygia (301 B.C.), when A. was slain in his eighty-first year.

ANTI'GONUS GONA'TAS was the son of Demetrius Poliorcetes, king of Macedonia, and grandson of the great Antigonus. On his father's death, B.C. 283, various claimants for the throne appeared, and much confusion ensued, the result of which was that the royal power fell into the hands of Ptolemæus Ceraunus, who, however, soon after perished in a battle with the Gauls, when A. G. at length became ruler of the country (277 B.C.) and governed precariously in that age of intrigue, dissimulation, and violence, for 33 years. He was twice expelled from his dominions by a hostile force from Epirus, but found refuge and assistance in the Peloponnesus. The close of his career was comparatively peaceful. He died in 243 B.C.

ANTI'GUA, a West India island, the most important of the Leeward Islands (see ANTILLES), and the residence of the governor-in-chief of the British portion of the group. It lies in W. long., between 61° 44′ and 61° 58′; and in N. lat., between 17° 2′ and 17° 13′. Its area is 170 square miles; or 122,000 acres, of which about 100,000 are under cultivation. In 1871, the population of A. was 34,344; in 1881, it was 34,964—about 205 persons to the square mile. It was first settled in 1632, having till then remained, in fact, uninhabited on account of the great scarcity of fresh water. It has twice suffered severely from earthquakes—in 1689 and 1843; while of hurricanes also, the other heavy scourge of the group, A. has had its full share. Numerous islets, rocks and shoals border the shore, so that, generally speaking, access is difficult and dangerous. But St. John's, the chief town, stands at the head of a safe and capacious bay, which unfortunately, however, does not admit large vessels. English Harbor is, on the whole, a more commodious port, and has been selected as the station of the Royal Mail Steam-packets. It is said to be capable of receiving the largest ships in the British navy.

A. is chiefly of tertiary formation. The south and west show grauwacke, porphyry, trap, breccia, amygdaloid, and basaltic greenstone; the north and east exhibit calcareous marl and coarse sandstone, interspersed with blocks of limestone; while the interior presents argillaceous strata and irregular beds of coarse flints.

Besides provisions, generally almost sufficient for its own consumption, A. produces large quantities of sugar, molasses, and rum. In this respect, the emancipation of the slaves appears to have been rather beneficial than otherwise. In 1880, the total tonnage of vessels (exclusive of the coasting-trade) which entered and cleared A. was 189,395, and of these the majority were British. The total value of imports was, in the same year, £161,543; of exports, £267,153. The value of the sugar exported was, in 1856, £301,740; in 1863, £199,832; in 1867, £87,393; and in 1873, £121,778. The revenue of A. is about £40,000, the expenditure a little less.

In connection generally with the emancipation of the slaves, of whom immediately previous to the abolition of slavery, A. had about 30,000, it seems to have occupied a prominently creditable position. Immediately after the passing of the imperial statute on the subject, the local legislature, rejecting the intermediate and probationary state of apprenticeship, proclaimed unqualified freedom for 1st August 1834—a bold measure, which proved to be as judicious as it was humane.

ANTI'LLES, a term used to designate generally the whole of the West India Islands, except the Bahamas. Generally speaking, they stretch eastward from the Gulf of Mexico to about the meridian of the Gulf of Paria; then southward to the Gulf of Paria itself; and lastly, westward to the Gulf of Maracaybo. Primarily, however, they are regarded not as three sections, but as two—the Greater A., to the north and west; and the Lesser, to the east and south. This distinction, which obviously involves considerations of position as well as of magnitude, will be found to indicate also a difference of organic structure.

The Greater A., reckoning from the west, are: Cuba (Spanish), Jamaica (British), Hayti (independent), and Porto Rico (Spanish). They extend, in W. long. from 84° 58′ to 65° 40′, and in N. lat. from 23° 9′ to 17° 40′—the higher of these two parallels being only 21′ or about 25 miles within the Tropic of Cancer. On the lowest estimate, the area is said to amount to 70,000 square miles. The Greater A. appear to be of primitive formation, presenting lofty granitic mountains. In Jamaica, however, there are many hills of calcareous origin.

The Lesser A. may be divided into two chains—the eastern, trending round from the eastward of Porto Rico to the Gulf of Paria; and the southern, stretching away in a direction nearly parallel with that of the Greater A., along the coast of Venezuela as far as the Gulf of Maracaybo. By the Spaniards, followed by some other nations, the latter chain is termed the Leeward Islands, and the former the Windward Islands. In English and French phraseology, however, the Leeward Islands are all those to the north of 15° N. lat., and the Windward Islands all those south of that parallel.

In the latter sense of the name, the Leeward Islands, reckoning from the north, come in pretty nearly the following order: Virgin Islands (Danish and British), Anegada (British), Anguilla (British), St. Martin (French and Dutch), St. Croix (Danish), Saba (Dutch), St. Bartholomew (French), St. Eustatius (Dutch), Barbuda (British), St. Christopher's (British), Nevis (British), Antigua (British), Montserrat (British), Deseada (French), Guadaloupe (French), Marie Galante (French), Dominica (British). They extend in W. long. from 65° 30′, at the W. extremity of the Virgin Isles, to 61° 23′, at the E. extremity of Dominica; and in N. lat. from 18° 48′, at the N. extremity of Anegada, to 15° 10′, at the S. extremity of Dominica. The area is about 5000 sq. m.

The Windward Islands, reckoning from N. to S., and then from E. to W., may be given as follows: Martinique (French), St. Lucia (British), Barbadoes (British), St. Vincent (British), Grenadines (British), Grenada (British), Tobago (British), Trinidad (British), Testigos (Venezuelan), Margarita (Venezuelan), Tortuga (Venezuelan), Blanquilla (Venezuelan), Buen Ayre (Dutch), Curaçoa (Dutch), Aruba (Dutch). They extend in W. long. from 59° 20′, at the E. of Barbadoes, to 70° 11′, at the W. of Aruba; and in N. lat. from 11°, at the S. of Margarita, to 14° 55′, at the N. of Martinique. Their entire area cannot exceed 1500 sq. m. The Windward Islands, in the Spanish sense of the term, are otherwise called the Caribbees; and hence the sea which they cut off from the open Atlantic is called the Caribbean sea (q. v.).

The Lesser A., as a whole, appear to be chiefly of coral formation, or of volcanic origin. Many of them contain extinct craters; and, though not destitute of harbors, their coasts are rendered in a great measure inaccessible by reason of reefs.

The A. generally—but perhaps the Lesser more so than the Greater—are subject to hurricanes and earthquakes. Their principal productions are sugar, rum, cotton, coffee, &c. The individual islands will be found noticed in detail in their respective places.

The name A. is generally supposed to have been given by mistake to the West Indian Islands. Before the discovery of America by Columbus, a tradition existed that far to the west of the Azores there lay a land called Antilla, whose position was vaguely indicated in the maps of the early cosmographers. Only eight months after Columbus's return, we find one Peter Martyr writing that the islands which the great navigator had touched upon, must be the Antillæ; and it is certain that Cuba and Hayti were known as such before a single link in the Caribbean chain was discovered.

ANTILOPE. See ANTELOPE.

ANTI-MASONS. See PARTIES POLITICAL, in AM. SUPP.

A'NTIMONY—symb. *Sb* (Lat. *Stibium*); equiv. 122—is a brittle metal of a flaky, crystalline texture, and a bluish-white color. It is readily reduced to powder by ordinary pulverization; when heated to 840° F., it fuses, and thereafter being allowed to cool, it solidifies in rhombohedral crystals, which are isomorphous with those of arsenic. Heated in a retort, where the oxygen of the air is excluded, as in an atmosphere of hydrogen, A. volatilizes as the vapor of the pure metal. When raised in temperature in contact with the air, it burns with a white light—combining with the oxygen of the atmosphere, and forming copious white fumes of the teroxide of A., or 'flower of A.' The metal is a bad conductor of heat and electricity, but may be used, in conjunction with bis-

muth, in the construction of thermo-electric piles. Exposed to the air at ordinary temperatures, A. does not tarnish or rust; and this property, combined with the hardness of the metal and of its compounds, renders A. of essential service in the useful arts, in the construction of alloys, such as Britannia metal, type metal, and plate pewter. It is likewise employed in the preparation of the large concave mirrors used in astronomical observations; and in casting of bells, to make them harder and whiter, and to give them a clearer and stronger sound.

The principal natural sources of A. are—*grey* or *crude* A. of commerce, which is the impure tersulphuret of A. (SbS_3); and *native* A., in which it occurs in the metallic state associated with silver, iron, and other metals. The extraction of A. from its ores is mainly carried on at Linz, in Germany, where the sulphide of A. is found extensively, and in Great Britain which receives its supply of ore from Singapore and Borneo, commonly as ballast. The process consists in heating the crude ore, covered with charcoal, on the bed of a furnace, when the sulphide of A. fuses, leaving unmelted the earthy impurities; and thereafter the liquid is drawn off into iron moulds, where it solidifies into cakes or loaves. The latter are reduced to coarse powder, placed on the bed of a reverberatory furnace, and heated with access of ordinary air containing oxygen, when the sulphur passes away as gaseous sulphurous acid (SO_2), leaving behind the A. as the teroxide (SbO_3). The roasted mass is now mixed with one-sixth of its weight of powdered charcoal, the whole moistened with a solution of carbonate of soda, and raised to bright redness in crucibles, when the metal A. trickles to the bottom, and the impurities are left above in the spent flux or scoria, which is known in the arts by the name of *crocus* of A.

The compounds of A. are numerous: with oxygen it forms (1) the *teroxide* of A., or *white A. ore* (SbO_3) which enters into the composition of tartar emetic; (2) *antimonious acid* (SbO_4), which forms one of the components of Dr. James's powders; (3) *antimonic acid* (SbO_5), a very insoluble compound, obtained by acting upon the metal with concentrated nitric acid. With sulphur, A. forms the *tersulphide* (SbS_3) already referred to as a natural ore of the metal, and which when roasted at a temperature sufficient to fuse it, passes into the mixed teroxide and tersulphide of A. known commercially as the *glass* of A. A native oxysulphide, of a pretty red color, is called *red A. ore*. When the ordinary sulphide of A. is boiled with potash, or the carbonate of potash, it dissolves; and thereafter, on boiling, deposits a reddish-brown substance, known as *mineral kermes*. The liquid from which the deposit has fallen, if treated with hydrochloric acid, throws down an orange precipitate of *golden sulphide* of A.

There is also a chloride of A. ($SbCl_3$) prepared by heating sulphide of A. and hydrochloric acid together, and which has the common name of *butter* of A. It is generally obtained as an oily liquid, of the consistence of melted butter, and of a golden yellow color. Mixed with olive oil, it is used by gunmakers as *bronzing salt*, to impart a yellow color to gun-barrels. The surface of the metal is afterwards polished by a burnisher, or coated with a varnish.

The various compounds of A. are used as medicinal agents, both in human and veterinary practice, especially the *tartar emetic*, a compound of teroxide of A., potash, and tartaric acid (SbO_3,KO,T).

ANTINO'MIANISM (Gr. *anti*, against, and *nomos*, law), the doctrine or opinion that Christians are freed from obligation to keep the law of God. It is generally regarded by the advocates of the doctrine of justification by faith, as a monstrous abuse and perversion of that doctrine, upon which it usually professes to be based. From several passages of the New Testament, as Rom. vi., and 2 Pet. ii. 18, 19, it would seem that a tendency to A. had manifested itself even in the apostolic age; and many of the Gnostic sects were really antinomian, as were probably also some of the heretical sects of the middle ages; but the term was first used at the time of the Reformation, when it was applied by Luther to the opinions advocated by John Agricola. Agricola had adopted the principles of the Reformation; but in 1527 he found fault with Melancthon for recommending the use of the law, and particularly of the ten commandments, in order to produce conviction and repentance, which he deemed inconsistent with the gospel. Ten years after, he maintained in a disputation at Wittenberg, that as men are justified simply by the gospel, the law is in no way necessary for justification or for sanctification. The 'Antinomian Controversy' of this time, in which Luther took a very active part, terminated in 1540 in a retractation by Agricola; but views more extreme than his were afterwards advocated by some of the English sectaries of the period of the Commonwealth; and, without being formally professed by a distinct sect, A. has been from time to time reproduced with various modifications. It ought, however, to be borne in mind, that the term A. has no reference to the *conduct*, but only to the *opinions* of men; so that men who practically disregard and violate the known law of God, are not therefore antinomians; and it is certain enough that men really holding opinions more or less antinomian, have in many cases been men of moral life. It is also to be observed that the term A. has been applied to opinions differing very much from each other. In its most extreme sense it denotes the rejection of the moral law as no longer binding upon Christians; and a power or privilege is asserted for the saints to do what they please without prejudice to their sanctity; it being maintained that to them nothing is sinful; and this is represented as the perfection of Christian liberty. But besides this extreme A., than which nothing can be more repugnant to Christianity, there is also sometimes designated by this term the opinion of those who refuse to seek or to see in the Bible any positive laws binding upon Christians, and regard them as left to the guidance of gospel principles and the constraint of Christian love, an opinion which, whatever may be thought of its tendency, is certainly not to be deemed of the same character with the other. Probably, the A. that does not arise out of a dislike of morality, usually originates in mistaken notions of Christian liberty, or in confusion of views as to the relation between the moral law and the Jewish law of ceremonial ordinances.

ANTI'NOUS, a beautiful youth of Claudiopolis, in Bithynia. He was page to the Emperor Hadrian, and the object of his extravagant affection, accompanying him in all his travels, but was either drowned accidentally in the river Nile, or as some suppose, committed suicide, from a loathing of the life he led, in 122 A.D. His memory and the grief of the emperor were perpetuated by many statues and bass-reliefs, of which several are very beautiful, especially two now in Rome—one found in the baths, and the other in the villa of Hadrian. 'In all figures of A.,' says Winckelmann, 'the face has a rather melancholy expression; the eyes are large, with fine outlines; the profile is gently sloped downwards; and the mouth and chin are especially beautiful.' The city of Besa, in the Thebais, near to which A. was drowned, was also rebuilt by Hadrian, and the name of Antinoöpolis conferred upon it, in memory of his favorite. A. was further enrolled amongst the gods, and temples erected to him in Egypt and Greece.

A'NTIOCH, the ancient capital of the Greek kings of Syria, was the most magnificent of the sixteen cities of that name built by Seleucus Nicator. Its situation was admirably chosen. The river Orontes, issuing from the mountains of Lebanon, flows north as far as the 36th parallel of latitude, and then south-west into the Levant. On the left bank of the river, after it has taken this last direction, and at a distance of twenty miles from the sea, lay the famous city, in the midst of a fertile and beautiful plain, ten miles long by five broad. By its harbor, Seleucia, it had communication with all the maritime cities of the West, while it became, on the other hand, an emporium for the merchandise of the East; for behind it lay the vast Syrian desert, across which traveled the caravans from Mesopotamia and Arabia. On the north, the plain of A. is bounded by the mountain-chain of Amanus, connected with the south-eastern extremity of Mount Taurus; and on the south, which is more rocky, by the broken declivities of Mount Casius, from which the ancient town was distant less than two miles. In early times, a part of the city stood upon an island, which has now disappeared. The rest was built partly on the plain, and partly on the rugged ascent towards Mount Casius. The slopes above the city were covered with vineyards, while the banks of the river displayed, as they do even at the present day, a gorgeous profusion of eastern fruit-trees. The ancients called it 'A. the Beautiful,' 'the Crown of the East,' &c. It was a favorite residence of the Seleucid princes and of the wealthy Romans, and was famed throughout the whole world for the abundance of its conveniences and the splendor of its luxury. It received from Strabo the name of *Tetrapolis*, on account of three new sites having been successively built upon, and each surrounded with a wall. Its public edifices were magnificent. The principal were—the Palace; the Senate-house; the Temple of Jupiter, burnished with gold; the Theater, Amphitheater, and Cæsarium, besides an aqueduct, a public promenade, and innumerable baths. At the beginning of the Roman empire, it was as large as Paris, and for many generations after, continued to receive numerous embellishments from the emperors. Nor did its glory fade immediately after the founding of Constantinople, for though it then ceased to be the first city of the East, it rose into new dignity as a Christian city. Ten councils were held in it.

Churches sprang up exhibiting a new style of architecture, which soon became prevalent; and even Constantine himself spent a considerable time here, adorning it, and strengthening its harbor, Seleucia. The Antiochenes themselves, however, brought about the ruin of their beautiful city. They were famous, above all other people in ancient times, for their biting and scurrilous wit, and for their ingenuity in devising nicknames; and when the Persians, under Chosroes, invaded Syria in 538 A.D., the Antiochenes could not refrain from jesting at them. The Persians took ample revenge by the total destruction of the city, which, however, was rebuilt by Justinian. The next important event in its history was

its conquest by the Saracens in the 7th c. In the 9th c. it was recovered by the Greeks under Nicephorus Phocas, but in 1084 it again fell into the hands of the Mohammedans. The Crusaders besieged and took it on the 3d of June 1098. At the close of the 13th c., the sultan of Egypt seized it: since then, it has undergone a variety of vicissitudes, and at present forms a portion of Syria, in the eyalet of Aleppo. Its modern name is *Antakieh*. It exhibits almost no traces of its former grandeur, except the ruins of its walls built by Justinian, and of the fortress erected by the Crusaders. Its manufactures are few and unimportant. In 1872 A. was mostly destroyed by an earthquake, and the population, which was then estimated at about 17,000, was in consequence greatly reduced.

ANTI'OCHUS, a common Greek name, was borne by thirteen kings of Syria, four kings of Commagene (a small country between the Euphrates and Mount Taurus), and many other persons of note (see Smith's *Dictionary of Greek and Roman Biography*). A. Soter, the first of the Syrian dynasty, or Seleucidæ, as they were called, from their founder, was the son of Seleucus, the general and one of the successors of Alexander. A. was the fruit of one of those marriages which Alexander celebrated at Susa between his generals and the princesses of Persia. His mother's name was Apama. From this fact we gather that A. was probably born in 324 B.C. For the earlier career of A., see SELEUCUS. On the murder of his father in 280 B.C., A. succeeded him in his dominions, but he afterwards permitted Antigonus Gonatas to retain possession of Macedonia on his marrying Phila, a daughter of Seleucus. A. was much occupied in wars with the Gauls, who invaded Asia Minor, and, on one occasion, is said to have gained a victory over them by the help of his elephants, from which circumstance he derived the name of Soter (Saviour). He was subsequently killed in a battle with the Gauls (261 B.C.), and was succeeded by his son A. II. This A. is mentioned in the Book of Daniel (xi. 6) as the king of the north—the king of the south being Ptolemy, whose daughter, Berenice, A. had been compelled to marry. On the death of Ptolemy, A. recalled his former wife, Laodice; but she, in revenge for the insult which she had received, caused A. to be murdered, along with Berenice and her son. A. lost the provinces of Parthia and Bactria.

But the most distinguished of the Seleucidæ was A. III., surnamed the Great, who was the son of Seleucus Callinicus, and grandson of the preceding. In his earlier wars with Ptolemy, Philopator A. was generally successful; and though he was defeated in a great battle fought near Gaza, he afterwards, by his victory over the Egyptian general, Scopas, obtained entire possession of Palestine and Cœle-Syria. In this war he was assisted by the Jews, to whom he granted many privileges. Fearing the power of the Romans, A. at length concluded a peace with Egypt, betrothed his daughter Cleopatra to the young king Ptolemy, and gave her Cœle-Syria and Palestine as a dowry. The formidable enemy which he thus hoped to escape encountered him at a later period of his career. Having conquered Philip of Macedonia, the Romans no longer dreaded a war with A., and accordingly sent him an embassy, demanding the surrender of the Thracian Chersonese, and of the places which he had conquered from Ptolemy, whose guardian the Romans had become. In 191 B.C., he was entirely defeated by the consul Acilius Glabrio at Thermopylæ, and compelled to return to Asia. Having a second time tried the fortune of war, he was defeated by Scipio, who had crossed over into Asia, and very severe terms were imposed on him. He found so much difficulty in raising money to pay the tribute the Romans demanded, that he was led to plunder a temple in Elymais, when the people rose against him, and killed him (187 B.C.). The fate of A. was foretold in the Book of Daniel (xi. 18, 19).

A. IV., (175—164 B.C.) surnamed Epiphanes, by his tyranny and sacrilege, excited the Jews to a successful insurrection under their leaders Mattathias, Judas Maccabæus, and other members of that heroic family. The monstrous life of A. is recorded in the books of the Maccabees. The last of the Seleucidæ, A. XIII., surnamed Asiaticus, was deprived of his kingdom by Pompey, who reduced Syria to a Roman province (65 B.C.).

ANTIPÆDOBA'PTIST, a term exactly designating one who objects to child-baptism. As such a one, however, is generally known in this country under the name Baptist, see BAPTIST.

ANTI'PAROS (anciently called Olearosor Oliaros), one of the Cyclades islands, celebrated for a stalactitic cave, is separated from Paros by a narrow strait. It contains about 400 inhabitants, and forms a part of the eparchy of Naxos. A. is 7 miles in length by about 3 in breadth; it is scantily supplied with water, but the flats in the north and west are tolerably fertile. Corn and wine are cultivated, but not to any great extent. The principal occupation of the inhabitants is fishing. From Kastron, the only village in the island, the distance to the celebrated grotto is about an hour and a half's ride.

This wonderful cave is not alluded to by any Greek or Roman writer whose works are extant, but must have been visited by the curiosity-hunters of antiquity, for, in 1806, Colonel Leake deciphered a Hellenic inscription which contained the names of those who had descended into it in ancient times. It is situated in the side of a mountain on the S. coast of the island, which is described as a mass of white marble. The top or entrance of the cave has a striking appearance; but the sloping descent is rather dangerous, on account of the cord by which the traveler holds being extremely slippery from constant humidity. The bottom once reached, and the grotto entered, there is presented to the eye as dazzling a specimen of stalactitic formation as can well be conceived—the roof, floor, and walls of the various chambers, all glittering with the most gorgeous incrustation, though it is said that the smoke of the torches and the constant fingering of visitors, are sullying the primitive purity of the massive columns. It is believed that there are other caves of equal splendor in the vicinity which have not yet been discovered. The height of the known cavern is 80 feet; its length and breadth more than 300; but it seems the eye can only take in at once a length of 150 feet and a breadth of 100. The grotto was first made known to the modern world in 1673, by the then French ambassador to the Porte, M. de Nointel.

ANTI'PATER. Of the many persons who bore this name in antiquity, the most celebrated was one of the generals and confidential friends of King Philip of Macedon. When Alexander led his troops into Asia, he left A.—who, along with Parmenion, had endeavored to dissuade him from the expedition—as governor of Macedonia. A. discharged the duties of this office with great ability, suppressing the insurrections in Thrace and Sparta; but Olympias, the mother of Alexander, who entertained a dislike to A., prevailed on her son to appoint Craterus as regent of Macedonia. Alexander, prompted also, it is supposed, by his own jealousy of A., consented, but died before the change was carried into effect; and A. was left to share with Craterus the government of Alexander's territories in Europe. The government of Macedonia was assigned to him; and soon after, he was called upon to defend himself against an alliance of the Grecian states. With the assistance of Craterus—on whom he afterwards bestowed his daughter Phila in marriage—and to a certain extent of Leonnatus, he succeeded in reducing the allies to subjection. Democracy at Athens was abolished, a garrison admitted into Munychia, and the leaders of the popular party put to death. When Demosthenes was summoned to the presence of A., he took poison, which for some time he had been carrying on his person, and died in the temple of Poseidon (322 B.C.). This war was followed by another with Perdiccas, who was also his son-in-law, in which A. again was successful. After the murder of Perdiccas in 321 B.C., A. was appointed to the supreme regency of the kingdom, and the guardianship of Alexander's children. He died at an advanced age, in B.C. 318 or 319, leaving the regency to Polysperchon, to the exclusion of his own son Cassander.

The others of this name were: I. A., second son of Cassander, king of Macedonia, who lived in the 3d c. B.C.—II. A., the father of Herod the Great. He flourished in the days of Pompey and Julius Cæsar, was a firm friend of the Romans, and about the year 47 B.C. was appointed procurator of Judea. He was poisoned in 43 B C. by one whose life he had twice saved.—III. A., grandson of the former, and son of Herod the Great by his first wife Doris, a worthless prince, who was perpetually conspiring against the life of his brothers, until his trial and condemnation at Jerusalem before Quintilius Varus, the Roman governor of Syria. He was executed in prison five days before Herod died, and in the same year with the massacre of the innocents at Bethlehem.

A. was likewise the name of various eminent men in ancient times—physicians, philosophers, historians, poets, mathematicians, and grammarians.

ANTI'PATHY is the term applied to a class of cases in which individuals are disagreeably affected by, or violently dislike, things innocuous or agreeable to the majority of mankind. These peculiarities are no doubt sometimes acquired in early life by injudiciously terrifying children with some object, the mental impression becoming permanent. A large class of persons have an A. to animal food, and from childhood refuse to taste it. In others, again, the aversion is limited to one kind of meat, as veal or pork; others are averse to eggs or milk. Nor is this feeling a conscious caprice, which an exertion of the will might remove; for it is generally found that contact with the object of the A. is resented by the bodily economy, and symptoms of poisoning are rapidly produced. Some are affected with these symptoms who have no mental aversion to the article. We read of a countess who had a liking for beef-udder, but directly it touched her lips they became swollen. There is also the case of a boy, who, 'if at any time he ate of an egg, his lips would swell, in his face would rise purple and black spots, and he would froth at the mouth.' Some medicines affect particular persons dangerously, even when given in very minute doses: a single grain of mercury has been known to induce a profuse salivation, with destruction of the jaw-

bones. On others, medicines have a peculiar effect—astringents may purge. Every summer, in Great Britain, persons may be seen with the most distressing irritation of the nasal and palpebral mucous membranes, produced by the exhalations arising from the fields during the inflorescence of the hay-crop. In others, an asthmatic condition is induced by the same cause. The air of some places has a similar influence on individuals: one gentleman was always attacked with asthma if he slept in the town of Kilkenny, and another rarely escaped a fit of that complaint if he slept anywhere else.

The most remarkable antipathies are those affecting the special senses. Nearly all persons have a loathing at reptiles, but some few *faint* on *seeing* a toad or lizard, others on seeing insects. 'The Duke d'Epernon swooned at sight of a leveret—a hare did not produce the same effect. Tycho Brahé fainted at sight of a fox, Henry III. of France at that of a cat, and Marshal d'Albert at a pig.'—*Millingen.*

Hearing a wet finger drawn on glass, the grinding of knives, or a creaking wheel, is sufficient to produce fainting in some. *Smelling* musk or ambergris throws some into convulsions; and we have seen how articles of food affect others—often, no doubt, owing to perverted taste. The *touch* of anything unusually smooth has the same effect sometimes. Zimmerman records the case of a lady who was thus affected by the feeling of silk, satin, or the velvety skin of a peach.—This subject is also noticed under IDIOSYNCRASY.

ANTIPHLOGI'STIC (Gr. *anti*, against, and *phlego*, I burn), a term applied to remedies, and also to regimen, that are opposed to inflammation; such as blood-letting, purgatives, low diet, &c.

A'NTIPHON, the earliest of the ten Attic orators in the Alexandrine canon, was the son of Sophilus the Sophist, and born at Rhamnus in Attica 480 B.C. In his youth, the reputation of Gorgias, the most showy and insincere of all the Greek rhetoricians, was at its height. A. soon became convinced of the worthlessness of that oratory which the fashion of the time so highly valued, and resolved to introduce a new and better kind. He labored to make his arguments clear, solid, and convincing, so that it might be impossible for the judges who listened to the speeches he wrote to refuse their assent to his propositions. His success was unmistakable. Although he never made a public appearance as a pleader in the courts of justice, but contented himself with writing speeches for others to deliver, he acquired great influence, which he did not fail to exert for the furtherance of his political principles. To him must be attributed the overthrow of the Athenian democracy (411 B.C.), and the establishment of the oligarchical government of the Four Hundred; for although Pisander figured prominently before the people in this revolution, the whole affair, according to Thucydides—one of A.'s pupils in oratory, and a man admirably fitted to judge of such a point—was secretly planned by him. The oligarchical government did not prosper. Dissensions quickly broke out among the Four Hundred, and six months after, Alcibiades the brilliant demagogue, was recalled. A. was brought to trial for treason, in having attempted to negotiate peace with Sparta. He is said to have made a noble defence of himself. Thucydides affirms that an abler was never made by any man in a similar position. It was his first and last oration. He was condemned to death; his property was confiscated, his house razed to the ground, his remains forbidden interment in Attica, and his children for ever declared incapable of enjoying civic privileges. Of the 60 orations of A. which the ancients possessed, only 15 have come down to us. Three of these are written for others, and are greatly admired for their clearness, purity, and vigor of expression; the remaining 12 appear to have been intended as specimens of school-rhetoric for his pupils. They are not held in equal estimation with the others.

ANTI'PHONY, a name given by the ancient Greeks to a species of musical accompaniment in the octave, by instruments or voices, in opposition to that executed in unison, which they called *Homophony*. A. is also the name of a species of sacred song, sung by two parties, each responding to the other; a practice which was cultivated in the early ages of the Hebrews, Greeks, and Romans. Many of the Psalms of David show that antiphonal singing was then in use. Its introduction into the Greek Church is ascribed to Ignatius, Bishop of Antioch, in the 2d c.; and Ambrosius, Bishop of Milan, is said to have introduced it into the Western Church, in the 4th c. The dividing of the antiphonies into verses, with rules regarding the same, is attributed to Pope Celestin in 432. Pope Gregory I., in 590, prepared the first regular *Antiphonarium* (see *Durandi Rationale Divinorum Officiorum*, Mainz, 1459). It was early a custom, which became especially common after the 13th c., to date deeds with the beginning words of the A. (*Introitus*), which in these times served for the day of the month and of the week. The Reformed Christian Churches of Germany and England have still retained a certain degree of antiphonal singing. The chanting of the Psalms in the English cathedral service is an imitation of the ancient antiphony.

ANTI'PODES, a word of Greek origin, signifying, literally, those who have their feet over against each other. As applied to geography, the term means the inhabitants of any two opposite points of the globe, or, in other words, the dwellers at the opposite extremities of any diameter of the earth. From this primary relation, there necessarily arise many secondary relations. A. must be on one and the same meridional circle, separated from each other by half the circumference. Being on one and the same meridional circle, they must differ in long. exactly 180°, with the exception of the poles themselves, as having no longitude at all; and being separated from each other by half the circumference, they must be equi-distant from the equator in opposite directions. Take Edinburgh, as an example, in lat. 55° 57′ N., and long. 3° 11′ W.; its A. must be in lat. 55° 57′ S., and in long. 183° 11′ W., or rather in 176° 49′ E.—which is merely an undistinguishable spot in the Antarctic or Southern Ocean. Take, as another example, London, in lat. 51° 30′ N., and long. 0° 5′ W. Its A. must be in lat. 51° 30′ S., and in long. 180° 5′ W., or rather 179° 55′ E.—coinciding pretty nearly with a small island to the south-east of New Zealand. This small island, in honor rather of London than of itself, has appropriated the term A. as its own peculiar name.

Between A. in general there necessarily exist also other secondary relations. With reference to the earth's daily rotation, the noon of the one side must be the midnight of the other; while, with regard to its annual revolution, the summer and the autumn of the one side must be the winter and the spring of the other. With respect, however, to the former contrast, some explanation may be required.

This, for instance, being Wednesday in London, was last midnight in that city the noon of Tuesday or of Wednesday at A. Island? The answer is, that, according to circumstances, it may be held to be either the one or the other. In going eastward—that is, in meeting the sun—one, from day to day, anticipates every noon and every midnight in the proportion of 4′ of time to 1° of long., or of 12 hours of time to 180° of long.; so that, on reaching A. Island from London by the Cape of Good Hope, the middle of Tuesday night, by Greenwich reckoning, is actually regarded on the spot as the noon of Wednesday. In going westward, again—that is, in leading, as it were, the sun—one, from day to day, postpones every noon and every midnight in the same proportion as above; so that, on reaching A. Island from London by Cape Horn, the middle of Tuesday night, by Greenwich reckoning, is actually regarded on the spot as the noon of Tuesday. In fact, navigators in opposite directions, meeting at any intermediate point whatever of the earth's circumference, always differ in their computation of time by a whole day, or 24 hours. In two cases, this has been permanently exemplified: the Spaniards at the Philippines, who have come from the east, are a day behind the Portuguese in Macao, who have come from the west; while, on the north-west coast of America, the Russians from the west were a day in advance of the British from the east.

A'NTIPOPE was a pontiff elected in opposition to one canonically chosen. The first antipope is reputed to be Laurentius, elected 398, in opposition to Symmachus. Several emperors of Germany set up popes against those whom the Romans had elected without consulting them. Otho the Great displaced successively two bishops of Rome; and when Sylvester III. had expelled the simoniacal and profligate pope Benedict IX., Conrad II., king of Germany, brought back this worthless pastor, who hastened to sell his dignity to Gregory VI. There were now, consequently, three popes, and their number was increased to four by the election of Clement II. in 1046. Shortly after, Alexander II. found a rival in Honorious II.; and in 1080 the same unseemly spectacle was witnessed, when Henry IV., emperor of Germany, elevated to the papal chair, Guibert of Ravenna, under the title of Clement III., in opposition to his implacable adversary, Gregory VII. But after the death of Gregory, Clement was himself opposed successively by Victor III. and Urban II., and at last died at a distance from Rome, having just beheld the exaltation of Pascal II. as the successor of Urban. During the 12th c., several antipopes flourished, such as Gregory VIII. and Honorious III.

On the death of the latter, France began to intermeddle in these disgraceful strifes, and upheld the cause of Innocent II. against Anaclet; while the kings of Sicily, on the other hand, more than once set up a pontiff of their own against the choice of the emperors. Between 1159 and 1378, there were four antipopes; but the most remarkable epoch is 'the great schism of the West,' produced by these disedifying rivalries in 1378—a schism which divided the Church for fifty years. It broke out after the death of Gregory XI., at the election of Urban VI., whom the voice of the Roman people, demanding an Italian pope, and not one who should fix his pontificate, like several of his predecessors, at a distance from Rome, had elevated to the papal throne. The French cardinals objected, withdrew to Provence, and elected a new pope, under the name of Clement VII., who was recognized by France, Spain, Savoy, and Scotland; whilst Italy, Germany, England, and the whole north of Europe, supported Urban VI. These two popes

excommunicated each other; nor did they even fear to compromise their sacred character by the most cruel outrages and the most odious insults. The schism continued after their death, when three popes were elected by different parties, all of whom were deposed by the Council of Constance in 1415, and Cardinal Colonna elected in their room, under the title of Martin V. The last antipope was Clement VIII. With him the schism ceased. These divisions are often alleged as an argument against the doctrine of papal infallibility; but Catholics consistently affirm that the privilege of infallibility is only claimed in matters of doctrine, and has no relation to questions of fact, such as disputed succession, or canonicity of election. See POPE.

A'NTIQUARIES, SOCIETY OF. Under this name, associations of learned men, established for the exclusive purpose of cultivating the study of antiquities, exist in the principal countries of Europe and in America—at London, Edinburgh, Paris, Rome, Vienna, Copenhagen, &c. The London Society of A. received its charter in 1751, but had commenced its meetings as early as 1707; minutes began to be kept in 1718. Long previous to this, in 1572, an Antiquarian Society was established by Archbishop Parker and Sir Robert Cotton. It was dissolved about 1604 by King James, who regarded the inquiries of the A. with suspicion. The present 'Society of A. of London' consists of a president, a council of 21, and several hundred Fellows. It has published a number of valuable works, among the most interesting of which is a series of Anglo-Saxon and early English literary remains. The Scottish Society of A. was founded in 1780. It has published several volumes of Transactions and Proceedings, with numerous cartularies, besides having collected a valuable museum, which has now become national property, and is arranged for permanent exhibition at the expense of the government. The *Société des Antiquaires de France* took that name in 1814, having been founded in 1805 as the *Académie Celtique*. With the change of name, the sphere of the Society's labors was greatly enlarged. It has published many important works. A similar institution is the *Société des Antiquaires de Normandie*, founded at Caen in 1824. The Copenhagen Society of A. is a body of high reputation. See ARCHÆOLOGY.

ANTI'QUE. As the term ancients is commonly applied to the Greeks and Romans, the word A. is used with reference to their works of art, especially their incomparable sculptures. The A. Style in works of art is distinguished by critics from the Romantic or Medieval, and also from the Modern. The sculpture of the Greeks is characterized by freshness, originality, and ideality; and the phases it underwent have their parallels in the development of the literature and general culture of that people. In the earliest times, the statues had a rigid, formal character, and looked more like the idols of barbarous nations than deities in human form; then came stern, Titan-like forms, corresponding with the Prometheus of Æschylus; next, the sculptures of Phidias, Polycletes, and Polygnotus—like the characters in the dramas of Sophocles—present to us humanity in its purest and noblest ideal forms. Then, as Euripides in poetry left the old domain of destiny, and derived motives and action from ordinary human passions, so statuary descended from the ideal to a closer resemblance to the forms of actual life; as we see in the works of Praxiteles and Lysippus. Afterwards, when Aristophanes introduced comedy, forms of every-day life began to appear in sculpture; and thus a gradual transition was made from the art of the Greeks, which was ideal, in the true sense of the word, to that of the Romans, which was real, monumental, and portrait-like. The Romans were the realists of the ancient world; their indigenous philosophy was of a popular kind; their poetry, so far as it was national, was satire; and their works of art may be regarded as monuments and portraitures of real life.

ANTIQUITIES. See ARCHÆOLOGY.

ANTI-RENTERS. See PARTIES, POLITICAL, in AM. SUPP.

ANTIRRHINUM. See SNAPDRAGON.

ANTISCORBUTICS. See SCURVY.

ANTISEPTICS (*anti*, against, *septikos*, causing putrefaction) are substances which prevent or arrest putrefaction and analogous fermentive changes. It has been proved that Putrefaction (q. v.), fermentation of grape-juice (*vinous fermentation*), of milk, (*lactic fermentation*), and many, though probably not all other fermentations, depend upon the presence of microscopic vegetable organisms (see GERM THEORY). To prevent these processes, then, it is necessary either (1) to exclude these organisms altogether; (2) to interfere with conditions which permit of their development; or (3) to destroy their vitality.

(1) These organisms, or their germs, are present in ordinary air; but it has been shown by Pasteur, Tyndall, Lister, Roberts, and others, that if air be filtered through cotton wool, or (if moving slowly) through a fine bent tube, it may be allowed to come in contact with putrescible substances, if these themselves contain no living organisms or germs, without causing putrefaction. This method, however, has had no important practical applications.

(2) Their growth may be arrested (*a*) by a low temperature. Thus large quantities of fresh meat are imported from America, and even Australia and New Zealand, in chambers cooled to near the freezing-point. Carcases of the long extinct mammoth, with the flesh still present, have been found in the ice-cliffs of Siberia. The longer time that meat, milk, &c., keep in cold than in hot weather is familiar. (*b*) By absence of moisture. Thus, if the contents of an egg be thrown out on a plate, and thoroughly dried in an oven, the whole becomes of a hard, horny consistence, and may be kept in this state for years. If soaked in water, it will soon begin to putrefy. In the same way meat may be kept fresh by thoroughly drying it. The preservation of fruits, &c., in strong syrup is an example of a similar action.

(3) The vitality of these organisms may be destroyed (*a*) by heat; e. g., meat and other eatables can be preserved for an indefinite time if they are boiled and hermetically sealed while still hot in tin vessels (see PRESERVES); (*b*) by various chemical substances. Some of the most important are common salt and saltpeter, used in curing fish, pickling meat, &c.; alcohol, in preserving zoological specimens, vegetable essences, fruits, &c.; sulphurous acid, boracic acid, and arsenious acid; many salts, as chloride of zinc (Burnett's solution, q. v.), permanganate of potash (Condy's fluid, see under MANGANESE), sulphate of copper (blue vitriol), corrosive sublimate, nitrate of silver; chlorine (given off by chloride of lime), iodine, iodoform (CHI_3), glycerine, boroglyceride ($C_3H_5Bo_3$), eucalyptus oil, thymol, creasote, carbolic acid, salicylic acid, tannic acid, quinine, the patent preparation 'sanitas,' charcoal (both vegetable and animal), dry mould, used in the earth-closet system (see SEWAGE EARTH-CLOSET). All these substances act directly or indirectly as poisons to the organisms which produce putrefaction, &c.; most of them are either poisonous or very unpalatable to man, and cannot therefore be used in preserving food. Many of them are, however, used in the arts to arrest the decomposition of putrescible substances; e. g., in the manufacture of size for writing-paper from scraps of hides, sulphite of soda or antichlore, containing sulphurous acid, is added; hides are preserved by salt, or, when tanned, by tannin, a compound of tannic acid; timber is found less liable to decay if charged with an antiseptic, such as sulphate of copper, chloride of zinc, corrosive sublimate, or creasote. It is placed in a steam-box, so that the air contained in its pores is replaced by steam; the whole casing is then closed tight, and allowed to cool; the steam condenses and leaves a vacuum in and around the wood. If one of these substances is then introduced, it finds its way into the innermost pores of the timber (see also WOOD-PRESERVING).

But next to the preservation of food, the most important purposes for which antiseptic methods and substances are used, are the *prevention of infectious diseases*, and the *treatment of wounds*.

The properties of the infectious matter of infectious diseases are closely analogous to those of the organisms that lead to putrefaction, &c.; and even in cases where its organic nature has not been proved (see GERM THEORY), can be rendered inert by a proper use of A., or by exposure to a high temperature. Thus anything that has come near the patient suffering from an infectious disease, and discharges from his person, can be made harmless by carbolic acid, chloride of zinc, or some other antiseptic; his bedding is roasted in an oven at a temperature of 212° F. or more; the room where he has been treated is fumigated with chlorine or sulphurous acid; and so the disease is prevented from spreading. This is, in fact, one of the chief aims of medical practice at the present day (see DISINFECTANTS).

Many of the evil effects which follow wounds and surgical operations are due to the presence of organisms (see PYÆMIA); and the effects of their antiseptic treatment, introduced by Mr. Lister, have been marvelous (see CARBOLIC ACID.).

ANTISPASMO'DICS. See SPASM.

ANTI'STHENES, founder of the Cynic school of philosophy, was the son of A., an Athenian. He fought in his youth at Tanagra (426 B.C.), survived the battle of Leuctra (371 B.C.), and died at Athens at the age of 70. After listening to the teaching of Socrates, he gave up rhetoric, which he had followed at first as a disciple of Gorgias, and applied himself wholly to philosophy. He was present at the death of Socrates, and never forgave his persecutors. A. held that virtue mainly consists in voluntary abstinence from pleasure, and in a stern contempt of riches, honors and even learning. Opinions of still greater extravagance are ascribed to A., but it is probable that they were rather extreme views, which he put into the mouths of the interlocutors in his dialogues, than expressions of those which he himself entertained. Even in his condemnation of pleasure, he excepted such as springs from the soul, or is founded on true friendship. In consistency with his teaching, A. appeared as a beggar, clad in ragged garments—an eccentricity which Socrates is said to have reproved by saying, 'I see your pride through the holes in your cloak.' The singularity affected

by A. gained many imitators, and among them Diogenes, who chose to live in a tub, and surpassed the master himself in Cynic practice. After the death of Socrates, A. taught moral and practical philosophy in the Athenian gymnasium Cynosarges, from which, it is said, his school derived its title. His writings—among them a polemical work against Plato—have mostly perished. Such fragments as remain have been collected by Winckelmann (*A., Fragmenta*, Turici, 1842). Ritter classes A. with the 'imperfect Socraticists.'

ANTI'THESIS (*tithemi*, to place, *anti* against), a figure of speech in which words are placed in direct opposition to each other, to produce a strong contrast. Thus Lessing, in criticism on a book, says: 'It contains many good things, and many new; but the good are not new, and the new are not good.' A., when naturally and moderately employed, gives liveliness to style; but, like all strong figures of speech, becomes wearisome when too often repeated.

ANTITRINITA'RIAN, one who denies the doctrine of the Trinity. An A. differs from a Unitarian only in this respect, that his objection to the doctrine in question is made on philosophical, while that of the latter is made on theological grounds. A Unitarian is one who accepts the Bible as inspired, but does not find in it the doctrine of the Trinity; an A. is, or may be, a philosophical theist, who denies the inspiration of Scripture. Mohammed, from the stand-point of a new and hostile religion, also denied this great Christian dogma. He announced himself, with fierce emphasis, an A.; and his followers to the present day are characterized by the intensity of their monotheism. See UNITARIAN and SOCINIAN.

A'NTITYPE, a Greek word, literally signifying a type or figure which corresponds to some other type or figure. In its theological sense, it denotes, not a type, but the person in whom any prophetic type is fulfilled; thus, Christ is called the A. of the paschal lamb. See TYPE.

A'NTIUM, one of the most ancient cities of Latium, stood on the coast 34 miles S.S.E. from Rome. Being favorably situated for commerce and piracy, it became, under the Volscians, into whose hands it had fallen, one of the most powerful enemies of rising Rome, until finally subdued (338 B.C.). It became a favorite resort of the wealthy Romans, and some of the most famous remains of ancient art have been discovered among the ruins of their villas and palaces; such as the Apollo Belvedere, and the Borghese Gladiator. It was the birthplace of the Emperors Caligula and Nero; and the latter constructed a splendid port by means of two moles enclosing a basin two miles in circumference. Antium was completely destroyed by the Saracens during the middle ages; and it was only in the 17th c. that the modern village of PORTO D'ANZO arose, the population of which does not exceed 500.

ANTIVARI, a seaport on the coast-district assigned to Montenegro by the Treaty of Berlin in 1878. It was formerly Albanian, and is 18 miles N.W. of Scutari. It has a good harbor, shut against war-ships. Pop. about 7000.

ANT-LION, the larva of an insect (*Myrmeleon formicarium*) of the order Neuroptera, remarkable for its habits, which have been carefully observed by some of the ablest naturalists of Europe. It inhabits sandy districts, is not known in Britain, and is more common in the south of Europe than in the north. The perfect insect is about an inch long, and has a considerable general resemblance to a dragon-fly. The larva is rather more than half an inch long; it has a very large abdomen, and a small head, which, however, is furnished with two very large incurved mandibles. It has six legs, but is incapable of rapid locomotion, and generally moves backwards. It feeds upon the juices of insects, particularly of ants, in order to obtain which it excavates with the greatest ingenuity a funnel-shaped hole in sandy ground, and lies in wait at the bottom, all but its mandibles buried in the sand. Insects which approach too near the edge of the hole, then become its prey, by the loose sand giving way, so that they fall down the steep slope. If they do not fall quite to the bottom, but begin to scramble up again, the A. throws sand upon them by jerking its head, and so brings them back. It employs its head in the same way to eject their bodies from its pit, after their juices have been sucked, and casts them to a considerable distance; and by the same means throws away the sand in excavating its hole, first ploughing it up with its body, and then placing it upon its head by means of one of its fore-legs. It always begins by working round the circular circumference of its future hole, and gradually narrows and deepens it; turning quite round after each time that it works round the hole, so as to employ next time the fore-leg of the other side. When it meets with a stone which it cannot remove, it deserts the excavation, and begins another. The pit is rather more than two inches deep. After about two years the larva spins its cocoon.

Ant-lion:
a, larva; *b*, perfect insect.

ANTOMMARCHI, FRANCESCO a well-known physician and native of Corsica, was born in the second half of the 18th c. He owes his celebrity almost entirely to his intimacy with Napoleon Bonaparte during the exile of the latter in St. Helena. In 1818, he was induced to leave Florence, where he held the office of anatomical dissector in the Hospital of Santa Maria Nuova of Florence, and to become private physician to the banished emperor. There was at first little cordiality between the two; but subsequently Bonoparte conceived a high regard for his countryman, and at his death left him 100,000 francs. In 1821, A. returned to Europe, and in 1826 published at Paris *Les Derniers Moments de Napoleon*, a work which has been very extensively read. He now became involved in a dispute with the heirs of Mascagni—his old anatomical professor—regarding certain anatomical plates which he announced as on the eve of publication. The heirs affirmed that A.'s lithographed drawings were mere copies from the plates of Mascagni, and the controversy went on briskly for some time, till Paris grew tired of it, when it gradually died away and was forgotten. On the breaking out of the Polish revolution, A. departed for Warsaw, where he received the appointment of general inspector of military hospitals. He soon returned to Paris, where he published a cast of Napoleon's head, which he affirmed to have taken when the emperor was on his death-bed. This declaration again involved him in a hot dispute with the phrenologists, who were not satisfied with the conformation of the cranium, and therefore cast suspicion—some of them apparently not altogether ill-founded—on the veracity of A's. statements. Harassed by the attacks of his adversaries, and sick of further controversy, A. about 1836, resolved to emigrate to America. He died at San Antonio, in Cuba, on the 3d of April 1838.

ANTON ULRICH, second son of Duke Ferdinand Albert of Braunschweig-Wolfenbüttel (till 1735, Braunschweig-Bevern, the title by which the prince was first known in Russia), was born in 1714. When the Russian Empress Anna was looking out for an alliance for her niece, Anna Carlowna, Princess of Mecklenburg-Schwerin, the influence of Austria led her to chose A. U. Accordingly, he came to Russia in 1733, was appointed colonel of a cuirassier regiment, and placed in the receipt of a considerable pension. The marriage was, however, long delayed. The princess showed a decided distaste for the insignificant character of the bridegroom-elect, and only married him to avoid a still more hated union with the son of Biron. The birth of the Prince Ivan took place in 1740, a year after the marriage. About the same time, the empress falling dangerously sick, appointed the infant prince her successor, and Biron regent. After her death, A. U. made some feeble attempts to reverse this appointment, which only led to the punishment of those supposed to have instigated them, and to his own military degradation. Biron's conduct towards the parents of the infant prince becoming unbearably insolent, Anna appealed in despair to General Münnich, who put a sudden end to Biron's sway, and declared the grand-duchess and her husband regents. After a few months, Anna ungratefully overthrew Münnich. After his fall, as little unity prevailed between the ministers at the helm as between herself and her husband, and the government was looked upon as both a foreign and a contemptible one. Then came the revolution of the 5th December, 1741, which in one night raised Elizabeth (q.v.) to the throne. A. U. and his consort were exiled, and lived long at Cholmogory, in the government of Archangel. Three children were born to them in exile. Anna died in 1746. Catharine II. offered A. U. his freedom, but he declined it. Ultimately, he grew blind. The exact year of his death is uncertain, but it is supposed to have taken place about 1780. Catharine offered to his children an asylum in Jutland, where they all died in comfortable circumstances.

ANTONE'LLI, GIACOMO, a distinguished cardinal, was born on the 2d of April, 1806, at Sonnino, a village situated near the Pontine Marshes. His father, a woodcutter, sent A. to be educated at the Grand Seminary of Rome, where he proved himself one of the cleverest students of his time. He gained the favor of the late Pope Gregory XVI., who named him a *prelato*, and gave him some excellent ecclesiastical appointments. In 1841, A. became Under-secretary of State to the Ministry of the Interior; in 1844, Second Treasurer; and in the following year, Finance Minister of the two Apostolic Chambers. Pope Pius IX. having mounted the papal throne in 1846, raised A., during the next year, to the dignity of Cardinal-deacon of St. Agatha alla Suburra. In 1848, A. was President and Minister of Foreign Affairs in a liberal cabinet, which framed the famous *Statuto* or Constitution, proclaimed in 1848, the principal articles of which were so very soon eluded. In the Œcumenical Council, which began its sittings in 1869, A. showed great tact and ability in restraining the zeal and impetuosity of his impulsive master. He died in 1876.

ANTONE'LLO (of Messina), a painter who holds a prominent position in the history of Italian art, was born probably about 1414, in Sicily. In his day, the paintings of Johann van Eyck (of Flanders) enjoyed a wide celebrity, and several specimens were brought to Naples, where A. saw one of them. Admiring the new style of oil-painting, he traveled into Flanders, and learned the secrets of the art from Van Eyck. Afterwards, he settled in Venice, and was the first Italian who painted in oil-colors, in which he gave instruction to many artists. He died probably in 1493. His works are now rather scarce. One, in the Museum at Berlin bears the date 1445.

ANTONI'NUS, MARCUS AURELIUS, the son of Annius Verus and Domitia Calvilla, was born at Rome on the 20th of April 121 A.D. His original name was Marcus Annius Verus. On the death of his father, he was adopted by his grandfather, who spared no pains to render him pre-eminent in every art and science. His fine qualities early attracted the notice of the Emperor Hadrian, who used to term him, not *Verus*, but *Verissimus*, and who conferred high honors on him, even while a child. When only seventeen years of age, he was adopted, along with Lucius C. Commodus, by Antoninus Pius, the successor of Hadrian; and Faustina, the daughter of Pius, was selected for his wife. In the year 140 A.D. he was made consul; and from this period to the death of Pius, in 161 A.D., he continued to discharge the duties of his various offices with the greatest promptitude and fidelity. The relation which subsisted between him and the emperor was of the warmest and most familiar kind. On his accession to the throne, he strikingly illustrated the magnanimity of his character, by voluntarily sharing the government (which Pius had left in his last moments, and the senate offered to him *alone*) with young Commodus, who henceforth bore the name of Lucius Aurelius Verus, and to whom he gave his daughter Lucilla in marriage. Towards the close of 161 A.D., the Parthian War broke out, and Lucius, a young man of vigorous bodily habits, was sent to the frontiers of the empire, to repel the incursions of the barbarians; but intoxicated with the enervating pleasures of the East, he obstinately refused to go beyond Antioch, and intrusted the command of the army to his lieutenant Cassius, who gained several brilliant victories. Lucius returned to Rome (166 A.D.), and enjoyed a triumph to which he had no real claim; for all the great achievements of the war were accomplished by his officers, while he was reveling in the most extravagant licentiousness. In the meantime, Marcus Aurelius had distinguished himself by the prudence and energy with which he administered affairs at home. A formidable insurrection had long been preparing in the German provinces; the Britons were on the point of revolt, and the Catti waiting for an opportunity to devastate the Rhenish provinces.

Within Rome itself raged a pestilence, believed to have been brought home by the troops of Lucius; frightful inundations and earthquakes had laid large portions of the city in ruins, destroyed the granaries in which were kept the supplies of corn, and thus created almost universal distress, which stimulated to an incalculable degree the terror which the citizens entertained of their savage enemies. To allay the popular perturbation, Marcus resolved to go forth to the war himself. Hecatombs were offered to the offended gods, and the Roman legions set out for the north. Marcus and Lucius were, for the time, completely successful. The pride of the Marcomanni, and the other rebellious tribes inhabiting the country between Illyria and the sources of the Danube, was humbled, and they were compelled to sue for peace in 168 A.D.; in the year after which Lucius died. The contest was renewed in 170 A.D., and may be said to have continued with little intermission during the whole life of the emperor. Although fond of peace, both from natural disposition and philosophical culture, he displayed the sternest vigor in suppressing the revolts of the barbarians; but in order to accomplish this, he had to enrol amongst his soldiery vast numbers of gladiators and slaves, for his army had been thinned by the ravages of the plague. His headquarters were Pannonia, out of which he drove the Marcomanni, whom he subsequently all but annihilated in crossing the Danube. The same fate befell the Jazyges; but the most famous as well as the most extraordinary of all his victories, was the miraculous one gained over the Quadi (174 A.D.), and which gave rise to copius discussion amongst Christian historians and others. Dion Cassius's account is, that the Romans were perishing of thirst in the heat of summer, when suddenly the cloudless sky darkened, and abundant showers fell, of which the soldiers were taking advantage when the barbarians attacked, and would have cut them to pieces, if a storm of hail and fire had not descended on the former. That some extraordinary phenomenon occurred is evident, for there is a letter of Aurelius still extant in which he commemorates the event; and the emperor was a man incapable of uttering a falsehood, not to mention that there was an entire army living to disprove the statement, if untrue. The effect of this remarkable victory was instantaneously and widely felt. The Germanic tribes hurried from all quarters to make their submission, and obtain clemency; but the practical advantages that might have resulted from it were nullified by a new outbreak in the East, occasioned through the infamous treachery of his own wife, which demanded his presence; and though suffering from failing health, he was obliged to leave Pannonia.

Before his departure, however, he learned that the ambitious governor, Avidius Cassius, who had rebelled against him, and seized the whole of Asia Minor, had perished by assassination. The conduct of Marcus Aurelius on hearing of his enemy's death was worthy of the sublime virtue of his character. He lamented that the Fates had not granted him his fondest wish—to have freely pardoned the man who had so basely conspired against his happiness. Like Cæsar in similar circumstances, but in a more purely humane spirit, he received the head of his murdered adversary with quite opposite feelings to what had been anticipated, rejecting the bloody gift with all the loathing of a benevolent nature, and even shrinking from the presence of the murderers. On his arrival in the East, he exhibited the same illustrious magnanimity. He burned the papers of Cassius, without reading them, so that he might not be at liberty to suspect any as traitors; treated the provinces which had rebelled with extreme gentleness; disarmed the enmity, and dispelled the fears of the nobles who had openly favored his insurgent lieutenant. While pursuing his work of restoring tranquillity, Faustina died in an obscure village at the foot of Mount Taurus; and her husband (and this was perhaps the single frailty of his character), though undoubtedly conscious of her glaring profligacy and infidelity, paid the most lavish honors to her memory.

On his way home, he visited Lower Egypt and Greece, displaying everywhere the noblest solicitude for the welfare of his vast empire, and drawing forth from his subjects, who were astonished at his goodness, sentiments of the profoundest admiration and regard. At Athens, which this imperial pagan philosopher must have venerated as a pious Jew did the city of Jerusalem, he showed a catholicity of intellect worthy of his great heart, by founding chairs of philosophy for each of the four chief sects—Platonic, Stoic, Peripatetic, and Epicurean. No man ever labored more earnestly to make that heathen faith which he loved so well, and that heathen philosophy which he believed in so truly, a vital and dominant reality. Towards the close of the year 176 A.D., he reached Italy, and celebrated his merciful and bloodless triumph on the 23d of December. In the succeeding autumn, he departed for Germany, where fresh disturbances had broken out among the restless and volatile barbarians. He was again successful in several sanguinary engagements; but his originally weak constitution, shattered by perpetual anxiety and fatigue, at length sunk, and he died either at Vienna, or at Sirmium, on the 17th of March, 180 A.D., after a reign of twenty years.

Marcus Aurelius A. was the flower of the stoical philosophy. It seems almost inexplicable that so harsh and crabbed a system should have produced as pure and gentle an example of humanity as the records of heathen—we had almost said, Christian history, can show.

Perhaps, as a modern philosophic theologian suggests, it was because stoicism was the most solid and practical of the philosophic theories, and the one which most earnestly opposed itself to the rapidly increasing licentiousness of the time, that the chaste heart of the youth was drawn towards it. At twelve years of age, he avowed himself a follower of Zeno, Epictetus, &c. Stoics were his teachers—Diognotus, Apollonius, and Junius Rusticus; and he himself is to be considered one of the most thoughtful teachers of the school. Oratory he studied under Herodes Atticus and Cornelius Fronto. His love of learning was insatiable. Even after he had attained to the highest dignity of the state, he did not disdain to attend the schools of Sextus of Chæronea. Men of letters were his most intimate friends, and received the highest honors both when alive and dead. His range of studies was extensive, embracing morals, metaphysics, mathematics, jurisprudence, music, poetry, and painting. Nor must we forget that these were cultivated not merely in the spring-time of his life, when enthusiasm was strong, and experience had not saddened his thoughts, and when study was his only labor, but during the tumults of perpetual war, and the distraction necessarily arising from the government of so vast an empire. The man who loved peace with his whole soul, died without beholding it, and yet the everlasting presence of war never tempted him to sink into a mere warrior. He maintained uncorrupted to the end of his noble life his philosophic and philanthropic aspirations. After his decease, which was felt to be a national calamity, every Roman citizen, and many others in distant portions of the empire, procured an image or statue of him, which more than a hundred years after was still found among their household gods. He became almost an object of worship, and was believed to appear in dreams, like the saints of subsequent Christian ages.

There is one feature in his character, however, which it would be dishonest to pass over—his hostility, namely, to Christianity. He was a persecutor of the new religion, and, it is clearly demonstrated, was cognizant, to a certain extent at least, of the atrocities

perpetrated upon its followers. Numerous explanations have been offered of his conduct in this matter. The most popular one is, that he once allowed himself to be led away by evil counselors; but a deeper reason is to be found in that very earnestness with which he clung to the old heathen faith of his ancestors. He believed it to be true, and to be the parent of those philosophies which had sprung up out of the same soil: he saw that a new religion, the character of which had been assiduously, though perhaps unconsciously, misrepresented to him, both as an immoral superstition, and a mysterious political conspiracy, was secretly spreading throughout the empire, and that it would hold no commerce with the older religion, but condemned it, generally in the strongest terms. It was, therefore, comparatively easy, even for so humane a ruler, to imagine it his duty to extirpate this unnaturally hostile sect.

Mr. John Stuart Mill finds in this tragical error of the great emperor a most striking warning against the danger of interfering with the liberty of thought. What he says is so completely in harmony with the above conception of the motives of Marcus Aurelius, and is in itself so eloquent, that no apology is required in quoting the passage: 'If ever any one possessed of power had grounds for thinking himself the best and most enlightened among his contemporaries, it was the Emperor Marcus Aurelius. Absolute monarch of the whole civilized world, he preserved through life not only the most unblemished justice, but what was less to be expected from his stoical breeding, the tenderest heart. The few failings which are attributed to him were all on the side of indulgence; while his writings, the highest ethical product of the ancient mind, differ scarcely perceptibly, if they differ at all, from the most characteristic teachings of Christ. This man, a better Christian, in all but the dogmatic sense of the word, than almost any of the ostensibly Christian sovereigns who have since reigned, persecuted Christianity. Placed at the summit of all the previous attainments of humanity, with an open, unfettered intellect, and a character which led him, of himself, to embody in his moral writings the Christian ideal, he yet failed to see that Christianity was to be a good and not an evil to the world, with his duties to which he was so deeply penetrated. Existing society he knew to be in a deplorable state. But such as it was, he saw, or thought he saw, that it was held together, and prevented from being worse, by belief and reverence of the received divinities. As a ruler of mankind, he deemed it his duty not to suffer society to fall in pieces, and saw not how, if its existing ties were removed, any others could be formed which could again knit it together. The new religion aimed openly at dissolving these ties; unless, therefore, it was his duty to adopt that religion, it seemed to be his duty to put it down. Inasmuch, then, as the theology of Christianity did not appear to him true, or of Divine origin; inasmuch as this strange history of a crucified God was not credible to him, and a system which purported to rest entirely upon a foundation to him so wholly unbelievable, could not be foreseen by him to be that renovating agency which, after all abatements, it has in fact proved to be; the gentlest and most amiable of philosophers and rulers, under a solemn sense of duty, authorized the persecution of Christianity. To my mind, this is one of the most tragical facts in all history. It is a bitter thought, how different a thing the Christianity of the world might have been, if the Christian faith had been adopted as the religion of the empire, under the auspices of Marcus Aurelius, instead of those of Constantine. But it would be equally unjust to him, and false to truth, to deny, that no one plea which can be urged for punishing Anti-christian teaching, was wanting to Marcus Aurelius for punishing, as he did, the propagation of Christianity. No Christian more firmly believes that atheism is false, and tends to the dissolution of society, than Marcus Aurelius believed the same things of Christianity; he who, of all men then living, might have been thought the most capable of appreciating it. Unless any one who approves of punishment for the promulgation of opinions, flatters himself that he is a wiser and better man than Marcus Aurelius—more deeply versed in the wisdom of his time—more elevated in his intellect above it—more earnest in his search for truth—let him abstain from that assumption of the joint infallibility of himself and the multitude, which the great A. made with so unfortunate a result.' See Renan's *Marc Aurèle* (1882).

ANTONI'NUS PIUS, TITUS AURE'LIUS FULVUS, a Roman emperor (138—161 A.D.), was born in the reign of Domitian (86 A.D.). The family of A. was originally from Nemausus, now Nimes, in Gaul. A. inherited great wealth, and early gave proof of excellent qualities. In 120 he was made consul; afterwards was sent by Hadrian as proconsul into Asia, where the wisdom and gentleness of his rule won for him a higher reputation than had been enjoyed by any of his predecessors. By his wife Faustina he had four children, of whom three died, leaving a daughter, Faustina, afterwards wife of Marcus Aurelius. In 138 he was adopted by the Emperor Hadrian, in consequence of merit alone, and came to the throne in the same year. The reign of A. was proverbially peaceful and happy. In his private character, he was simple, temperate, and benevolent; while in public affairs he acted as the father of his people. The persecution of Christians, which was continued during his reign, was partly stayed by his mild measures. He was little engaged in war, excepting in Britain, where he extended the power of Rome, and built a wall between the Forth and the Clyde, as a defence against invasions by the predatory inhabitants of the north; but he was frequently employed in arbitration and general counsel on the affairs of foreign states. 'Happy the nation which has no history.' The reign of A. illustrates this saying, for by the justice, wisdom, kindliness,

Copper Coin of Antoninus Pius, commemorative of his Victories in Britain, from one in the British Museum.

and courtesy of the emporer, his vast empire was preserved from the crimes, conspiracies, insurrections, and bloodshed, the recording of which formed the largest part of the historian's work in the dark centuries of the Roman empire. It is said that only *one* senator was impeached during A.'s lifetime. Literature received great encouragement; the laws were improved; commerce extended; the means of communication were facilitated by the repair of roads, bridges, &c.; new sanitary regulations were introduced; and a taste for architecture fostered in the citizens. The epithet PIUS was conferred on him on account of his conduct in defending the memory of his predecessor Hadrian against certain dishonoring measures brought forward by the senate. A. died in 161 A.D. The column raised to his memory by his adopted son and successor, Marcus Aurelius Antoninus (q. v.), was discovered in 1709, and now exists only in fragments. The so-called Pillar of Antoninus, now in the *Piazza Colonna* at Rome, is that raised by the senate in honor of Marcus Aurelius, after his victory over the Marcomanni

ANTONI'NUS, ITINERARY OF (*Antonini Itinerarium*), a valuable geographical work, containing the names of all the places and stations on the principal and cross roads of the Roman empire, with their distances from each other in Roman miles. It has been usually attributed to the Emperor M. Aurelius Antoninus, whence its name. The testimony, however, of the Greek geographer Æthicus, author of the *Cosmographia*, assures us that a general survey of the Roman empire was commenced 44 B.C., in the consulship of Julius Cæsar and M. Antonius, and completed in the reign of Augustus, when the results of the survey received the sanction of the state. These results, it is with some probability inferred, are embodied in this *Itinerary*, which, it is further supposed, received additions and amendments in the time of the Antonines. Subsequent improvements were made down to the reign of Diocletian. The best editions are those of Wesseling (Amst. 4to, 1735), and Parthey (Berl., 1848).

ANTONI'NUS, WALL OF (*Antonini Vallum*), a barrier erected between the Firths of Forth and Clyde by the Romans, in the reign of Antoninus Pius, to restrain the encroachments of the native tribes. A fragment of a Roman pillar, which was at one time in the university of Edinburgh, fixes the date of its execution to 140 A.D. The superintendence of the work is generally attributed to the imperial legate Lollius Urbicus. Its length was about 27 English miles—the eastern termination being, according to two different suppositions, at Carriden, or at Kinniel, on the Forth; the western, at Old Kilpatrick, or at Dunglass Castle, on the Clyde. The work consisted of a ditch about 20 feet deep and 40 wide, a rampart of earth and stone about 20 feet high and 24 feet thick at the base, and on the inner or south side of the rampart a paved military road. It was protected by a chain of nineteen forts, with watch-towers between. The line of the wall may still be traced to a considerable extent. The most perfect fragments are at Elf Hill, on the moor of Bonnieside, about a mile and a half from Castlecary; within the park of Callander House, near Falkirk; and on the slopes at Inveravon, not far from the railway station at Polmont. It is commonly designated *Graham's Dike*—a name given also to more than one ancient ditch and rampart in England. (See SEVERUS, WALL OF). For best accounts of the Wall of Antonine, see Roy's *Military Antiquities of the Romans in North Britain* (1793), and Stuart's *Caledonia Romana* (2d ed., 1852).

ANTO'NIUS, MARCUS (MARK ANTONY), the Roman triumvir, born in 83 B.C., a descendant of one of the oldest patrician families, was the son of the Prætor M. Antonius Creticus, and,

on the side of his mother Julia, was related to Julius Cæsar. His youth was wasted in dissipation, and finding himself pressed by numerous impatient creditors, he escaped to Greece in 58 B.C., where, for a short time, he listened to the teaching of Athenian philosophers and orators. His studies here were soon interrupted by the Proconsul Gabinius, who appointed him as leader of his cavalry. In the campaign against Aristobulus in Palestine, and in Egypt, A. distinguished himself by his courage and activity, and ingratiated himself with the soldiers. After assisting Cæsar in Gaul, he went to Rome in 50 B.C., to advance the interests of the former, who stood in great danger from the hostility of the oligarchical party, and was appointed an augur, and chosen one of the tribunes of the people. In the following year, on account of his adherence to the party of Cæsar, he was expelled from the curia, and fled to Cæsar, who made use of this event as a pretext for his war against Pompey. At the outbreak of this war, A. received the appointment of commander-in-chief in Italy. In the battle of Pharsalia, he commanded the left wing of Cæsar's army. In 47, he was made Master of the Horse by Cæsar, who left him to govern Italy during his absence in Africa. Antony, as usual, disgraced himself; got perpetually drunk; divorced his wife, and married an actress, with whom he paraded offensively through the chief towns of the peninsula. In 44 B.C., he married Fulvia, the widow of Clodius; was made consul, and vainly endeavored to prevail on the Romans to recognize Cæsar as emperor. After the assassination of Cæsar, he played the part so well described by Shakspeare; and by his funeral oration, and the well-timed display of Cæsar's bloody robe, so wrought on the passions of the people, that the conspirators were compelled to escape from Rome, leaving the successful orator for a while in possession of almost absolute power. Next, we find A. occupied in disputes and reconciliations with Octavianus (Cæsar's heir), besieging Mutina, and then denounced by Cicero as an enemy of the state. In 43 B.C., his troops were defeated at the battle of Mutina, when he escaped beyond the Alps; visited the camp of Lepidus, who commanded in Gaul; and gained the favor of the army, of which he took the command. Plancus and Pollio joined him with their troops; and A., who so recently had escaped as a helpless fugitive from Italy, returned to Rome at the head of seventeen legions and 10,000 cavalry. Octavianus, who had pretended to maintain republican principles, now threw off the mask, and held a consultation with A. and Lepidus on the island of Reno (or Lavino), near Bologna, when it was determined that these triumviri should share the whole Roman world among themselves. To secure their spoil, they returned to Rome, and began their course of murder and robbery throughout Italy. Among their first victims fell Cicero, the orator whose eloquence they dreaded.

According to Appian, not less than 300 senators and 2000 knights fell under the power of the triumviri. After making Italy safe for themselves, and raising an enormous sum of money to carry on their war abroad, A. and Octavianus led their troops into Macedonia against Brutus and Cassius, and defeated the republican forces. A. next paid a visit to Athens, and went into Asia, to arrange his dispute with Cleopatra, queen of Egypt, whose conduct had offended the triumviri. The queen herself appeared to answer his challenge, and captivated A. by her beauty and address. The general who had overcome Brutus and Cassius was now made a prisoner, but not of war. He followed Cleopatra into Egypt, and lived with her in idleness and luxury, until he was aroused by tidings of the quarrel which had taken place in Italy between his own relatives and Octavianus. This dispute gave rise to a short war, which came to an end before A. arrived in Italy. A new division of the Roman world now took place between the triumviri, and was soon quietly arranged at Brundusium. A. took the East, and Octavianus took the West; while the ambition of the feeble Lepidus was appeased by having the whole of Africa for his portion. Even this shadow of dominion was taken from him in 36 B.C. Meanwhile A. had confirmed his friendship with Octavianus by a marriage with Octavia, his sister. He now returned to Cleopatra, resumed his former voluptuous mode of life, squandered the wealth of Rome in gifts to his royal mistress, and became guilty of gross acts of injustice. Octavianus made use of these facts to excite the indignation of the Roman people against A., and a war between the rivals became unavoidable. A., in his idleness, tried to postpone the trial of strength which he saw inevitably approaching, and filled the island of Samos (where his troops were quartered) with musicians, jugglers, and buffoons. Meanwhile, at Rome, he was deposed from the triumvirate, and war was proclaimed against Cleopatra. Each party collected its forces, and in the naval engagement which took place (31 B.C), near Actium (q. v.), A. was defeated. His subsequent hope of finding troops still faithful to him in Libya was disappointed. He returned to Egypt, where, with Cleopatra, he once more forgot political cares and vexations, until his amusements were suddenly interrupted by the arrival of Octavianus at Alexandria. A. now roused himself, made a charge with his cavalry, and repelled the enemy; but the advantage was only momentary. Deserted by the Egyptian fleet, as by his own army, and suspecting that even Cleopatra had conspired against him, he went to her palace, from which the queen had escaped. Deceived by a false message informing him of the death of Cleopatra, A. committed suicide by falling upon his sword, in the year 30 B.C.

ANTO'NIUS or A'NTONY OF PADUA, SAINT, was born at Lisbon, August 15, 1195, and, on the father's side, was related to Godfrey of Bouillon. He was first a monk of the Augustine order, and in 1221 became one of the most active propagators of the order of Franciscans. On his missionary voyage to Africa, being cast on the coast of Italy, he preached with great success at Montpelier, Toulouse, Bologna, and Padua, where he died, June 13, 1231. The legends of A. of P. are full of absurd fables. Among others, we are told that his eloquence as a preacher was so great that even the fish in the sea were deeply affected by it! His anniversary falls on June 13. His monument, a fine work of statuary, is in the church which bears his name at Padua.

ANTONY, SAINT, surnamed THE GREAT, and also ANTONY OF THEBES, the father of monachism, was born about the year 251 A.D., at Koma, near Heraklea, in Upper Egypt. His parents were both wealthy and pious, and bestowed on him a religious education. Having, in obedience to what he believed to be a divine injunction, sold his possessions, and distributed the proceeds among the poor, he withdrew into the wilderness, where he disciplined himself in all those austerities which have hallowed his memory in the Catholic Church, and formed the model of the monastic life. When 30 years of age, however, desirous of obtaining a deeper repose than his situation afforded, he penetrated further into the desert, and took up his abode in an old ruin on the top of a hill, where he spent twenty years in the most rigorous seclusion; but, in 305, he was persuaded to leave this retreat by the prayers of numerous anchorites, who wished to live under his direction. He now founded the monastery of Faïoum, which at first was only a group of separate and scattered cells near Memphis and Arsinoë, but which, nevertheless, may be considered the origin of cenobite life. The persecution of the Christians by Maximian in 311 A.D., induced St. A. to leave his cell, and proceed to Alexandria, in the hope of obtaining the crown of martyrdom; but having failed in this, he returned to his solitude in the course of a year, which, however, he soon left, and plunged yet deeper into the desert. At length he found a lodgment on a hill, about a day's journey from the Red Sea; but his disciples discovering his retreat, so pressed him with their affectionate importunities, that he ventured to accompany them back. After many pious exhortations, he once more left them, and soon became the mighty oracle of the whole valley of the Nile. In 355, the venerable hermit, then 104 years of age, made a journey to Alexandria to dispute with the Arians. He had interviews with Athanasius and other distinguished persons; but feeling his end approaching, he retired to his desert home, where he died, 356 A.D.

Athanasius states, in his Life of St. A., that the saint wore only a coarse shirt of hair, and never washed his body, which is more credible than the stories he relates of his encounters with the devil, or his miracles. His whole conduct indicates the predominance of a glowing and yet gloomy fancy, which is the proper condition of religious asceticism. Although the father of monachism, St. A. is not the author of any monastic 'rules;' those which the monks of the eastern schismatic sects attribute to him are the production of St. Basil. He is perhaps the most popular saint in the Catholic Church. Accounts of his life and miracles are given in the *Acta Sanctorum* of the Bollandists, under the date of the 17th January, on which day his festival was kept.

ST. ANTHONY'S FIRE.—The Rev. Alban Butler, in his *Lives of the Saints*, gives the following account of the origin of this name: 'In 1089, a pestilential erysipelatous distemper, called the *sacred fire*, swept off great numbers in most provinces of France; public prayers and processions were ordered against this scourge. At length, it pleased God to grant many miraculous cures of this dreadful distemper, to those who implored His mercy through the intercession of St. A., especially before his relics; the church [of La Motte St. Didier, near Vienne, in Dauphiné] in which they were deposited was resorted to by great numbers of pilgrims, and his patronage was implored over the whole kingdom against this disease.' The 'order of Canons Regular of St. Anthony,' a religious fraternity, founded about 1090, for the relief of persons afflicted with the fire of St. A., survived in France till 1790.

ST. ANTHONY'S WELL, a small fountain near the ruined chapel of St. A., on the northern slope of Arthur's Seat (q. v.), near Edinburgh. This interesting fountain, which consists only of a stone basin, into which water trickles from under an incumbent rock, is celebrated in the Scottish song—

'*O, waly, waly.*'

ANTRAI'GUES, EMANUEL-LOUIS-HENRI DELAUNAY, COUNT OF, a great politican, but very ambiguous character, was born at Vivarais, in the department Ardèche, in 1765, and was educated

under the Abbé Maury. His superior talents were first displayed in his *Mémoire sur les Etats-généraux, leurs Droits et la Manière de les convoquer* (1788). This book, full of daring assertions of liberty, was one of the first sparks of the fire which afterwards rose to such height in the French Revolution. In 1789, when A. was chosen as a deputy, he not only defended the privileges of the hereditary aristocracy, but also ranked himself with those who opposed the union of the three estates; while in the discussions on the constitution, he maintained that the royal *veto* was an indispensable part of good government. After leaving the Assembly in 1790, he was employed in diplomacy at St. Petersburg and Vienna, where he defended the cause of the Bourbons. In 1803 he was employed under Alexander of Russia in an embassy to Dresden, where he wrote against Bonaparte a brochure, entitled *A Fragment of the 18th Book of Polybius, discovered on Mount Athos.* He afterwards came to England, and acquired great influence with Canning. Despite his attachment to the interest of the Bourbons, he could never win the confidence of Louis XVIII. In 1812 he was murdered, with his wife, at his residence near London, by an Italian servant, who, immediately after the act, committed suicide.

A'NTRIM, a maritime county in the north-east of Ireland, in the province of Ulster; bounded, N., by the Atlantic; W., by the north part of the river Bann, dividing it from Londonderry, and by Lough Neagh; S., by Lagan river, separating it from the county of Down; S. E., by Belfast Lough; and E. by the Irish Channel. It stands third among the Irish counties in population, but in extent only ninth. Its greatest length is 56 miles; its greatest breadth, 30; its extent of sea-coast, 90 miles. Area, 1164 square miles. About two-thirds of this is arable; a fourth, barren; and a seventy-fourth in woods. Pop. (1851) 352,264; (1861) 368,948; (1871) 404,015; (1881) 421,943, of whom near 190,000 were Presbyterians, 108,000 Roman Catholics, and 98,000 Protestant Episcopalians. Off the north coast lie Rathlin Isle and the Skerries; and off the east coast, the Maiden Rocks. The east coast is hilly; and from Larne to Fair Head, parallel mountain-ranges of no great height, and covering a third of the county, stretch S. W. into the interior, forming valleys opening seaward, called the Glens of Antrim. The interior slopes towards Lough Neagh. The highest eminences are—Trostan, 1810 feet; and Slievemish, or Slemish, 1782 feet. The principal streams are—the Bann, from Lough Neagh to the Atlantic; the Main, running parallel to the Bann, but in the reverse direction, into Lough Neagh; and the Bush, flowing north into the Atlantic. Many peat-bogs occur in the county. Six-sevenths of the surface consists of basaltic trap, often alternating with red ochre, and overlying hardened chalk, green-sand, new red sandstone, and mica-slate.

The surface and edges of the trap-field, in some places, present basaltic columns of varied outlines. The green-sand and new red sandstone crop out of the E. and S.-E. borders, and millstone grit occurs in the N.-E. Between Ballycastle and the mouth of the Bann, the basalt assumes very picturesque forms; and the Giants' Causeway, is one of the most perfect examples of columnar basalt in the world. Fine salt mines occur at Dunerue and Carrickfergus; and small coal-fields near Ballycastle and the interior. Rich beds of iron ore of fine quality have been recently opened in Glenravel, and a large export has been carried on from Cushendall and Carnlough. The soil of A. is mostly light, and the chief crop is oats. In 1878, 246,498 acres were under crop, 81,760 being in oats, 45,831 in potatoes, and 5372 in wheat. The land is very much sub-divided; and the rearing of flax, and the various branches, of the linen, cotton, and coarse woollen manufacture employ a great portion of the people. In 1881, there were upwards of 95,000 pupils on the rolls of the National Schools in the county (23,000 being Catholics). The principal towns are—Belfast, Lisburn, Ballymena, Ballymoney, Carrickfergus, Larne, and Antrim. A. county returns two members to parliament; Belfast borough, two; and Carrickfergus and Lisburn boroughs, each one. The inhabitants are mostly Presbyterians, the county having been extensively colonized from England and Scotland. The original possessors were the O'Neills, who, partially dispossessed by John de Courey, reappeared as chief, on the failure of his line, and in 1533, regained the whole country, except Carrickfergus and part of the Glens—held by the Bissets of Glenarm. The forfeiture of Shane O'Neill terminated the dominion of his race.

A'NTWERP (in French, ANVERS), the capital of the province which bears its name, and the chief commercial city of Belgium, is situated on the river Scheldt. Pop. (1880) 169,112. Its chief public institutions are—the Academy of Sciences, Academy of Painting and Sculpture, formerly known as the Academy of St. Mark, a Medical and Surgical School, Naval Arsenal, Museum, and Zoological Gardens. The cathedral, one of the noblest Gothic structures in Europe, is 500 feet in length by 240 in breath, with a roof supported by 125 pillars, and a very lofty spire. The interior is enriched by the two greatest of all the pictures of Rubens, the Elevation of, and the Descent from the Cross. The Church of St. James contains the monument of the Rubens family. The new fortifications, recently erected, render the commercial capital of Belgium one of the most strongly fortified places in Europe. The trade and manufactures of A. have recently greatly extended, and the large dock and quay accommodation having been found too limited, steps have been taken for making a new quarter of the town, with ample harbor-room, on the opposite side of the Scheldt. The manufactures consist chiefly of sugar, white-lead, cotton goods, point-lace, linen-thread, carpets, gold and silver lace. It is still celebrated for its sewing-silk, black silk stuffs, and printer's ink, as it was in former times for its velvets, damasks, and satins. There are also to be mentioned tobacco-manufacture, the cutting of diamonds and other precious stones, and shipbuilding.

A. is mentioned as early as the 8th c.; in the 12th and 13th it gave signs of considerable prosperity, and in 1550 numbered more than 200,000 inhabitants. The union of Belgium with Holland in 1815 was very favorable to the commerce and general prosperity of A. By the revolution of August 1830, it was linked to the destiny of Belgium. When the revolutionary party gained possession, the commandant, General Chassé, retreated to the citadel, and, exasperated by the breach of truce, commenced a bombardment, which destroyed the arsenal and about thirty houses. In 1832, a French army of 50,000 men, under Marshal Gérard, appeared before A., to demand the surrender of the citadel, which General Chassé refused. After the interior of the citadel had been reduced to ruins by the French artillery, General Chassé capitulated; the Flemish fortification, and the forts Burght, Zwindrecht, and Austroweel, were surrendered to the Belgian troops, and the Dutch troops were taken to France, as hostages for the surrender of the forts Lillo and Liefkenshoek, according to an article in the negotiation of Nov. 15, 1831, which stipulated that the five citadels held by the Dutch troops in Belgium should be surrendered.

ANU'BIS, an Egyptian deity, styled Anepu on hieroglyphic monuments, was, according to mythology, the son of Osiris and Nephthys. By the Greeks, he was frequently styled Hermes or Hermanubis, combining the Egyptian with the Grecian name. He is represented on monuments as having the head of a jackal, with pointed ears and snout, which the Greeks frequently changed to those of a dog. Sometimes he is seen wearing a double crown. A white and yellow cock was sacrificed to him. His office, like that of Hermes Psychopompus among the Greeks, was to accompany the ghosts of the deceased into Hades (Amenthes), and there to assist Horus in weighing their actions, under the inspection of Osiris. As, in the time of the Romans, the Egyptian worship had spread beyond Egypt itself, the two conceptions of A. and Hermes were blent together, and the dog's head of the former was found united to the insignia of the latter.

Anubis.

ANUPSHUHU'R, a town of India, in the British district of Bolundshuhur, North-west Provinces, on the right bank of the Ganges, 73 miles east from Delhi, on the route to Bareilly. The channel of the Ganges is here about a mile wide, but only about one-fifth of that space is occupied by the stream in the dry season. The town is ill built and crowded, the houses either of mud or ill-cemented brick. Pop. (1871) 10,644.

A'NUS, The, and its Diseases. The term *anus* is applied by anatomists to the lower or (in the case of animals) the posterior aperture of the intestinal canal; the rectum terminating externally in the anus. With regard to its anatomy, it is sufficient to state that it is kept firmly closed on ordinary occasions by the *external* and *internal sphincter* muscles, the former of which contracts the integument around the opening, and, by its attachment to the coccyx behind, and to a tendinous center in front, helps the *levator ani* muscle in supporting the aperture during the expulsive efforts that are made in the passage of the fæces or intestinal evacuations; while the latter or *internal sphincter*, is an aggregation of the circular muscular fibres of the lowest part of the rectum, and acts in contracting the extremity of the tube. The main function of the *levator ani* muscle is expressed in its name, it being the antagonist of the diaphragm and other muscles which act in the expulsion of the fæces. The integument around the anus lies in radiating plaits, which allow of its stretching without pain during the passage of the fæces; and the margin is provided with a number of sebaceous glands, which, in some of the lower animals, secrete strongly odorous matters. See Anal Glands. Infants are occasionally born with an imperforate *anus*, or congenital closure of the rectum. In the simplest form of this affection, the anus is merely closed by thin skin, which soon becomes distended with the Meconium (q. v.). More complicated cases are those (1) in which the gut terminates some distance above the seat of the anus in a blind sac or pouch; (2) where the rectum termi-

nates in the bladder, &c. Fortunately, the closure by a layer of skin is far the most common form of imperforate anus, and the little patient is at once relieved by a very simple surgical operation. If, however, no treatment be adopted, which is too often the case, in consequence of a popular delusion that the affection is incurable, the abdomen becomes distended and hard, vomiting comes on, the vomited matters soon assume a fæcal smell, and the infant dies in a few days, either from exhaustion or rupture of the intestines.

Spasm of the Sphincter Ani is by no means a rare affection; it is characterized by violent pain of the anus, with difficulty in passing the faeces. On attempting an examination, the muscle feels hard, and resists the introduction of the finger. It usually occurs in sudden paroxysms, which soon go off; but sometimes it is of a more persistent character. Its causes are not clearly known, and although most surgeons regard it as a special affection, some consider that the spasm is not a disease in itself, but merely a symptom of some slight excoriation or ulceration.

Suppositories containing opium or belladonna introduced during the period of relaxation, are sometimes of use; and if there are ulcers, they must be specially treated. *Ulceration* occurring as a breach of surface at one or more points around the anus, but not extending within the orifice, is by no means uncommon in persons who are not attentive to cleanliness, and especially in women with vaginal discharges. Strict attention to cleanliness, the patient being directed to apply warm water to the parts at least twice daily with a sponge (which after each operation should be carefully rinsed out), and one or two applications of the solid nitrate of silver, followed by black-wash, will effect a speedy cure. If the ulcer is seated partly *without* the anus and partly *within* the rectum, the distress is much more severe, and the treatment often requires the use of a knife. *Fissure of the anus* is a term applied to an affection consisting in one or more cracks, excoriations, or superficial ulcerations, situated between the folds of the skin and mucous membrane at the verge of the anus, and only slightly involving the rectum. They give rise to intense pain during the passage of the evacuations, and for some hours afterwards to great discomfort, smarting, and itching. The treatment to be adopted is to endeavor to procure regular and somewhat soft evacuations, and to sponge with warm water immediately afterwards, the parts being dried with a soft cloth. One or two applications of solid nitrate of silver will sometimes cure the disease; and an ointment of oxide of zinc, or one containing chloroform, will sometimes serve to allay the irritation and heal the parts.—*Pruritus ani*, which simply means intense itching and irritation of this part, is perhaps rather to be regarged as a symptom of certain morbid changes rather than as a special disorder; but as it is a very common affection, and is productive of much suffering it must not be passed over. It is often associated with an unhealthy state of the intestinal secretions, or with simple constipation; with a congested state of the mucous membrane; with a disordered condition of the womb; with the presence of thread-worms in the rectum, &c.; and it is peculiarly common in persons whose occupations are sedentary. The affection is often much aggravated by the patient's being unable to refrain from scratching the parts, which leads to excoriations, ulcerations, thickening of the skin, &c. The symptoms are usually most severe when the sufferer begins to get warm in bed. If the affection arise from worms, or a loaded state of the large intestines, enemata and purgatives will give immediate relief. If unhealthy excretions exist, attention must be paid to the diet, and the occasional administration of a pill containing a grain of calomel and four grains of watery extract of aloes, together with the local application of soap and water to the parts, will often stop the itching. If there are any cracks or ulcers, nitrate of silver must be applied until they heal. To prevent the reappearance of these sores, the patient should bathe the parts night and morning with a strong solution of alum. An ointment composed of a drachm of calomel and an ounce of lard is strongly recommended by Mr. Smith of King's College Hospital, when other means have failed; who also states that the daily introduction of a well-oiled bougie, made of black wax, will sometimes succeed in very obstinate cases. The other principal affections of the anus are *Fistula*, *Piles*, and *Prolapsus*, which are discussed in special articles.

ANVILLE, Jean Baptiste Bourguignon d', a celebrated French geographer, born at Paris in 1697, died in 1782. He devoted his whole life to geographical science. Such was his natural taste for map-drawing, that his first study of the ancient authors induced him to publish, at the age of fifteen, a map of Greece. His rare qualities gained him the friendship of the Abbé de Songuerue, from whom he received those instructions which were the source of that profound and extensive knowledge he subsequently acquired. He read the Greek and Latin historians and philosophers, as well as poets, specially noting the names and positions of cities and nations. He advanced the science of geography, not only by the vast number of maps which he executed, but also by the treatises, full of erudition and of historic and critical details, in which he discussed numerous interesting questions. The works of A. announced by M. de Maine many years ago, were to have been contained in six volumes, exclusive of the volumes of maps. The principal portion was published in 1834 by Levrault. But the death of M. de Maine in 1832 stopped the quarto edition near the end of the twelfth volume, to which the map of Africa was however wanting, although the text had been added, with notes digested from the most recent investigations in that country. A. has left 211 maps and plans, and 78 memoirs, the most of which are inserted in the *Recueil des Mémoires de l'Académie des Inscriptions et Belles-lettres*. His best map is that of Ancient Egypt. His *Orbis Veteribus Notus* and *Orbis Romanus*, are also invaluable. The same remark applies to his maps of Gaul, Italy, and Greece, both ancient and medieval. His maps of modern countries contain all the knowledge attained in his time. His valuable collection of maps was purchased in 1779 by the French government for the Royal Library.

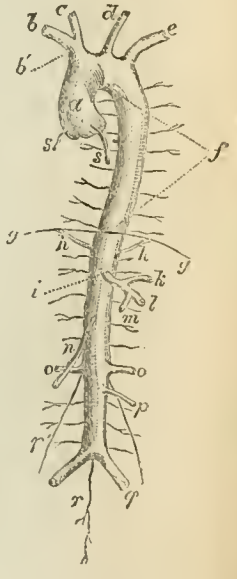
ANWARI, a celebrated Persian poet, who flourished during the 12th c., was born in the province of Khorassan, and educated at the college of Mansur, at Tus. He emerged from obscurity in the course of a night. The story goes that the Seljukide sultan, Sanjar, happened on one occasion to visit Tus, when the imagination of the youthful poet was so excited by the presence of the monarch and his glittering retinue, that he resolved to write a poem in his praise. By next morning, it was finished, and presented to Sanjar, who instantly placed the fortunate youth among his courtiers. A. now began to devote himself to astrology, which was his ruin; for having predicted that in 1185 or 1186 A.D. a hurricane would burst over all Asia, overthrow the most solid edifices, and shake the very mountains, and nothing of the sort really occurring, but, on the contrary, an entire year of remarkably tranquil weather, he fell into disgrace, and had to retire to Balkh, where he died in 1200—1201 A.D.

His poems consist chiefly of lengthy panegyrics, and shorter lyrical effusions. The latter (*ghazels*) are characterized by simplicity, ease, and naturalness; but the *kasidas*, or long poems, are disfigured, like many other eastern poems, by glittering imagery and historical conceits. His *Elegy on the Captivity of Sanjar taken Prisoner by the Ghurides*, has been translated into English by Captain Kirkpatrick in the 1st volume of *Asiatic Miscellanies* (Calcutta, 1785).

AONLAGA'NJ, or AOUNLAH, a town of India, in the British district of Bareilly, 21 miles south-west from Bareilly, on the route to Allygurh. It has a large bazaar. Pop. (1871) 9947.

A'ORIST, a form of the Greek verb by which an action is expressed as taking place in an indefinite (Gr. *aoristos*) time. The Greek language is especially fertile in the past tenses of verbs, having, in addition to the tenses common to other languages—namely, the imperfect, perfect, and pluperfect—the A., which is peculiarly adapted to the narrative style of writing. The distinction of first and second A. is purely formal.

AO'RTA is the great arterial trunk which, rising from the left ventricle of the heart, sends its branches ramifying through the whole body. The A. in man is subdivided by anatomists into the Arch, the Thoracic A., and the Abdominal A. The *arch* is a loop with the convexity directed upwards, forwards, and to the right side, reaching at its highest part to a level with the second piece of the breast-bone, and then descending to the left side of the third dorsal vertebra. Five arteries arise from the arch—viz., two coronaries, for the supply of the muscular tissue of the heart itself; the innominata; and the left carotid and left subclavian arteries. At the commencement of the arch are three small swellings or pouches, the aortic sinuses, below which are the three semilunar valves or folds of the lining membrane, which prevent regurgitation of the blood back into the heart. The *thoracic A.* extends from the third dorsal vertebra to the diaphragm, gradually getting into the middle line of the spine. The thoracic A. gives off the bronchial arteries (two or three) to supply the tissue of the lungs; and some small branches (three or four) to the œsophagus, and intercostal arteries, to supply the walls of the chest (ten on left, and nine on right side). The *abdominal A.* passes from the diaphragm to the fourth lumbar vertebra, opposite the



Aorta:

a, ascending arch of aorta; *ee*, coronary arteries; *b'*, innominata artery; *b*, right subclavian; *c*, right carotid; *d*, left carotid; *e*, left subclavian; *f*, thoracic aorta; *gg*, diaphragm; *hh*, phrenic arteries; *i*, cœliac axis; *k*, coronary or gastric; *l*, splenic; *m*, hepatic; *n*, superior mesenteric; *oo*, renal arteries; *p*, inferior mesenteric; *p'*, spermatic; *q*, common iliac; *r*, middle sacral.

lower margin of which it divides into the two common iliac trunks. The abdominal A. gives off the two phrenic arteries to the diaphragm; the cœliac axis, which divides into three large branches for the stomach, liver, and spleen; the superior mesenteric for the small, and part of the large intestine; the *renals* (two); the *suprarenals* (two), one for each kidney; the spermatic; the inferior mesenterie, for the part of the large intestine not supplied by the superior mesenteric; and four or five lumbar arteries, which supply the lower part of the abdominal walls (the loins).

Where the A. bifurcates, a small artery, the *sacramedia*, or *caudal* artery, arises, and passes along in the middle line; in fish and in animals with large tails, this branch is a continuation of the A.

The above is the usual arrangement; but occasionally it varies, especially in the number of arteries springing from the arch. The structure of the A. will be given under ARTERY; and the comparative anatomy under HEART and CIRCULATION.

During fœtal life, there is a communication between the arch of the A. and the pulmonary artery called the *ductus arteriosus*, the canal of which becomes obliterated after birth. It has been calculated that the velocity of the blood in the ascending part of the arch is 2½ inches in a second. The pressure of the blood in the A. of a horse has been estimated to be 11 pounds; and in man's, 4 pounds 6 ounces.

The coats of the A. are very subject to fatty disease termed Atheronia (q. v.), and in advanced life, to calcareous degeneration or deposit of earthy particles, which destroys their elasticity. This change renders them very liable to Aneurism (q. v.), which as may be expected, is generally situated at the curves of the A., especially at the arch. Sufferers from this disease in the arch or thoracic A., suffer from palpitation within the chest, difficulty of breathing, occurring in paroxysms and during sleep, and shoots of pain through the chest. If the aneurism is on the arch, it generally presses forward, and may completely destroy the breast-bone, forming a pulsating-tumor, covered only by the skin, or it may press up into the neck. If low in the chest, the aneurism may compress the thoracic duct, and cause emaciation. In the abdomen, the symptoms are pulsation and pain; but in both situations aneurism may exist for a length of time without attracting attention.

In some cases, the A. has been found obliterated, showing that the lower extremities can be supplied with blood by the anastomosing branches. Sir Astley Cooper and other surgeons have tied the A. for aneurism, but without success.

AOSTA, a district of the province of Turin, in North Italy, surrounded by the highest elevations of the Alps, and watered by the river Dora-baltea. It contains an area of 1233 square miles. The dense pine-woods on the hills, the alpine pastures on the slopes, the plantations of vines, almonds, olives, figs, and mulberry trees in the valleys, and the ores of silver, copper, and iron in the bosom of the mountains, supply occupation and means of subsistence to a population of about 83,000; but the land generally is not adapted to the growth of corn, though maize, barley, oats, &c., are produced in the lowest portions of the valleys. The disease styled Cretinism (q. v.) prevails to a lamentable extent, and few persons are altogether free from Goitre (q. v.). Great numbers of the poorer class emigrate during winter into the richer countries in their vicinity, and earn a livelihood as chimney-sweepers, masons, and smiths.—AOSTA, the principal town, 49 miles N.N.W. of Turin, contains 6700 inhabitants, and has a large trade in cheese, hemp, leather, &c. It was in ancient times the chief residence of the Salassi, a brave race of mountaineers, with whom Appius Claudius (134 B.C.) had to contend on his way into Gaul. They were finally destroyed by Terentius Varro in the time of Augustus. Monuments of the Roman times—a well-preserved arch, two gateways, the ruins of an amphitheater, and a bridge—still remain. The celebrated baths and mines of St. Didier are in the neighborhood. St. Bernard, the founder of the famous hospice which bears his name, was Archdeacon of A.; and Anselm, Archbishop of Canterbury, was born here.

APA'FI, MICHAEL I., Prince of Transylvania, was born in 1632, of an old but decayed family. He accompanied Prince George II. in an expedition against the Poles in 1656, but was taken prisoner at the irruption of the Tatar hordes under their khan, Mohammed Girai. After his release, he went and lived for a short time at his paternal estate; but in 1661 he was chosen Prince of Transylvania, at the instigation or desire of Ali Pasha, generalissimo of the Turkish forces under Sultan Mahmoud IV. During the peace concluded with Austria, he reigned peaceably under the protection of the Porte, and acquired the towns of Clausenburg and Zathmar. He remained faithful to the Ottoman power till the siege of Vienna in 1683. Fortune then changed. The imperial troops penetrated into the country; and on the 12th of August 1687, A. made a treaty with the emperor at Harkany, by which Transylvania was declared to be freed 'for ever' from Turkish suzerainty, and placed under German protection. At Fogaras, on the 1st of July 1688, the Transylvanian deputies assembled at the national Diet, took the oath of fealty to the Hapsburgs as legitimate monarchs of Hungary. Ever since the death of his wife, Anna Bornemitza, in 1688, A. had been sorely afflicted both in body and mind, and died (April 15, 1690) on the eve of a fierce retributive war, commenced by his old allies the Turks, who considered themselves ill used by his desertion of them. His son, Michael II., succeeded to the throne and its perils.

The Turks, under the vizier Cuprigli, overthrew the imperial army, and took several places, such as Nissa, Widdin, Semendria, Belgrade, &c.; but the intestine troubles of the Ottoman empire hindered them, or rather Count Tekeli, the adventurer whom they were helping, from retaining these towns. The imperial troops subsequently regained everything; and at length the young Transylvanian prince was inveigled to Vienna, and cajoled into giving up his dominions to Austria in lieu of a pension of 12,000 or 15,000 florins. He died in 1713.

A'PANAGE is not an English legal term, but is a technical word in the French law, in which system it signifies the assignment or conveyance by the crown of lands and feudal rights to the princes of the royal family, that they may be enabled to maintain themselves according to their rank. (See a long article on this subject in Knight's *Political Dictionary*, which refers to Rotteck and Welcker, *Staats-Lexicon*, art. by P. A. Pfizer. See also Merlin's *Répertoire de Jurisprudence* under this head.) The word A., however, is sometimes found in Scotch law-books, the Scotch lawyers having most probably derived it from France, whose system of laws was so largely imported into Scotland—the Court of Session itself having been modelled after the plan of the Parliament of Paris. Mr. Erskine, in his *Principles of the Law of Scotland*, book i., tit. 4, sec. 8, says: 'The A., or patrimony of the Prince of Scotland, has been long erected into a regality jurisdiction, called the principality. It is personal to the king's eldest son, upon whose death or succession it returns to the crown. The prince has, or may have, his own chancery, from which his writs issue, and may have his own chamberlain and other officers, for receiving and managing his revenue;' and the late Professor Bell, in his *Principles of the Scotch Law*, calls this principality the prince's 'perpetual A. and personal provision.' In England, the duchy of Cornwall may be said to be an A. of the Prince of Wales, in whose person, also, since the junction of the two kingdoms under the same crown, now merge the rights of the Prince of Scotland. His royal highness, in fact, when he goes north, ought strictly to be called, not Prince of Wales, but Prince of Scotland.

In common parlance in England the word A. is loosely used to denote any extra-territorial jurisdiction or sovereignty by governments or states; and even any dignity or right enjoyed by persons of rank.

APATHI'N, a town of Hungary, in the county of Bacs, near the left bank of the Danube, 49 miles south-west from Theresiopol. It has manufactures of woollen cloth, and a considerable trade in hemp, silk, madder, and woad, the products of the vicinity. Pop. (1869) 11,047.

A'PATITE is the scientific and commercial name applied to a mineral mainly consisting of phosphate of lime (bone-earth), and which for some years past has been largely used in the preparation of manures. It is employed for the same purpose as bones or bone-ash—namely, to supply phosphoric acid to the soil. The massive radiated variety is sometimes called *phosphorite*, and when massive, earthy, and impure, it is also known as *osteolite*. Coprolites (q. v.), or phosphatic nodules, are likewise mainly composed of phosphate of lime. A. is found as a bedded rock, in compact spheroidal masses, in veins and dykes, and as an accessory constituent of rocks. It exists in nearly all geological formations, but is perhaps most abundant in the older metamorphic rocks. Extensive deposits of A. occur in various parts of the world. From Krageröe in Norway, where it occurs associated with granitic rocks, and from Estremadura in Spain, where it is found in cretaceous strata, it has been largely sent to England, the total imports of these mineral phosphates having in some years reached 5000 tons. There is a bed of A., 18 inches thick, of Silurian age, at Llanfyllin in North Wales which has been extensively worked. A remarkable deposit of a kind of A., or rather rock guano, which has been termed 'Sombrerite,' was discovered some years ago in the small island of Sombrero, situated about 60 miles to the east of St. Thomas, in the West Indian group. It covers a great part of the island, which is about 1½ miles long, by ⅔ths of a mile in breadth. Mr. A. A. Julien, writing from the spot in 1864, says there 'is a natural division of the Sombrero Guano into two varieties. One of an oolitic structure, of a great variety of colors, and containing, in addition to the bone ($3CaO,PO_5$) and neutral ($2CaO,PO_5$) phosphates of lime, the phosphates of alumina, iron, and magnesia, &c. The other variety, generally of a broad concretionary structure, is of a white or yellowish-white color, containing a little carbonate of lime, sulphate of lime, &c., but especially abounds in bone phosphate of lime. It is almost certain that the former more nearly resembles the original deposit, and is the older of the two; while the latter

is far more uniform in composition. The guano is interlaminated with ordinary coral limestone.' It is now believed that this hard or rock guano has been formed by water filtering through ordinary guano, into the coral rock adjoining, and turning it more or less completely into phosphate of lime. A similar hard guano occurs at Monk's Island, and one or two others in the Caribbean Sea. Large quantities have been introduced into this country, and still more into the United States, under the name of Sombrero Guano, and are extensively employed by the manufacturers of artificial manures, in place of ordinary bone-ash. The general treatment to which mineral phosphate is subjected, is to reduce it to powder, and act upon the pulverized matter with sulphuric acid, which renders the phosphoric acid in the A. soluble in water, and thereby facilitates its introduction into the plant.

These substances require to be ground to a finer powder, and subjected to a more protracted digestion than bones. In the greater number of cases where the A. or Sombrero Guano is treated in this way, it is mixed with other manures, such as Peruvian Guano, blood, or true bones, and thus a complex substance is manufactured, which is much more acceptable to the plant than the simple A. or *mineral phosphate* itself. The great importance of mineral phosphate, in an agricultural point of view, arises from the fact that no mineral substance possesses more influence over the growth of the edible plants, such as wheat, barley, oats, turnips, &c., than phosphoric acid does; any cheap source of that substance, therefore, is a great boon. The island of Sombrero contains as much phosphatic or bony matter as is present in many millions of oxen, and represents as much manure as would be obtained by the employment of the bones of these cattle. The different varieties of A. contain a little fluoride or chloride of calcium, or both, as well as phosphate of lime. Of these varieties, besides those already mentioned, there are others, as *Moroxite*, *Francolite*, and *Asparagus Stone*. It occurs both massive and in crystals—which are generally small, and are often six-sided prisms, or six-sided tables, but some very large ones have been brought from Canada. It occurs in some of the tin mines in Cornwall, Saxony, Bohemia, &c., and in rocks of various ages, as mentioned above. It is found of various colors, more or less green, blue or red, sometimes white, and often gray. The proposal to employ it as a manure first excited much interest in 1856, and began to be enterprisingly carried into effect, with happy results—rocks once deemed most barren being thus rendered conducive to the fertility of soils. In Spain, A. is used as a building stone.

APE, a name commonly given to the tailless monkeys. (See BARBARY APE, CHIMPANZEE, GIBBON, GORILLA, ORANG-OTANG, &c.) It was originally commensurate in signification with monkey, and the terms were indiscriminately used. The origin of the word is uncertain. See MONKEY.

The worship of apes or monkeys has been common among pagan nations from a period of remote antiquity, and still prevails very extensively, being practised in Japan, in India, and by some of the African tribes. The source of it is perhaps to be found partly in the doctrine of the transmigration of souls, and partly in the qualities which apes have been supposed to possess in a conspicuous degree, and of which they have been made symbolic. An A.'s tooth, kept in a temple in Ceylon, was regarded with extraordinary veneration, and immense wealth was accumulated through the continual offerings of the worshippers; but the temple was plundered, and the tooth carried away by the Portuguese in 1554.

A-PEAK, or A-PEEK, a maritime term signifying the position of an anchor when the cable has been drawn so tight as to bring the ship directly over it; the sailors then say that 'the anchor is a-peak.'

A'PELDORN, a beautiful village in the Netherlands province of Gelderland, is situated about 17 miles north from Arnhem, on a canal which joins the river Grift, a branch of the Yssel, by which, and the public roads from Arnhem and Utrecht to Deventer and Zutphen, and by railway, it has much traffic. The Loo, a hunting-lodge of the king, is in the neighborhood. The principal industries are agriculture, making paper, grinding corn, founding copper, manufacturing blankets and coarse woollen cloth, &c. Pop. of A., (1879) 15,053.

APE'LLES, the most celebrated painter in ancient times, was the son of Pythias, and was probably, in accordance with the statement of Suidas, born at Colophon, on the Ionian coast of Asia Minor; though Pliny and Ovid call him a Coan, and Strabo and Lucian an Ephesian. This, however, may simply refer to the fact that he was made a burgess of that town. He flourished in the latter part of the 4th c. B.C., received his first instruction in art in the Ionian school of Ephesus, then studied under Pamphilus of Amphipolis, and latterly at Sicyon, under Melanthius, and thus he united the fine coloring of the Ionian with the accurate drawing of the Sicyonic school. During the time of Philip, A. visited Macedon, where he became the intimate friend of Alexander the Great. It was probably at the Macedonian court that the best days of A. were spent. Pliny relates that on one occasion when Alexander visited A. in his studio, the king exhibited such ignorance of art, that A. recommended him to be silent, as the boys who were grinding the colors were laughing at him. But the same story is told of Zeuxis and Megabyzus. He afterwards visited Rhodes (where he was familiar with Protogenes), Cos, Alexandria, and Ephesus. The period of his death is not known; but as he practised his art before the death of Philip, and as his visit to Alexandria was after the assumption of the regal title by Ptolemy, he probably flourished between 352 and 308 B.C. The most celebrated paintings of A. were his Anadyomene, or Venus Rising from the Sea, with a shower of silver drops falling round her like a veil of gauze, the Graces, and similar subjects; but he cultivated the heroic as well as the graceful style. His ideal portrait of Alexander wielding a thunderbolt was highly esteemed, and preserved in the temple of Diana at Ephesus. With reference to this painting, Alexander said: 'There are only two Alexanders—the invincible son of Philip, and the inimitable Alexander of A.' A. is said to have left an incomplete painting of Venus, to which no other painter would presume to give the finishing touches. The disposition of A. was remarkably free from envy, and he willingly acknowledged the merits of his contemporaries. Amphion, he said, excelled him in grouping, and Asclepiodorus in perspective, but *grace* was his alone. On coming to Rhodes, and finding that the works of Protogenes were not appreciated by his countrymen, he at once offered him fifty talents for a picture, and spread the report that he intended to sell it again as his own. The industry with which he practiced drawing was so great as to give rise to the proverb *Nulla dies sine lineâ*. Many other anecdotes are related of A.

When his pictures were exposed to public view, he used to place himself behind a picture, to listen to the criticisms of the common people. A cobbler having detected a fault in the shoe of one of his figures, it is said that A. instantly rectified it; but when the cobbler, on the following day, extended his criticism to the legs, the painter rushed from his hiding-place, and told the cobbler to stick to the shoes; or, in the Latin version, which has become proverbial, 'Ne sutor supra crepidam.'

A'PENNINES (Ital. *Appenni'ni;* anciently, Lat. *Mons Apennînus*), a mountain-chain extending uninterruptedly throughout the whole length of the Italian peninsula. It lies between 37° and 44° 30′ N. lat. and 7° 40′ and 18° 20′ E. long., and belongs to the system of the Alps, from which it branches off at the Col de Tenda, near the sources of the Tanaro. From this point, the chain, under the name of the Ligurian A., girdles the Gulf of Genoa, in the immediate vicinity of the sea, and then runs inland to a considerable extent, forming the water-shed between the Adriatic and the Mediterranean, but gradually approaching the east coast, till, in the highlands of the Abruzzi, it is close upon it; after which it takes a south-western direction through Naples, dips under the sea at the Strait of Messina, and reappears on the northern coast of Sicily. Recent geographers divide the A. as follows: 1. *The North A.*, from the Col de Tenda in the Maritime Alps to the pass of Borgo San Sepolcro, in the neighborhood of Arezzo, on the eastern border of Tuscany. 2. *The Central A.*, from Arezzo to the valley of the Pescara, which flows between the two Abruzzi. 3. *The South A.*, from the valley of the Pescara to Cape Spartivento. 4. *The Insular A.*, or the Sicilian range. The leading feature of the A., wherever they approach the coast, is their extraordinarily steep declivities; while in Middle Italy and the adjoining portions of Upper and Lower Italy, long terraced plateaus, lower ranges, and finally extensive coast-plains, mark their gradual descent on the west. The general name for these lower ranges is *Sub-Apennine;* but they have a variety of particular designations, such as, the Mountains of Carrara and Seravezza, Pratomagno and Monte Amiata in Tuscany; the Sabine, Alban, and Volscian mountains, in the former Papal States; Monte Gargano on the south-east coast, north of Manfredonia, &c. The main chain of the A. does not send off spurs into the Apulian peninsula, or heel of Italy, which, for the most part, is rather level, or only interspersed with detached groups of hills.

The direction of the great chain of the A. is favorable to the formation, on the west side, of important river-basins, such as those of the Arno, the Tiber, the Garigliano, and the Volturno; while, on the east side, we find nothing but small streams, in most cases, destitute of affluents, hurrying down to the sea through wild precipitous valleys. In Northern Italy, the Ligurian A., almost overhanging the Gulf of Genoa, can only develop on the south puny streams, while the north sends down, through the plains of Piedmont, large tributaries to the Po.

The average height of the entire chain of the A. is about 4000 feet, which, however, in the north, sinks down to little more than 3500 feet; and in the mountains of the Abruzzi, rises to 7000 feet. Here, in Monte Corno, the highest peak of the range known under the name of Gran Sasso d'Italia, they reach an elevation of 10,200 feet, and in Monte Velino, of 7850 feet. The North A. at-

tain, in Monte Cimone, situated in the south of Modena, a height of 6973 feet; the South A., in Monte Amara, a height of 9000 feet; the Insular A., if we exclude the isolated peak of Ætna—in Pizzo di Case, a height of 6500 feet.

The A. are crossed by thirteen principal passes: these are, proceeding from N. to S.—1. The Pass of Savona; 2, of Bocchetta; 3, of Cisa; 4, of Monte Cimone; 5, of Porretta; 6, of Pietramala; 7, of Borgo San Sepolcro; 8, of Furlo; 9, of Serravalle; 10, of Aquila; 11, of Isernia; 12, of Arcano and Troja; 13, of Potenza. The prevalent stone is a species of compact limestone, of a whitish-gray color, belonging to the Jura formation. Resting on the limestone is found a more recent formation of sandstone and marl, which is especially abundant in the middle region of the Sub-A., contains an extraordinary number of petrifactions, and must be reckoned as belonging to the upper division of the Parisian limestone. Older formations, however, frequently crop out. Thus, for instance, on the water-shed of the North and Central A. there are found transition clay-slate, grauwacke-slate, &c. The A., especially the Roman and Neapolitan, are distinguished from all other mountain-chains by the rich variety of marbles which they contain. In some places, the quarries seem inexhaustible. Volcanic rocks are numerous in the middle and southern regions, where the ageney of fire has caused very wonderful formations, as, for instance, the crater-lakes of Albano, Nemi, Vesuvius, Solfatara.

The principle chain exhibits, for the most part, a dreary and barren appearance; it looks like a vast wall, with very few projecting peaks to break the dull monotony of the scene, and therefore seldom furnishes any salient points on which the eye of the spectator can rest with pleasure. Naked, riven, covered with thick *débris*, the declivities seem as if scorched by the southern sun. Only in the Abruzzi, in the Sub-A., and above all, in the marble mountains of Carrara and Seravezza, do the bold and magnificent forms of the Alps reappear. Where the A.—in general so poorly supplied with streams—exhibit a trace of Alpine abundance of water, there is no lack of rich pastures and dense forests, but usually only thin grass and wild scrubby bushes cover the stony slopes. The greater number of the roaring forest brooks, in the deep rocky ravines, display, during summer, only a dry bed. Where the mountains dip down to the sea, as at the Riviera of Genoa and the Gulf of Naples, a rich, peculiarly southern vegetation clothes the declivities. Gigantic agaves, Indian figs (*Cactus Opuntia*), myrtle-bushes, orange-groves, hint in these northern lands of the splendors of the tropics. Up to 3000 feet of elevation, cornfields, fruit-bearing chestnuts, and deciduous oaks are found. Beyond this, all vegetation often ceases on the steep and stony sides of the mountains; but at other times the beech or the fir appears in dense forests. There is no region of perpetual snow; but the summit of the Abruzzi and the lofty peaks of Lunigiana, are often covered with snow from October far into May, and send their icy breath so suddenly down into the mild valleys, that the temperature in a few hours sinks 12°—18° F., and a warm spring afternoon is succeeded by a bitter December evening.

APENRA'DE, a town in the Prussian province of Slesvig-Holstein, situated at the bottom of a gulf in the Little Belt, has an excellent harbor, and a considerable amount of shipping. Pop. (1880) 6215. The environs of the town are beautiful. The first historical mention made of A. relates to its destruction by the Slaves in 1148; and, indeed, its position has always laid it open to the casualties of northern war, whether on a large or small scale, as has been especially seen since 1848. Near the town stands the castle of Brundlund, built by Queen Margaret in 1411, in which the bailiff of the place resides.

APE'TALOUS, a term in Botany, applied to flowers or to flowering plants, and signifying that they are destitute of petals or corolla (q. v.). When both the calyx and corolla are wanting, the flower is said to be *achlamydeous* (from the Greek *chlamys*, a covering), or naked. The absence of the whorl of petals sometimes occurs in an exceptional manner in orders or genera ordinarily characterized by its presence. In some plants, as in certain species of the order *Caryophyllaceæ*, petals are sometimes present, sometimes absent, a tendency apparently existing to the suppression of this whorl.

APHA'SIA (Gr. *a*, not, and *phasis*, speech) is a term adopted by the eminent French physician, Trousseau, to denote a remarkable symptom of certain conditions of the nervous system in which the patient is more or less unable to express his thoughts in speech. The disease has been casually noticed by many early observers, amongst whom Dr. Parry of Bath may be especially noticed; but it was not until within the last twenty years that it has received the attention which its great singularity demands. Before receiving its present name, it had been termed *Aphemia* (from *a*, not, and *phemi*, I speak), and *Alalia* (from *laleo*, I talk). Voisin, in an elaborate Memoir on this subject, published in 1865, observes that it may be due to several causes. It may be congenital or acquired, and in the latter case is due to some form of lesion or injury of the anterior lobes of the brain. This fact was observed as long ago as 1825 by Bouillaud; but in 1861, during a discussion of the Anthropological Society of Paris, as to whether certain faculties, such as language, are or are not localized in special parts of the brain, Broca advanced the view, that the faculty of language has its seat not only in the anterior lobes, but in the left lobe, and occupies exactly the external left frontal convolution, where the anterior lobe meets the middle lobe immediately in front of the fissure of Sylvius. This singular conclusion was deduced from only two post-mortem examinations which had just occurred at the Bicêtre, but a number of previously published cases supported it; and Dr. Hughlings Jackson, of the London Hospital, 'has seen about seventy cases of loss or defect of speech with hemiplegia, and in all but one, the hemiplegia was on the right side, indicating disease of the *left* side of the brain.'—*Lancet*, Nov. 26, 1864. Moreover, in the two cases which during the year last named proved fatal in the Edinburgh and Glasgow Infirmaries, Dr. Sanders and Dr. Gairdner traced the disease to the *exact spot* described by Broca. It may be caused by wounds, tumors of various kinds, including hydatids, or by softening of the left anterior lobe, and has occasionally, but very rarely, been found in association with lesions of other parts of the cerebrum, and even of the cerebellum and spinal cord. According to Voisin, in 146 ases, the left anterior lobe was affected in 140, and the right in only 6 cases. A variety of asphasia has been noticed in typhoid fever and in the first stage of small-pox; also in certain chronic cachexias or intoxicants, as, for example, in syphilis and chronic alcoholism; and there are cases in which the affection is purely nervous, and results from epilepsy, an over-taxed brain, &c. The patients in whom true asphasia from disease of the brain occurs, are excellently described by Dr. Gairdner in his essay *On the Functions of Articulate Speech*, &c. (Glasgow, 1866). This description, in a condensed form, is as follows: These patients have been the subject of some form of disturbance of the cerebral functions, sometimes with, but sometimes also without a manifest disturbance of the intellect. It may have been epilepsy or apoplexy, in which latter case, as has been already noticed, there is often paralysis, almost invariably on the right side of the body. This paralysis may be of any extent of completeness, but in many cases the patient has such command over the movements of the tongue and lips, as to show that it is not from paralysis his speech is affected.

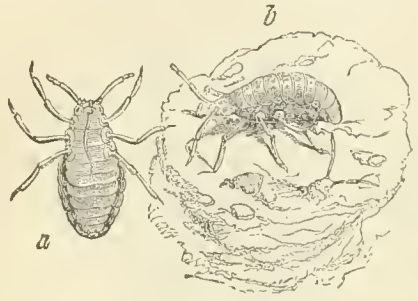
The states of intellect and consciousness are equally variable, the patient occasionally appearing and behaving as if he were in perfect bodily and mental health, except for the aphasia. Moreover, the aphasia itself shows itself in the most varied forms. In the more trivial cases, it is little more than an aggravation of the common defect of forgetting, or being unable to recall the name of a person or thing when wanted. Dr. Gairdner records the case of what he calls 'an aphasic,' who could conduct an ordinary conversation pretty well, but who could not name the days of the week, and would, for instance, call Monday 'the first working-day,' and who had forgotten, or could not give utterance to his own name. Sometimes a patient will perfectly articulate such expressions as these: 'I want——, I want—— Where's the' ——, almost always stopping short at the name of the object. Sometimes the patient's vocabulary is limited to one or two common words, as 'Yes' or 'No;' or perhaps he utters only one or more unintelligible words, as in the case of one of Trousseau's patients, who for four months uttered nothing but '*Cousisi*' to every possible question, unless when in moments of great irritation, and he would then articulate '*Sacon, sacon*'—probably an abbreviation for a French oath. Strange to say, certain aphasics who can articulate absolutely nothing else, can swear with perfect facility. Such exclamations as 'Oh!' 'Dear me!' 'God bless my life!' and 'D—n it!' are often the only utterances of these patients. Dr. H. Jackson, in a Memoir on Aphasia, in the first volume of the *London Hospital Reports*, has made some excellent remarks on this peculiarity, which are well worthy of perusal by all who study mental philosophy. He ingeniously regards an oath not as a part of language, but as 'a sort of detonating comma.' The general reader may also read with advantage the histories of two cases recorded by Trousseau, in which Frenchmen of high mental capacity, and well acquainted with the disease (one of them an eminent physician in Paris, who had specially studied the diseases of the brain; and the other, Professor Lordat of Montpellier), have passed through attacks of aphasia have recovered, and have described their own cases.

Aphasia may be either temporary or persistent; in the former case, being due to loss of nervous energy, congestion, or some other functional disorder; while in the latter case, it is probably associated with disease of structure. It is unnecessary to describe the treatment, which varies according to the peculiarity of each individual case, and must be left solely in the hands of the physician.

APHE'LION, that point in the elliptical orbit of a planet which is most remote from the sun. The opposite point, or that nearest

to the sun, is styled the PERIHELION. At the former point, the swiftness of the planet's motion is least, and begins to increase; at the latter, it is greatest, and begins to decrease. This irregularity of motion is most remarkable in comets whose orbits deviate most from the circle. The motion of the comet of 1680, at its perihelion, was calculated as 137,000 times more rapid than its motion in A. See APSIDES.

A'PHIS, a genus of insects belonging to the order Hemiptera, sub-order Homoptera—the type of a family called *Aphidii*. They are small insects, living by sucking the juices of plants, upon

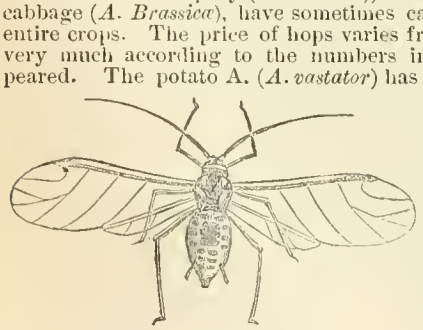


Apple Aphis (*Eriosoma Mali*):
a, wingless insect, magnified; *b*, wingless insect in excrescence of the tree, magnified.

which they may be seen congregated in immense numbers, often doing serious injury, causing the distortion of leaves, and even the blight and decay of the plant. The woolly Aphis, or American Blight (*A. lanigera; Eriosoma Mali* of Leach), is sometimes very injurious to apple-trees, and when once it has found its way into a garden or orchard, it is very difficult of removal. It is a minute

Apple Aphis:
a branch with excrescences, reduced.

insect, 'covered with a long cotton-like wool, transpiring from the pores of its body'—'a cottony excretion'—in which it differs from the ordinary aphides, and takes its place in the chinks and rugosities of the bark, multiplying rapidly, extracting the sap, causing diseased excrescences, and, ultimately, the destruction of the tree. It was first observed in England in 1787; but it is uncertain if it was, as has been supposed, accidentally imported from America. The Hop-fly (*A. Humuli*), and the A. of the turnip and cabbage (*A. Brassicæ*), have sometimes caused the destruction of entire crops. The price of hops varies from one year to another, very much according to the numbers in which '*the fly*' has appeared. The potato A. (*A. vastator*) has been represented as the cause of the potato disease; but this opinion has few supporters. The aphides of the rose (*A. Rosæ*) and of the bean (*A. Fabæ*) are among the most familiarly known. Every one must have observed the leaves of trees and shrubs deformed by red convexities. In the hollows of the under side of these, aphides have their habitation, and there they find their food; the exhausted leaf at last curls up. Most of the species are green; the A. of the bean is black. They are generally called Plant-lice. They have a proboscis (*haustellum*), by which they pierce and suck plants; and at the extremity of the abdomen, two horn-like processes, from which exude frequent small drops of a saccharine fluid called *Honey-dew*, a favorite food of ants. It has been seen even to fall in a kind of shower from trees much covered with aphides. Mention has been made in the article ANT, of the means which ants take to obtain this food. The legs of aphides are long, and they move slowly and awkwardly by them. The greater number of them never have wings; It is in the autumn that perfect winged insects generally appear.



Potato Aphis (*Aphis vastator*).
magnified fifty times.

From the pairing of these result eggs, which produce female aphides in the following spring, and successive generations of wingless aphides are produced in a viviparous manner without impregnation throughout the summer, after which winged aphides again appear. Their increase is restrained not only by birds, but by insects which feed on them. A family of coleopterous insects, to which the genus *Coccinella* or Lady-bird (q. v.) belongs, has received upon this account the name of *Aphidiphagi*, or aphis-eaters. There are also certain minute hymenopterous insects, which destroy them in great numbers by depositing their eggs in them; the larva feeds upon the living A., out of which it at last eats its way, leaving a mere desiccated skin.

APHO'NIA (Gr. *a*, not, and *phone*, voice) is the term used in Medicine to signify a more or less complete loss of voice. It is altogether distinct from mutism, in which it is impossible to form articulate sounds, and in most cases the voice is not entirely gone, but only more or less lost or suppressed. The voice is essentially produced (as has been proved in the special article on that subject) by three distinct agents—viz., (1) the expiration of air, (2) the opening of the glottis, and (3) the tension of the vocal cords—and hence anything interfering with expiration, or with the functions of the glottis and vocal cords, may cause aphonia. Thus, it may result from paralysis of the respiratory muscles, from pulmonary emphysema, and sometimes from pneumonia; or it may be caused by diseases of the larynx, as chronic laryngitis, œdema of the glottis, polypus, &c.; or by pressure on the larynx caused by abscesses, vegetations, and any kind of morbid growth; or it may be traced to some functional or organic disturbance of the inferior vocal cords. Thus, the muscular fibres which act on these cords may become affected in acute laryngitis by extension of the inflammation, or their action may be impeded by the pressure of false membrane in croup. In typhoid fever, the aphonia which is so commonly observed is due to ulceration extending to these structures. Again, in cases of lead or phosphorus poisoning, there is aphonia due to fatty degeneration of these muscles. Not unfrequently, aphonia may be traced to compression of the recurrent or inferior laryngeal nerve, which is the nerve supplying motor power to all the muscles of the larynx, with one trifling exception.

Such pressure is not unfrequently caused by an aneuris, an abscess, tumor, &c. In the same way, a wound or contusion of the pneumogastric nerve, or one of the recurrent branches, will cause aphonia, or, more commonly, an extremely hoarse modification of the voice, in consequence of the laryngeal muscles being paralyzed on one side, and remaining active on the other. There are cases of direct nervous action being interfered with; but there are many cases of what may be termed *reflex aphonia*, as when the voice is often more or less lost in the course of pregnancy when accompanied with convulsions, or in consequence of the presence of intestinal worms, or after the rapid suppression of an exanthematous rash, or of a long-continued hæmorrhagic discharge. Aphonia is, moreover, very commonly associated with hysteria.

When aphonia is not due to irremovable causes, as tumors pressing on the recurrent nerve, fatty degeneration of the laryngeal muscles, &c., it generally disappears after a longer or shorter interval. It occasionally assumes remarkable intermittent shapes. In one instance, the affection came on regularly at the same time of the year for seventeen years, beginning daily at noon, and lasting the remainder of the day, for a period varying from three to seven months. Another case is recorded in which, during fourteen years, a young woman could only speak during two or three hours daily.

In those cases which are amenable to treatment, emetics, electricity, strychnine, leeching, blistering, croton-oil liniment, and internal application of nitrate of silver, have been found to be the most useful remedies.

A'PHORISM, a maxim, or any short and significant saying; such as, 'Custom is a second nature.' A whole piece or work is sometimes written in the form of a series of aphorisms, arranged in due order, and leaving their connection to be traced by the reader's reflection. In certain circumstances this aphoristic style has an impressive effect; but long continued, it becomes wearisome.

APHRODI'TÉ, the Greek name of Venus, according to various traditions, is derived from *aphros* (foam), in allusion to the old poetical myth which represented the goddess as springing from the foam of the sea. See VENUS and APELLES. *Aphrodisia* were festivals celebrated in honor of A., in numerous cities of Greece, but especially in Cyprus. At Paphos, in this island, was her most ancient temple. Bloodless sacrifices alone were imagined to please A., such as flow-

ers, incense, &c. Mysteries of an impure kind formed part of the ceremonial of the aphrodisia. Aphrodisia were no doubt held in the other places where A. was worshiped, such as Cythera, Sparta, Thebes, Elis, &c., though they are not mentioned. At Corinth and Athens, the aphrodisia were celebrated principally by prostitutes.

API'CEÆ. See UMBELLIFERÆ.

APIACERE. See AD LIBITUM.

A'PIARY. See BEE.

API'CIUS, MARCUS GABIUS, a Roman epicure, who lived in the times of Augustus and Tiberius, and was celebrated for his luxurious table and his acquirements in the art of cookery. When, by the gratification of his favorite indulgence, he had consumed the greater part of his fortune, and had only some £80,000 left, he poisoned himself, in order to avoid the misery of plain diet. Two other gourmands—one in the time of Pompey, the other in the reign of Trajan—are mentioned under the name Apicius. The Roman cookery-book *Cælii Apicii de Obsoniis et Condimentis sive de re Culinariâ* (libri decem), ascribed to A., belongs to a much later time, inasmuch as it abounds in inaccuracies and solecisms. Its author *Cælius* has thought proper to recommend his work to gourmands by affixing to it the celebrated name of Apicius.

A'PION, a Greek grammarian, was born at Oasis, a town in Libya, but educated in Alexandria, which he affected to consider his birthplace, from a desire of being thought a pure Greek. He studied under Apollonius, the son of Archibius, from whom he acquired an admiration of Homer, and afterwards went to Rome, where he succeeded Theon as teacher of rhetoric. He seems to have been as remarkable for his loquacious vanity as for his knowledge. He declared that himself, and every one whom he mentioned, would be held in immortal memory, that he was equal to the first philosophers of Greece, and that Alexandria should be proud of him. From his bragging, Tiberius used to call him *Cymbalum Mundi* (the cymbal of the universe).

With the exception of one or two fragments, the whole of A.'s numerous writings are lost. He composed a work on the text of Homer, partly in the form of a dictionary, which was frequently referred to by subsequent authors; a work on Egypt, which contained the far-famed story of *Androclus and the Lion*, preserved by Aulus Gellius; a work against the Jews; one in praise of Alexander the Great; another on the great epicurean Apicius; histories of various countries, &c.

A'PIOS TUBERO'SA, formerly included in the genus *Glycine*, and called *G. Apios*, a plant belonging to the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having tuberous roots, a twining stem, dark red flowers, leathery, 2-valvular legumes, and pinnate leaves, with seven pair of smooth ovato-lanceolate leaflets. This plant, which is a native of Virginia, has for a century been cultivated in botanic gardens in Europe, and has recently been brought into particular notice on the continent, in a great measure through the French traveler Lamare-Picquot, who, during his travels in North America, convinced himself of the value of the tubers as an article of food, for which they are there used to some extent. Various attemps have since been made to cultivate it like the potato; but its cultivation is found difficult, upon account of the length and weakness of the twining shoots and the length of the roots. The tubers cooked in steam are free from all acridity and bitterness, and very much resemble potatoes dressed in the same way. They contain more nitrogen than potatoes (4·5 per cent.), also more starchy farina (33·55 according to an analysis by Payen).

A'PIS, the bull worshiped by the ancient Egyptians, who regarded it as a symbol of Osiris, the god of the Nile, the husband

Apis.—Golden Calf.

of Isis, and the great divinity of Egypt. A sacred court or yard was set apart for the residence of A. in the temple of Ptah at Memphis, where a numerous retinue of priests waited upon him, and sacrifices of red oxen were offered to him. His movements, choice of places, and changes of appetite, were religiously regarded as oracles. It was an understood law that A. must not live longer than twenty-five years. When he attained this age, he was secretly put to death, and buried by the priests in a sacred well, the popular belief being that he cast himself into the water. If, however, he died a natural death, his body was solemnly interred in the Temple of Serapis at Memphis, and bacchanalian festivals were held to celebrate the inauguration of a new bull as A. As soon as a suitable animal was found having the required marks—black color with a white square on the brow; the figure of an eagle on the back, and a knot in the shape of a cantharus under the tongue—he was led in triumphal procession to Nilopolis at the time of the new moon, where he remained forty days, waited upon by nude women, and was afterwards conveyed in a splendid vessel to Memphis. His Theophany, or day of discovery, and his birthday, were celebrated as high festivals of seven days' duration during the rise of the Nile. The worship of the golden calf by the Israelites in the wilderness, and also the employment of golden calves as symbols of the Deity by Jeroboam, have been very generally referred to the Egyptian worship of A.

A'PIS, APIDÆ. See BEE.

A'PIUM. See CELERY.

APO'CALYPSE. See REVELATION OF ST. JOHN.

APOCALY'PTIC NUMBER is 'the mystical number' 666, spoken of in the book of Revelation (xiii. 18). As early as the 2d c., the Church had found that the name, Antichrist, was indicated by the Greek characters expressive of this number; while others believed it to express a date. The most probable interpretation is that which was current in the days of Irenæus, and which found the number in the word *Lateinos* (*Latinus*). The Roman nation—the mightiest pagan power on earth—was the most terrible symbol of Antichrist, and the number 666 appears in the Greek characters which spell the name. Protestant controversialists very generally support their views by this interpretation, applying the prophecy to papal Rome. See ANTICHRIST in AM. SUPP.

APOCA'RPOUS FRUITS, in Botany, are those fruits which are the produce of a single flower, and are formed of only one carpel, or of a number of carpels remaining free and separate from each other. The term is derived from the Greek *apo*, implying separation, and *carpos*, fruit.

A POCO A POCO (Ital.), in Music, by degrees; by little and little.

APOCRE'NIC ACID is one of the products of the natural decay of wood and other plant textures, and is found wherever lignine or woody fibre is decomposing in soils, &c. As A. A. is soluble in water, it follows that rain-water falling on and percolating through soils containing this substance, becomes impregnated with it; and hence, in many natural waters, A. A. is a recognized constituent. A. A. performs an important function in the growth of plants, as there is every reason to believe that it forms one of the stages through which matter travels from dead plants again into the living vegetable tissue.

APO'CRYPHA, or APOCRYPHAL WRITINGS. The word originally meant *secret* or *concealed*, and was rendered current by the Jews of Alexandria. In the earliest churches, it was applied with very different significations to a variety of writings. Sometimes it was given to those whose authorship and original form were unknown; sometimes to writings containing a hidden meaning; sometimes to those whose public use was not thought advisable. In this last signification, it has been customary, since the time of Jerome, to apply the term to a number of writings which the Septuagint had circulated amongst the Christians, and which were sometimes considered as an appendage to the Old Testament, and sometimes as a portion of it. The Greek Church, at the Council of Laodicea (360 A.D.), excluded them from the canon; the Latin Church, on the other hand, always highly favored them; and finally the Council of Trent (1545—1563) placed them on an equality with the rest of the Old Testament. The Church of England uses them in part for edification, but not for the 'establishment of doctrine.' All other Protestant churches in England and America reject their use in public worship.

But it was once customary to bind up the A. between the authorized versions of the Old and New Testaments, though this has now ceased, and, as a consequence, this curious, interesting, and instructive part of Jewish literature is now known only to scholars. The Old Testament A. consists of 14 books: 1. First Esdras (q. v.); 2. Second Esdras (q. v.); 3. Tobit (q. v.); 4. Judith (q. v.); 5. The parts of Esther not found in Hebrew or Chaldee; 6. The Wisdom of Solomon; 7. The Wisdom of Jesus, son of Sirach, or Ecclesiasticus (q. v.); 8. Baruch (q. v.); 9. The Song of the Three Holy Children; 10. The History of Susanna; 11. The History of the Destruction of Bel and the Dragon (q. v.); 12. The Prayer of Manasses, King of Judah (see MANASSEH); 13. First

Maccabees (q. v.); 14. Second Maccabees (q. v.). The precise origin of all these writings cannot be ascertained. It is enough to state here that some bear traces of a Palestinian, others of an Egypto-Alexandrine, and others, again, of a Chaldaico-Persian origin or influence. Most, if not all, bear internal evidence of having been composed in the 1st and 2d centuries B.C.

The A. of the New Testament may be arranged under three heads. 1. The writings comprising the *Apocryphal Gospels*, which consist of 22 separate documents, 10 in Greek and 12 in Latin. They concern themselves with the history of Joseph and of the Virgin Mary before the birth of Christ, with the infancy of Christ, and with the history of Pilate. The most important of the set are the *Protevangelium of James*, the *Gospel of Thomas*, and the *Acts of Pilate*, which are perhaps the *origines* of all the apocryphal traditions. That many of the stories found in these were current in the 2d century, is abundantly proved, but we have no evidence that any of the books known as Apocryphal Gospels were then in existence, or are older than the 4th century. 2. The *Apocryphal Acts of the Apostles*, consisting of 13 documents originally written in Greek, but found also in a Latin compilation probably of the 6th century. They are distinguished from the Apocryphal Gospels by having less of miracle and more of didactic discourse. The more important of the collection are *The Acts of Peter and Paul*, *The Acts of Barnabas*, *The Acts of Philip*, *the Acts of Andrew*, *the Acts of Bartholomew*, and *The Acts of John*. It is difficult to ascertain their age. Some are probably of earlier date than the Apocryphal Gospels, but the original MSS. are lost, and we only possess them in late transcripts of the middle ages. 3. The *Apocryphal Apocalypses*, consisting of seven documents, four of which are called apocalypses by their authors. There is great and perplexing variety in the MSS. That called *The Apocalypse of Moses* relates rather to the Old Testament than to the New; so does *Apocalypse of Esdras*, which is a weak imitation of the Fourth Book of Esdras. The others are *The Apocalypse of Paul*, *The Apocalypse of John*, and *The Assumption of Mary* in three forms. These, too, only exist in late MSS. of the middle ages, and it is, of course, not quite certain that they are the same in form as the works bearing the same name referred to in the writings of the Fathers.

The New Testament A. is not without interest or instruction for us. It throws a flood of light upon the workings of the early Christian consciousness and modes of thought, and it also enables us to appreciate the vast superiority of those Scriptures which have obtained canonical authority.—See Tischendorf's *Prolegomena* to the Apocryphal Literature of the New Testament (Leipsic, 1873); and Clark's *Ante-Nicene Christian Library*, vol. 16 (Edinburgh, 1870).

APOCYNA'CEÆ, or APOCY'NEÆ, a natural order of Dicotyledonous plants, consisting of trees and shrubs, generally with milky juice, having entire leaves and no stipules. The calyx is usually 5-partite, persistent; the corolla hypogynous, monopetalous, often with scales in its throat, regular 5-lobed, twisted in bud. There are five stamens which are inserted on the corolla; the anthers adhere firmly to the stigma, to which the pollen is immediately applied; the anthers are 2-celled, and open longitudinally; the pollen is granular. The ovaries are two, each 1-celled, or one, which is 2-celled; ovules usually numerous; styles 1 or 2; the stigma is contracted in the middle, and peculiarly characteristic of the order. The fruit is a follicle or capsule, or drupe or berry, double or single. The seeds have a fleshy or cartilaginous albumen, or (rarely) are ex-albuminous.—There are about 566 known species, chiefly natives of tropical countries. The PERIWINKLE (q. v.) is its only representative in the flora of Britain, a wanderer, as it were, from the tropics, yet hardly enough for the climate with which it has to contend; the OLEANDER (q. v.) and a few others are found in the south of Europe. Many species are poisonous; amongst which is the noted TANGHIN (q. v.) or TANGHEENA of Madagascar. Some are used in medicine, in India and other countries. A number of species yield CAOUTCHOUC (q. v.). The milk of others is bland and wholesome, as the HYA HYA or COW-TREE (q. v.) of Demerara. Some are used in dyeing; *Wrightia tinctoria* yields indigo of good quality.—A number yield eatable fruits, as *Willughbeia edulis* and *Carissa Carandas* in India; *Carissa edulis* in Arabia, and certain species of *Carpodinus*, called PISHAMIN in Sierra Leone, and *Hancornia*.—*Apocynum cannabinum*, Canadian hemp, a herbaceous plant about 4—5 feet in height, with unbranched stem, oblong leaves, and lateral cymes of whitish bell-shaped flowers, yields a very strong fibre, which the Indians of North America employ for making twine, cloth, fishing-nets, &c.

APO'LDA, a town of the grand duchy of Saxe-Weimar-Eisenach, Germany, on the Werlitz, a feeder of the Saale, eight miles north-east from Weimar. It is a station on the Thuringian Railway, between Weimar and Weissenfels. It is a place of much industrial activity, having extensive manufactures of hosiery. Pop. (1880) 15,630.

A'PODAL FISHES are fishes destitute of ventral fins. In the Linnæan system, the *Apodes* are an order of Fishes, in which genera not otherwise nearly allied are brought together; but in the systems of Cuvier and other recent naturalists, a less important place is assigned to this distinctive character.—Eels are an example of A. fishes.

APODI'CTIC, a logical term signifying a judgment or conclusion which is necessarily true; or, in other words, a judgment of which the opposite is impossible. No A. judgment can be founded on experience, because experience does not supply the idea of an absolute necessity.

A'POGEE (Gr. *apo*, from, and *ge*, the earth), properly speaking, the greatest distance of the earth from any of the heavenly bodies. Its application, however, is restricted to the sun and moon, the sun's A. corresponding to the earth's aphelion, and the moon's A. being the point of its orbit most remote from the earth. A. is opposed to perigee.

APOLLINA'RIS, the Younger, Bishop of Laodicea in Syria (362), and one of the warmest opponents of Arianism. Both as a man and a scholar, he was held in the greatest reverence; and his writings were extensively read in his own day. His father, A. the Elder, who was presbyter of Laodicea, was born at Alexandria, and taught grammar, first at Berytus, and afterwards at Laodicea. When Julian prohibited the Christians from teaching the classics, the father and son endeavored to supply the loss by converting the Scriptures into a body of poetry, rhetoric, and philosophy. The Old Testament was selected as the subject for poetical compositions after the manner of Homer, Pindar, and the tragedians; whilst the New Testament formed the groundwork of dialogues in imitation of Plato. It is not ascertained what share the father had in this work, but as he had a reputation for poetry, he probably put the Old Testament into Greek verse. But it was chiefly as a controversial theologian, and as the founder of a sect, that A. is celebrated. He maintained the doctrine that the *logos*, or divine nature in Christ, took the place of the rational human soul or mind, and that the body of Christ was a spiritualized and glorified form of humanity. This doctrine was condemned by several synods, especially by the Council of Constantinople (381), on the ground that it denied the true human nature of Christ.

The heresy styled Apollinarianism spread itself rapidly in Syria and the neighboring countries, and, after the death of A., divided itself into two sects—the Vitalians, named after Vitalis, Bishop of Antioch; and the Polemeans, who added to the doctrine of A. the assertion that the divine and human natures were so blended as one substance in Christ that his body was a proper object of adoration. On this account, they were accused of *sarcolatria* (worship of the flesh) and *anthropolatria* (worship of man), and also were styled *synousiastoi* (*syn*, together, and *ousia*, substance), because they confused together the two distinct substances. The whole controversy, which occupied a great part of the 5th c., is an instance of human reason wandering out of its proper sphere. A. must not be confounded with Claudius A., Bishop of Hierapolis, in Phrygia (170 A.D.), and who wrote an *Apology* for the Christian faith, and several other works, all of which are lost.

APO'LLO (Gr. APOLLON). A. may be regarded as the characteristic divinity of the Greeks, inasmuch as he was the impersonation of Greek life in its most beautiful and natural forms, and the ideal representative of the Grecian nation. His mild worship, with its many festivals, accompanied as they were by a cessation from all hostilities; his various shrines at sacred places, with their oracles, and the general idea of his character, had a wide, powerful, and beneficent influence on social and political life throughout the states of Greece. Homer and Hesiod mention that he was the son of Zeus and Leto, but neither states where he was born. The Ephesians believed that both he and Diana, his sister, were born in a grove near their city. The Tegyræans of Bœotia, and the inhabitants of Zoster in Attica, also claimed the honor of his birth; while the Egyptians seemed to think he properly belonged to them; but the most popular legend was that which made him a native of Delos, one of the Cyclades, where his mother Leto, followed by the jealous wrath of Juno over land and sea, at length found rest and shelter, and was delivered of him, under the shadow of an olive-tree, at the foot of Mount Cynthus. To spite the Queen of Heaven, who was far from being a favorite with the other goddesses, these hastened to tender their services to the weak and wearied Leto. The young A. was much made of. Themis fed him with nectar and ambrosia, the food of the gods, which seems to have suddenly excited the conceit of the infant deity, inasmuch as he surprised his nurse by starting to his feet, demanding a lyre, and announcing his intention of henceforth revealing to mortals the will of Jove. The island, proud of having been the birthplace of A., adorned itself with a robe of golden flowers.

In ancient literature A. is described as possessed of many and various powers, all of which, however, are seen on closer inspection to be intimately related to each other. He is spoken of: 1. The god of retributive justice, who, armed with bow and arrows,

sends down his glittering shafts upon insolent offenders. In this character he appears in the opening of the *Iliad*. 2. As the instructor of bards, and the god of song and minstrelsy, playing upon the phorminx or seven-stringed lyre, and singing for the diversion of the other deities when engaged in feasting. 3. As the god of prophetic inspiration, especially in his oracle at Delphi. 4. As the guardian deity of herds and flocks. 5. As the god of medicine, who affords help, and wards off evil. In this sense he is represented as the father of Asclepius (Æsculapius), the god of the healing art. 6. As a founder of cities. According to Homer, he assisted Neptune in building the walls of Troy. Cyrene, Naxos in Sicily, and other cities, venerated A. as their founder. By the later writers, A. was identified with Helios, the sun-god, though Homer describes the latter as a distinct deity. Several critics, however, have regarded Helios, or the sun-god, as the true original A.—an opinion which may be supported by many probabilities. The supposition that A. was identical with the Egyptian deity Horus was rejected by the learned O. Müller, who generally opposed all attempts to deduce Grecian from Egyptian mythology. According to Müller's theory, A. was a purely Doric deity, whose first residence was in Tempe, and who afterwards removed to Delphi, whence the fame of his oracle was spread abroad, and made him to be recognized as the national divinity of Greece. The introduction of his worship into Attica appears to have been contemporaneous with the immigration of the Ionians, and that worship would seem to have spread over the Peloponnesus, immediately after it was conquered by the Dorians. Much controversy has taken place, both with reference to the idea which lies at the root of the whole myth of the A. worship, and also as to whether this myth had its origin in the north of Greece or in Egypt. Even on the supposition that the original conception was derived from the latter source, it was to Greek art and philosophy that it owed its development into the ideal of humanity. The most celebrated oracles of A. were at Delphi, Abæ in Phocis, Ismenion in Thebes, Delos, Claros, near Colophon, and Patara in Lycia. Among the Romans, the worship of A. was practised as early as 430 B.C., and prevailed especially under the emperors. But there can be no doubt that the Romans derived their conceptions of A. entirely from the Greeks. It was in honor of A. and his sister Diana that the *ludi sæculares* were celebrated every hundred years. The attributes of A. are the bow and quiver, the cithara and plectrum, the snake, shepherd's crook, tripod, laurel, raven, &c.; less frequently, the grasshopper, cock, hawk, wolf, and olive-tree. In sculpture, he is generally represented with a face beautifully oval, high forehead, flowing hair, and slender figure.

Apollo.

APO'LLO BELVEDE'RE, a celebrated statue of antiquity, which has generally been regarded as embodying the highest ideal of manly beauty. It is generally supposed to represent the 'lord of the unerring bow' in the moment of his victory over the Python, but numerous other explanations have been suggested. The figure (upwards of 7 feet in height) is naked, but a cloak fastened round the neck hangs gracefully over the extended left arm; the expression of the face is one of calm and godlike triumph, mixed with 'beautiful disdain.' This great work of art was discovered in 1503, amid the ruins of the ancient Antium, now Capo d'Anzo, and purchased by Pope Julius II., who placed it in the Belvedere of the Vatican, whence the name it bears. The date of its execution is with probability referred to the reign of Nero, but the name of the artist is a matter of mere conjecture. The left hand and the right fore-arm, wanting in the statute as discovered, were restored by G. A. da Montorsoli, a pupil of Michael Angelo.

Apollo Belvedere.

APOLLODO'RUS, an Athenian painter, who flourished about 408 B.C., and was the predecessor of Zeuxis. He introduced improved coloring and distribution of light and shade.—A., a celebrated architect in the time of the emperor Trajan, by whom he was employed to construct a bridge over the Danube in Lower Hungary. His severe censure, boldly pronounced on a design for a temple of Venus, which the emperor Hadrian had sent to him, caused A. to be sentenced to death in 129 A.D.—A., a Greek grammarian lived about 140 B.C., studied philosophy in Athens, and grammar under Aristarchus; wrote a work on mythology, giving an arrangement of old myths from the earliest times to the historical period; also a geography, a chronicle in iambic verse, and several grammatical works. The mythology, which begins with the origin of the gods, probably went down as far as the Trojan cycle, but a portion of it has perished. It has been reckoned by some only an extract from a larger work by A., though this is a mere hypothesis, based on the fact that the legends are given with extreme simplicity and brevity. The work is one of great value to classical scholars. An edition of the *Bibliotheca* of A., in 4 vols., was published at Göttingen, 1782—1783, by C. H. G. Heyne.

APOLLO'NIUS, the name of several celebrated Greek grammarians and rhetoricians. A., surnamed DYSCOLOS (or ill-tempered), of Alexandria, lived in the 2d c. Some of his grammatical works were edited by Bekker. A. was the first who reduced grammar to a system. His reputation was so high, that Priscian calls him *grammaticorum princeps* (the prince of grammarians).—A., son of Archebulus, also of Alexandria, lived in the time of Augustus, and was the author of a lexicon of Homeric words.—A., surnamed Molon, was a teacher of rhetoric at Rhodes, and also gave lectures at Rome, where he was highly esteemed by Cicero and Cæsar.—A. of PERGA, 240 B.C., is classed with Euclid, Archimedes, and Diophantus, as one of the founders of the mathematical sciences. His work on conic sections has been preserved, partly in the original Greek, partly in an Arabic translation.—A. OF RHODES (or of Alexandria, say some authorities), born 235 B.C., wrote many works on grammar, and an epic poem, entitled the *Argonautica*, marked rather by learning and industry than by poetical genius, though it contains some truly artistic passages, such as those exhibiting the growth of Medea's love. Is was greatly admired by the Romans, was translated into Latin by Publius Terentius Varro, and was imitated, not only in a wholesale manner by Valerius Flaccus, but even by Virgil in some passages. It has been edited by the German scholars Brunck and Wellauer (Leipsic, 1813—1828).

APOLLO'NIUS, OF TYANA, in Cappadocia, who lived in the time of Christ, was a zealous follower of the doctrines of Pythagoras. He soon collected a considerable number of disciples, traveled through a great part of Asia Minor, and endeavored to find his way to India, in order to become acquainted with the doctrine of the Brahmins. On this journey he stayed for a time in Babylon, was introduced to the Magi, and at last reached the court of King Phraortes, in India, who recommended him to Jarchas, the principal Brahmin. When A. returned from this pilgrimage, his fame as a wise man was greatly increased; the people regarded him as a worker of miracles and a divine being, and princes were glad to entertain him at their courts. He himself seems to have claimed insight into futurity, rather than the power of working miracles. From Rome he was expelled on a charge of having raised a young woman from the dead. After extensive travels in Spain, Italy, Greece, and Ethiopia, he was accused of having taken part in an insurrection against Domitian; but appeared before the tribunal, and was acquitted. Ultimately, he appears to have settled in Ephesus, where he opened a Pythagorean school, and continued his teaching until he died, nearly one hundred years old. His history was written about a hundred years after his death by Philostratus (q. v.). It contains a mass of absurdities and fables, through which an outline of historical facts and the real character of the man are sufficiently discernible. Hierocles, a heathen statesman and opponent of Christianity, wrote, in the 3d c., a work on the life and doctrines of A., with a view to prove their superiority to the doctrines of Christ. In modern times, the notorious English freethinker Blount, and Voltaire in France, have renewed the attempt.

APOLLO'NIUS, of TYRE, the hero of a Greek romance, which enjoyed great popularity in the middle ages, and was translated into almost all the languages of Western Europe. In it are related the romantic adventures which befell A., a Syrian prince, previous to his marriage with the daughter of King Alcistrates, of Cyrene. To these are added the adventures of his wife, who was parted from him by apparent death, as well as those of his daughter, Tarsia, who was carried off by pirates, and sold in Mitylene. The poem closes with the reunion of the whole family. The original Greek work no longer exists; but there are three very early Latin versions, of which one was published by Welser (Augsburg, 1595); another is to be found in the *Gesta Romanorum;* and the third in the *Pantheon* of Gottfried of Viterbo. From this Latin source have proceeded the Spanish version of the 13th c., printed in Sanchez' *Coleccion de Poesias Castellanas* (2d edition, Paris, 1842), several French versions, in prose and verse, as well as several Italian. As early as the 11th c. there was an Anglo-Saxon adaptation of the work, and subsequently various English ones appeared. Shakspeare has treated the subject in his drama of *Pericles;* he substantially follows Gower, in his *Confessio Amantis*, who bases his narrative on the *Pantheon* of Gottfried of Viterbo. Three popular English stories, drawn from a French version of

this romance, appeared in London in 1510, 1576, and 1607; while the Dutch, in 1493, derived theirs from the German. The romance was rendered into German, probably from the *Gesta Romanorum*, by a certain 'Heinrich von der Neuenstadt' (i. e., Vienna), about the year 1300, in the form of a long and, as yet, unpublished poem. Later, we have a *Histori des Küniges Appolonii*, translated from Gottfried of Viterbo, and first published at Augsburg in 1476. Simrock, in his *Sources of Shakspeare*, narrates the story as it is given in the *Gesta Romanorum*. A modern Greek translation of the Latin romance, undertaken in 1500 by Gabriel Contianus, of Crete, and several times reprinted at Venice, must not be confounded with the lost Greek original.

A'POLOGUE, a fable, parable, or short story, intended to serve as a pleasant vehicle of some moral doctrine. One of the oldest and best apologues or parables is that by Jotham, as given in the Book of Judges (ix. 7—15). Another celebrated A. is that of the 'Limbs and the Body,' related by the patrician Menenius Agrippa. Æsop's fables have enjoyed a world-wide reputation. Luther held such an opinion of the value of the A. as a vehicle of moral truth, that he edited a revised Æsop, for which he wrote a characteristic preface. He says: 'In doing this, I have especially cared for young people, that they may receive instruction in a style suitable to their age, which is naturally fond of all kinds of fiction; and I have wished to gratify this natural taste without indulging anything that is bad.'

APO'LOGY. The term is now commonly understood as synonymous with an excuse for breach of an engagement, &c., but was originally used as the title of any work written in defence of certain doctrines, as in the *A. of Socrates*, ascribed to Plato and Xenophon; the *A. for the Christians*, by Tertullian, and in many other defences of the Christians, written by Justin Martyr, Athenagoras, Tatian, Theophilus, Origen, Eusebius, Minucius Felix, Arnobius, Lactantius, Augustine, Orosius, and others. The attacks parried or retorted in these apologetical works are such as charges of atheism, want of philosophical knowledge, anti-social tenets, &c. Both the charges and the refutations brought forward serve to give us an insight into the character of the times when these works were written. Thus, in the A. by Tertullian, it is curious to find a formal argument employed to refute the assertion that the spread of Christianity was the cause of 'earthquakes' and other natural phenomena which had occurred in some parts of the Roman empire. After the fourth century, when the church was made dominant under the Roman emperors, apologetical writings were less called for; but Bartholus Edessenus and Raymundus Martinus wrote against the Jews and the Mohammedans. In the 15th c., when the revival of learning placed Christianity in apparent opposition to the Platonic philosophy, Marsilius Ficinus wrote in defence of revelation; and some time after the Reformation, the spread of free-thinking and scepticism in England was opposed by a variety of apologetical works, chiefly maintaining the points that Christianity is a divine revelation, Christ a divine messenger, and his church a divine institution. The defence of Christianity on grounds of reason came now to be treated as a distinct branch of theology, under the name of *Apologetics*. Among the numerous apologetic works by Protestants, may be mentioned those by Grotius (*De Veritate*, &c.), Butler (*Analogy of Religion, Natural and Revealed*), Lardner (*Credibility of the Gospel History*), Leland, Addison, Soame Jenyns (*Internal Evidences of the Christian Religion*), Hugh Farmer, Bishop Watson (*A. for Christianity*), Paley (*Evidences of Christianity*, and *Horæ Paulinæ*), &c. Among Roman Catholic apologetic writers, the most eminent are Pascal, Houteville, Guenée, Bergier, Mayr, and Chateaubriand.

Recently, a great number of apologetic works by Neander, Tholuck, and others have appeared, in reply to Strauss's *Life of Jesus*, and the *Vie de Jésus* by Joseph Ernest Renan.

APONEURO'SIS is an anatomical term for an expansion of strong fibrous tissue, of which there are many examples in the human body. For the sake of convenience, it is generally confined to expansions from the tendons of muscles, as the lumbar A. If a tendon is very broad and expanded, as that of the external oblique muscle of the abdomen, it is said to be aponeurotic. Some muscles, as those on the shoulder-blade, are partially covered with a tendinous expansion, to which some of their fibres are attached; this is termed the aponeurotic *origin* of the muscle; it gives the muscle a more extensive attachment, without adding materially to weight. Aponeuroses stretch in some localities as protections over large arteries; thus, in bleeding from the vein nearest the inside of the bend of the elbow, the only structure between it, the lancet and the brachial artery, is an aponeurotic expansion from the biceps tendon into the muscles of the fore-arm. See FASCIA.

A'POPHTHEGM (Gr., an utterance), a term used to designate any truth or maxim sententiously expressed. The oracles of the heathen gods often took this form, as also the proverbs, memorable sayings, &c., of the sages of antiquity. In modern times, Lord Bacon has made a charming collection of apophthegms.

A'POPLEXY is a term applied to an engorgement of blood, with or without extravasation, in or upon any organ, as the brain (*cerebral* A.), the *spinal* cord or lungs (*pulmonary* A.). As popularly used, the term denotes vaguely a condition arising from some disturbance within the head. A. occurs in *fits*, which may be sudden or come on by degrees. They are characterized by loss of sense and motion, speechlessness and heavy sleep, with stertorous respiration and a slow pulse. The fit may last from a few hours to two or three days, and passes off, leaving generally more or less paralysis, and recurs at intervals of months or years. The *age* at which A. occurs most commonly is from fifty to seventy, and is comparatively rare before and after these ages. Cerebral A. may arise from mere congestion of the blood-vessels of the brain, caused by impeded return of the venous blood, as from the military stock pressing on the jugular veins, keeping the head long in one position, or turning it quickly. Stout persons, with short necks, are more liable to this form of A.; though lean persons are also frequently its victims. But in addition to congestion, there may be an escape of the watery portion of the blood from the congested vessels, and this collecting, produces *serous* A.; or, owing to a diseased condition of the arterial walls, the vessels may burst, and A. from cerebral hemorrhage be the result; the latter is the most common, and is usually preceded by some softening of the brain substance itself. If this bleeding be to any great extent, death results; if only a small quantity escapes, it coagulates, and forms a clot, which is absorbed in time. Persons with diseased heart and lungs, and pregnant females, are liable to apoplectic fits. The attack is generally preceded by vertigo, headache, partial or temporary loss of memory, and occasionally double vision. When these warnings occur, medical advice should be sought to correct the digestive functions; and by relieving the oppressed brain, ward off the fit. When the latter occurs, the patient's head should be raised, cold applied, and in some cases blood should be withdrawn from the temporal artery or external jugular vein. As soon as possible, purgative medicines should be administered. For the results of A., see PARALYSIS. Tumors within the skull produce symptoms of A.

APO'STATE literally designates any one who changes his religion, whatever may be his motive; but, by custom, the word is always used in an injurious sense, as equivalent to renegade, or one who, in changing his creed, is actuated by unworthy motives. In early Christian times, the word was applied to those who abandoned their faith in order to escape from persecution; but it was also applied to such as rejected Christianity on speculative grounds (the Emperor Julian, for instance). After the 5th c., when heathenism was declining, many who had no sincere belief in Christianity, yet made profession of it, and were baptized: these also were styled apostates. The apostates in times of persecution were styled variously Sacrificati, Thurificati, &c., according to the modes in which they publicly made known their return to heathenism, by offering sacrifices or incense to the gods of Rome. The Roman Catholic Church at one period imposed severe penalties on apostasy. The apostate was of course excommunicated; but sometimes also his property was confiscated, and he himself, banished, or even put to death. It has often been of great moment to the fortunes of a nation that a prince has apostatized. The most renowned instance in modern history, is that of Henry IV. of France. In 1833 there was published, at Erlangen, *A Gallery of Important Persons who in the 16th, 17th, and 18th Centuries went over from the Protestant to the Roman Catholic Church*.—The term APOSTASY is now employed commonly, and often abusively, as a reproach for great or sudden changes in political opinions.

APO'STLE (Gr. *apostolos*, sent forth, sent on a mission), any messenger whatever, but especially used to denote the twelve disciples whom Jesus sent forth to preach the gospel. Their names were Simon Peter, Andrew, John (the son of Zebedee), James (his brother), Philip, Bartholomew (called also Nathaniel), Thomas, Matthew (surnamed Levi), James (the son of Alphæus), Thaddeus, Simon, and Judas Iscariot. Subsequently, Matthias was chosen in the room of Judas; and at a still later period, the number of the apostles were further increased by the calling of Paul to the apostleship. The term is sometimes used in the New Testament in its more general signification. Barnabas is styled an A. (Acts xiv.). It is a point of controversy between the supporters and opponents of episcopacy, whether or not the term A., as indicating an office, is applied to any except the original twelve, Matthias and Paul; it being maintained, on the one hand, that the office is perpetuated in bishops; on the other, that it was temporary and belonged exclusively to those who were witnesses of the resurrection of Christ, and were employed by him to found the Christian Church. The apostles were twice commissioned by their Master to go forth on their work of evangelization. First, during the third year of his public ministry. On this occasion, their labors were to be restricted to the Jews, properly so called.

Not even the Samaritans, though natives of Palestine, were to be the objects of their religious solicitude. They were earnestly

to seek out the lost sheep of the house of Israel. The second time was shortly before the Lord's ascension, when their sphere of labor was indefinitely extended. 'Go, and teach all nations, baptizing them in the name of the Father, and of the Son, and of the Holy Ghost.' On the day of Pentecost, the apostles received miraculous gifts fitting them for their arduous work. And after evangelizing for some years in Palestine, they all departed, with the exception of St. James, into various quarters of the globe; but the region of their ministry seems to have principally comprised the civilized provinces and cities of the eastern part of the Roman empire—viz., Syria, Asia Minor, and Greece; though probably Peter, and after him Paul, visited Rome. There is no historical foundation for the tradition that the first apostles divided the then known world into twelve parts, each taking one of these for his special sphere of labor. This figment was very likely originated by two circumstances: 1. That the desciples were commanded to go into all the world and preach the gospel; and 2. That the desciples in point of fact had little personal intercourse with each other. Their zeal for the propagation of Chistianity left them no time to gratify their social inclinations. As a consequence, we have very imperfect accounts of their lives or manner of death.

The several apostles are usually represented in medieval pictures with special badges or attributes: St. Peter, with the keys; St. Paul, with a sword; St. Andrew, with a cross; St. James the Less, with a fuller's pole; St. John, with a cup and a winged serpent flying out of it; St. Bartholomew, with a knife; St. Philip, with a long staff, whose upper end is formed into a cross; St. Thomas, with a lance; St. Matthew, with a hatchet; St. Matthias, with a battle-ax; St. James the Greater, with a pilgrim's staff and a gourd-bottle; St. Simon, with a saw; and St. Jude, with a club.

APO'STLES' CREED. See CREED.

APOSTO'LIC, or APOSTO'LICAL, the general term applied to everything derived directly from, or bearing the character of the apostles. Either case constitutes apostolicity. The Roman Catholic Church declares itself the A. Church; the papal chair the A. chair, on the ground of an unbroken series of Roman bishops, from the chief apostle, Peter. The Church of England, in virtue of regular episcopal ordination from the pre-reformation church, claims to be the A.; so likewise do the Protestant Episcopal churches in Scotland and the United States. Apostolic Tradition (see TRADITION) claims to have been handed down from the apostles. In the same special sense, the name of A. Council belongs to that conclave of the apostles at Jerusalem (Acts, xv.), about the year 51 or 52 A.D., occasioned by the disputes raised at Antioch by Judaizing Christians as to the admission of uncircumcised Gentiles into the church. Certain congregations or churches, also, which were the special scenes of the labors of the apostles, bore for centuries the title of A. Churches, more especially those of Jerusalem, Antioch, Ephesus, Corinth, and Rome. But with the ever-increasing spiritual power of the Romish hierarchy, the name A. came to be more and more exclusively applied to Rome, and is retained by her, despite the energetic protests of the Protestant Churches. Hence the term Apostolic See, i.e., the see of Rome; Apostolic Blessing, the blessing of the pope as the successor of St. Peter; Apostolic Vicar, the cardinal who represents the pope in extraordinary missions; Apostolic Chamber, a council intrusted with the care of the revenues of the see of Rome; Apostolic Months—January, March, May, July, September, November—the months in which the pope, according to the Vienna Concordat of 1448, took possession of the vacant benefices in Germany, &c. A papal brief or letter is styled A. in the same sense.

APOSTO'LIC BRETHREN, or APOSTOLICI, the name given in Italy, towards the end of the 13th c., to one of those sects which, animated by the spirit of an Arnold of Brescia, felt constrained to oppose the worldly tendencies of the church. Its founder was Gerhard Segarelli, a weaver in Parma. Rejected, from some cause or other, by the Franciscan order, his long-continued and enthusiastic meditations led him to the profound conviction that it was above all things necessary to return to the simple forms of apostolic life. Accordingly, he went about (1260) in the garb of the apostles, as a preacher of repentance, and by his practical discourses gathered many adherents into a kind of free society, bound by no oaths.

At first he managed to avoid any direct collision with the dogmas of the church; but after twenty years of undisturbed activity and growing influence, Segarelli was arrested by the Bishop of Parma; and in 1286, upon the occasion of his release, Pope Honorius IV. renewed a decree of Pope Gregory X. against all religious communities not directly sanctioned by the papal chair. In 1290, Nicholas IV. setting himself expressly to oppose the A. B., they, on their side, began avowedly to denounce the papacy, and its corrupt and worldly church, as the Babylon of the Apocalypse. In 1300, many, both men and women, and among them Segarelli, as having, after abjuration, relapsed into heresy, perished at the stake. But his cause survived him. Dolcino, a more energetic and cultivated man, brought up as a priest, who had previously taken an active part in the Tyrol against the corruption of the church, now headed the orphan sect in Italy. He taught the duty of a complete renunciation of all worldly ties, of property and settled abode, &c. Having retreated into Dalmatia, he announced from thence the dawning of a new era, and in 1304, reappeared in Upper Italy, with thousands of adherents, as the enemy of the papacy—at that time humbled and impoverished by France. In 1305, a crusade was preached against him. He fortified the mountain Zebello in the diocese of Vercelli, but was, after a gallant defence, compelled by famine to submit. After horrible tortures, which he bore with the utmost fortitude, he was burned. In Lombardy and the south of France, remnants of the A. B. lingered on till 1368. See Krone, *Fra Dolcino und die Patarener*. (Leipsic, 1844.)

APOSTO'LIC CATHOLICS. See IRVINGITES.

APOSTO'LIC FATHERS, the name given to the immediate disciples and fellow-laborers of the apostles, and, in a more restricted sense, to those among them who have left writings behind them. The A. F., specially so called, are Barnabas, Clement of Rome, Ignatius of Antioch, and Polycarp of Smyrna. It is uncertain whether Papias of Hierapolis, and the author of the *Shepherd*, were really disciples of the apostles. The writings of the A. F., as to their form and subject, may be looked upon as a continuation of the apostolic epistles, though far inferior to them in spirit. Their main purpose is to exhort to faith and holiness before Christ's coming again.—Editions of the A. F. were published by Cotelerius (Par. 1672), Jacobson (Oxford, 1838), Hefele (1839), and Dressel (1857); another by Zahn, Gebhardt, and others began to appear in 1875. There are several English translations, including one in Dr. Donaldson's *Ante-Nicene Library*, vol i. (1867).

APOSTO'LIC MAJESTY, a title held by the kings of Hungary, was conferred by Pope Sylvester II., in 1000 A.D., upon Duke Stephen of Hungary, who had not only much encouraged the progress of Christianity in Hungary, but actually preached himself, in imitation of the apostles. In 1758, the title was renewed by Pope Clement XIII., in favor of Maria Theresa as Queen of Hungary, and continues to be used by the emperor of Austria as king of Hungary.

APOSTO'LIC CANONS AND CONSTITUTIONS, both ascribed by tradition to Clemens Romanus, are notes of ecclesiastical customs held to be apostolical, written in the form of apostolic precepts. *Constitutiones Apostolicæ*, consisting of eight books, were probably composed in Syria, and contain, in the first six books, a comprehensive rule for the whole of Christian life. These were probably written about the end of the 3d c.; while the seventh book, which is essentially an abridgment of them, may have belonged to the beginning of the 4th c. The eighth book was put together in the middle of the 4th c., for the use of the priests, and only relates to the sacred offices. Interpolations, however, were afterwards introduced. *Canones Apostolici*, which were also recognized by the church, were composed at a later period. The first fifty, compiled in the middle of the 5th c., and translated from the Greek into Latin by Dionysius the Younger, were acknowledged by the Latin Church alone. The Greek Church, on the other hand, accepted the thirty-five canons put forth in the beginning of the 6th c.; and this became a point of discord between the churches. Both collections were probably looked upon at first as apostolic traditions merely. Later, it came to be believed that they were written down by the apostles themselves, it being thought probable that they should have expressed themselves positively about the constitution as well as the dogmas of the Church.

APOSTO'LIC PARTY, the name given to a party who acted a conspicuous part in the modern history of Spain. They were composed of ardent Catholics, who were also absolutists so far as the king consented to be their instrument. They formed themselves (soon after the revolution of 1819) into an A. P., whose leaders were fugitive priests, and whose troops were smugglers and robbers. After taking an active part in all the subsequent agitations, they finally merged (1830) in the Carlist party.

APOSTO'LICAL SUCCESSION is a phrase used to denote one or both of *two* things—the derivation of holy orders by an unbroken chain of transmission from the apostles, and the succession of a ministry so ordained to the powers and privileges of the apostles. The former is necessarily a matter of fact, to be ascertained by history; the latter is rather a matter of opinion—the Roman and Protestant Churches, and again individuals and parties in either, differing widely from each other in their views. See BISHOP and ORDINATION.

APO'STROPHE (Gr. *apostrophe*, a turning away, or breaking off) is a rhetorical figure by which a speaker changes the course of his speech, and addresses, with greater or lesser emotional emphasis, persons present or absent, the dead, or inanimate objects, either to invoke them as witnesses, or to pity, praise, or blame

them. When the figure is well managed, it has a thrilling effect, both in oratory and poetry; but when extravagantly introduced, it becomes ludicrous. Examples of it abound in the writings and speeches of the great poets and statesmen both of ancient and modern times.—A. in grammar, is the omission of a letter or letters in a word, the omission being marked by a comma, as *'tis* for *it is;* the comma so employed is also called an *A.*

APO'THECARY, the name formerly given in England and Ireland to members of an inferior branch of the medical profession. The A. was in England a licentiate of the Apothecaries' Society of London; in Ireland, a licentiate of the Apothecaries' Hall of Ireland. Up to a comparatively recent period, however, no inconsiderable proportion of those who practised as apothecaries, at any rate in England, were persons practising without any license. The A. frequently kept a shop in which he sold drugs and made up medical prescriptions, in this respect competing with the chemist and druggist. But he was entitled to attend sick persons, and prescribe for them; and though it was the almost universal practice of apothecaries to charge their patients only for medicines supplied, they had the choice between doing this and charging for their attendances. They could not charge for both. This was held by Chief-justice Best, in an action by an A., who sought to recover on both grounds (see Wilcock, *On the Medical Profession*).

In having this choice as to their mode of charging, they had the advantage of the chemists and druggists; but the chief advantage they had over these lay in the recognition, by the law, of their right to practice, and their consequent immunity from punishment for the results of malpractice, except where they had shown gross ignorance. The Medical Act of 1858, which greatly altered the conditions of medical practice throughout the United Kingdom has much improved the status of licentiates of the Apothecaries' Societies; and though such licentiates are still entitled to keep shops for the sale of drugs, and to make up their own prescriptions, the passing of the Pharmacy Act (1868) has made broader the distinction between them and the class of chemists and druggists (see CHEMISTS AND DRUGGISTS). The term A. has been long in disuse, though, no doubt, it is still a legal description for licentiates of the Apothecaries' Society of London, or of the Apothecaries' Hall of Ireland; and such licentiates are now, as licentiates in medicine before the law, in all respects, including eligibility for public appointments, on a par with the graduates of universities. Under the Medical Act of 1858, they are entitled to be registered as licentiates in medicine, and, when registered, they have the right of practising medicine in all parts of the Queen's dominions, charging both for their visits and professional advice, and for medicines or medical appliances supplied by them. It is possible, indeed, that they have one advantage over medical men practising on other qualifications; for it has been repeatedly held by county court judges in England that they are the only medical practitioners entitled to recover the price of medicines supplied to patients.

But this question has never been brought before the superior courts in England, and the decisions referred to seem not to be supported by the language of the Medical Act. The conditions of getting the licenses of the Apothecaries' Society and of the Apothecaries' Hall in Ireland are nearly the same as those imposed by other corporations which grant medical qualification, the only difference worth mentioning being, that an apprenticeship to a licentiate for five years in England, for three years in Ireland, is indispensable for the apothecaries' license. The requirement of an apprenticeship put the Apothecaries' Society and the Apothecaries' Hall of Ireland at a disadvantage compared with the Colleges of Physicians which grant licenses to practise medicine; it also made it impossible for them to combine with surgical corporations in giving the double qualification in medicine and surgery on the result of a conjoint examination. Accordingly, the Act 37 and 38 Vict. c. 34, s. 2, in 1874 made the requirement of apprenticeship unnecessary. The Apothecaries' Society of London and the Apothecaries' Hall of Ireland each appoint a member of the General Council of Medical Education and Registration. The former is the first licensing corporation in the United Kingdom which granted a license to a woman to practise medicine; and the Act of 1874, which has been above referred to, saved their rights to admit women to certain examinations.

In England, the business or profession of an A., although not regulated, nor, indeed, fully recognized, till modern times, was the subject of several ancient statutes, and is traceable to a remote period. Richard Fitznigel, who died Bishop of London, is stated to have been A. to Henry II.; and it is an accredited tradition, that in 1345 King Edward III. gave a pension of sixpence a day to Coursus de Gangland, an A. in London, for taking care of, and attending his majesty during his illness in Scotland. It is, however, improbable that apothecaries were then common; indeed, it may be doubted whether at that time they existed as a publicly known body at all, for, in 1511, there was passed an act of parliament, the 3 Henry VIII. c. 11, for regulating the admission of persons practising physic or surgery, which makes no mention of the class now known as apothecaries. In 1543, however, the parliament passed a very curious act, the 34 and 35 Henry VIII. c. 8, the preamble of which deals severely with the ignorance and cupidity of the London surgeons; and which, as a remedy, provides for the toleration and protection of the irregular practitioners, who afterwards, as a body, acquired the distinctive name of apothecaries. This act, strange though it be in its language, may perhaps be regarded as the real foundation of the office of the A. It certainly shows on its face sufficient cause for its recognition of the persons to benefit whom it was passed, for it complains that the surgeons of London were not only unskilful and grasping, but that they 'have sued, troubled, and vexed divers honest persons, as well men as women, whom God had endued with the knowledge of the nature, kind, and operation of certain herbs, roots, and waters, and the using and ministering of them to such as had been pained with customable diseases, as women's breasts being sore, a pin and the web in the eye, uncomes of hands, burnings, scaldings, sore mouths, the stone, strangury, saucelim, and morphew, and such other like diseases; and yet the said persons have not taken anything for their pains or cunning, but have ministered the same to poor people only for neighborhood and God's sake, and of pity and charity.'

The act, therefore, proceeds to ordain, 'That at all time from henceforth it shall be lawful to every person being the king's subject, having knowledge and experience of the nature of herbs, roots, and waters, or of the operation of the same, by speculation or practice, within any part of the realm of England, or within any other the king's dominions, to practise, use, and minister in and to any outward sore, uncome, wound, apostermation, outward swelling or disease, any herb or herbs, ointments, baths pultess, and emplaisters, according to their cunning, experience, and knowledge in any of the diseases, sores, and maladies beforesaid, and all other like to the same, or drinks for the stone, strangury, or agues, without suit, vexation, trouble, penalty, or loss of their goods, the foresaid statute in the foresaid third year of the king's most gracious reign, or any other act, ordinance, or statute to the contrary heretofore made in anywise notwithstanding.'

Anciently, the apothecaries were not distinguishable from the grocers (the surgeons being, in like manner, undistinguishable from the barbers); indeed, it rather appears that apothecaries and grocers were synonymous terms; and it was not till 1617, in the 13th year of James I., that these bodies were formed into two distinct corporations by a charter from the king, which, reciting a previous grant to the grocers in 1606, by which the two bodies were expressly united, declares that the apothecaries shall, thenceforward, be separate from, and constitute a company distinct from the grocers. The privileges conferred by this charter upon the apothecaries were afterwards considerably enlarged by an act of parliament, 55 Geo. III. c. 194, to which we shall presently refer. But even after the charter of James, the London apothecaries appear to have been regarded merely as a trading company, occasionally prescribing the medicines which they sold, thus trespassing, as it was thought, on the province of the physician, until their right to do so was supported by a judgment of the House of Lords, in the case of the College of Physicians against Rose, reversing a previous decision of the Court of King's Bench. Rose, who was an A. and freeman of London, had attended one Seale a butcher, and made up and administered what was not denied to be proper medicine to him. This, it was contended, on behalf of the physicians, was an infringement of their exclusive privileges, and the King's Bench being of the same opinion, unanimously gave judgment for the plaintiffs; but the judgment was reversed by the House of Lords. So generally established had this branch of the medical profession become, that, in 1815, the act of parliament, 55 Geo. III. c. 194, to which we have already referred, was passed to provide for the sufficiency of their education; thus, for the first time, as it may be said, placing the apothecaries, as a body, on the footing of a liberal profession.

This statute, which completely regulates the position, privileges, and responsibilites of the apothecaries, after reciting (and for the most part confirming) the charter of James I., by which the apothecaries of London had been distinctively incorporated as a company, proceeds to enact that no person shall practise as an A., or act as an assistant to an A., in any part of England or Wales, unless he shall have been examined by a court of examiners (to be chosen by the master and wardens of the said company, in such manner as the act directs), and have received therefrom a certificate of his being duly qualified to practise as such. And with respect to what constitutes such practice as an A., it has been judicially determined that courts of law will look to section 5 of the act, which defines certain of the duties and liabilities of the office, but which in no way deprives apothecaries of any of their previously acquired privileges. The certificate—for which a sum is to be paid for the benefit of the company's funds—is not to be granted to any person below the age of twenty-one, though he needs now no apprenticeship of five years to an A., or who cannot produce testimonials of sufficient medical education and good

moral conduct; and any person practising without such certificate, is disabled from recovering his charges, and for every such offence is, moreover, liable to a penalty of £20, which can be recovered in the county court. It is also provided that—inasmuch as it is the duty of every A. to prepare, with exactness, such medicines that may be directed for the sick by any physician lawfully licensed—any A. refusing to compound or sell, or negligently compounding or selling any medicines as directed by any prescription or order, signed by any physician, lawfully licensed, with his initials, shall incur such penalties and forfeitures as therein set forth. And further, that the master, wardens, and society of apothecaries for the time being, or any persons by them appointed, and being not fewer than two, and properly qualified, may at all reasonable times in the daytime enter the shops of any A. throughout England and Wales, and search and examine whether the medicines and drugs be wholesome, and meet for the health of the subjects of the realm, and destroy such as they find to be otherwise; and report to the master and wardens of the society the names of the offenders, who are made liable to a fine of £5 for the first, £10 for the second, and £20 for the third offence. The act contains, however, a proviso that nothing therein shall affect the business of a chemist and druggist in the buying, preparing, compounding, dispensing, and vending drugs, medicines, and medicinal compounds, wholesale and retail; nor interfere with the rights of the universities of Cambridge or Oxford, the College of Physicians or of Surgeons, or the Society of Apothecaries, respectively, except as altered by that act.

This act, which was passed on the 12th of July, 1815, provides for the exemption from its operation of such apothecaries as might have been in practice on or before the first day of August of that year, and was amended by an act of 1874, chap. 34.

The apothecaries in Ireland are an exclusive corporation, whose privileges, equally with those of the Apothecaries' Company of London, are expressly saved by the Medical Act of 1858 (the 21 and 22 Vict. c. 90). Although occupying a position corresponding in many respects to that of the same body in England previous to 1858, the Irish apothecaries do not appear to have established their rights as medical practitioners to the extent to which the English apothecaries have succeeded.

The law relating to apothecaries in Ireland is contained in an act of the Irish parliament, the 31 Geo. III. c. 34, passed in 1791, which enacted that none should practice the art and mystery of an apothecary until after examination and certificate from the Apothecaries' Hall in Dublin. A great deficiency had long existed in Ireland of establishments and shops for the sale of medicines and compounding of prescriptions. It thus became necessary to form a Pharmaceutical Society in Ireland, and provide for the examination and registration of persons having competent practical knowledge of pharmaceutical and general chemistry. In 1875 an act called the Pharmacy Act (Ireland), 1875, 38 and 39 Vict. c. 57, was passed, creating the Pharmaceutical Society of Ireland as a body corporate with a first council, and defining qualifications for their successors. By that act all future duly examined persons, and all the existing licentiates of Apothecaries' Hall, were entitled to be registered as pharmaceutical chemists. So much of the act 1791 as prohibited keeping of open shop by others than licentiates was repealed; but it is unlawful for any person to sell or keep open shop for retailing, dispensing, or compounding poisons within the Act 33 and 34 Vict. c. 26, or medical prescriptions, unless registered as a pharmaceutical chemist, or a chemist and druggist, under this act of 1875, or to assume such names unless registered. Unqualified persons incur a penalty of £5; but licentiates of the Apothecaries' Hall, and others who have passed an examination in pharmacy, are excepted. Registration under the Act 1875 does not entitle to practise medicine or surgery. See CHEMISTS AND DRUGGISTS.

In Scotland, there never was a class of practitioners corresponding to the English apothecaries.

APOTHE'CIA. See LICHENS.

APOTHE'OSIS, deification, or the raising of a mortal to the rank of a god (Gr. *theos*). From the polytheistic point of view there is nothing monstrous in this idea; on the contrary, it is quite natural, and a necessary part of the system. Among heathens generally, and especially among the Romans, every departed spirit became a deity (see MANES); 'and as it was common for children to worship (privately) the manes of their fathers, so was it natural for divine honors to be *publicly* paid to a deceased emperor, who was regarded as the parent of his country.' (See SMITH'S *Dictionary of Greek and Roman Antiquities.*) At the *Consecratio*, as it was called, of a Roman emperor, the body was burnt on a funeral pile, and as the fire ascended, an eagle was let loose to mount into the sky, carrying, as was believed, the soul of the emperor from earth to heaven. Many medals are found with the word *consecratio* surrounding an altar, with fire on it, and an eagle rising into the air.

APPALA'CHIANS, the general appellation of the great mountain-system—called also the Alleghanies—which stretches from the interior of Maine to the borders of Alabama, its distance from the sea gradually ranging between about 100 miles in the north, and about 300 in the south. Speaking generally, this chain may be regarded as the parent of the Atlantic rivers of the United States on the one side, and on the other of the southern tributaries of the St. Lawrence, and of the eastern feeders of the Mississippi; it is not, however, the actual water-shed during its entire length, for it is crossed by the Connecticut, the Hudson, and the Delaware, just as the Himalayas are pierced by the Ganges, and the Andes by the Amazon. The chain, in fact, consists of several ranges generally parallel to each other, which, along with the intermediate valleys that occupy two-thirds of the breadth, form a belt 100 miles wide—its multiform character, however, developing itself only to the west and south of the Hudson. To take the chief ridges by name, and to begin from the north; the White Hills of New Hampshire present some of the loftiest elevations, Moosehillock and Washington being respectively 4636 and 6634 feet above the sea. Next in order, the Green Mountains, which, true to the name, almost cover Vermont attain, in Killington Peak, a height of 3924 feet; then come the Highlands, on the east of the Hudson, so striking an object to the voyagers on its waters; immediately beyond that river, again, we find the Catskill Mountains, which, though of inconsiderable length, contain two eminences—Round Top and High Peak—respectively of 3804 and 3718 feet; while, on a terrace of another member of the group, Mountain House, a favorite refuge from the heats of summer, is perched 2500 feet above the level of the Hudson. Proceeding onwards, the Kittatinnies extend from the north of New Jersey as far as Virginia; while nearer to the sea, the Blue Ridge, stretching from about the same parallel down to North Carolina, is crowned, within the limits of Virginia, by the Peaks of Otter, 4000 feet high. In North Carolina are the Black Mountains, with the highest summit of the system, Black Dome, 6760 feet in height. Lastly, there lie, more to the westward, the Alleghanies proper in Pennsylvania and Virginia, and the Cumberland Mountains on the east border of Kentucky and Tennessee.

Of all these elevations not one at all approaches the limit of perpetual snow. Yet France, while struggling with England in North America, regarded the A. as a wall that was physically to exclude her rival from the basins of the St. Lawrence and the Mississippi. Anglo-Saxon energy, however, has virtually leveled the supposed barrier from end to end. Through Maine, New Hampshire, and Vermont runs a railway from Portland to Canada; by canal or by railway, or even by both abreast, New York has reached the waters of the St. Lawrence on at least four principal points between Montreal in the east, and Buffalo in the west; Pennsylvania has carried to Pittsburg a railway of 248 miles from Harrisburg, and a canal of 312 miles from Columbia; while, with the necessary exception of little Delaware alone, the remaining states along the coast have each its iron-way through the A.

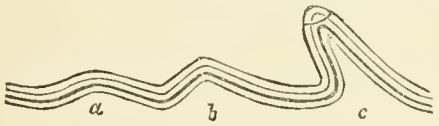
The chain abounds in coal and iron, those gifts of nature to industrious man, which in all ages have done so much for civilization, and which, in our own age, have, with the aid of steam, more than doubled all that they had done before; and it is a curious instance of the adaptation of the two worlds to each other, that, while the Spaniard met, in the south, the gigantic counterparts of the central plateau of his own romantic land, the Englishman, in the north, stumbled, as it were, on those same elements of almost creative energy which, within two centuries, were to be so instrumental in placing the daughter next to the mother among the nations of the earth. As an evidence of the actual value of the coal and iron of the A., Pennsylvania—where, hitherto, they have been chiefly found—has since 1840 made more rapid strides in growth of population than any other state in the Union, till between 1860 and 1870, when Illinois increased somewhat more rapidly. Nor are iron and coal the only valuable products of the A. To say nothing of the valleys—many of them as fertile as they are lovely—which separate the parallel ranges from each other, the mountains themselves yield limestone, marble, slate, building-stone, copper, zinc, chrome, &c.

Geology.—During the Azoic and Palæozoic periods of the earth's geological history, the district now occupied by the A. was a level plain. These mountains date their origin from a period subsequent to the Carboniferous epoch. The Coal measures are the newest upturned beds associated with the Appalachian range; and as the stratified rocks, with few exceptions, are laid down horizontally, these strata must owe their inclined position to the dislocating agency which elevated the mountains; they, consequently, supply a date anterior to its activity. At the base of the A., on their eastern side, there are a series of red sandstone beds, unconformable to the upturned strata, and occupying the valleys in their original horizontality, thus evidently unaffected by the disrupting agency which must have been active prior to their deposition. These beds have been referred by geologists to different

ages. That they are Old Red Sandstone, as conjectured by Maclure and others, is now universally denied. Hitchcock's supposition that they were Permian, is also considered as referring them to too remote a geological age. W. B. Rogers considered them first as members of the Triassic period; but has since, from evidence adduced from the contained organic remains, shown reason for relating them to the beginning of the Jurassic period. We thus obtain two grand limiting dates—the Carboniferous and Jurassic periods—within which the A. must have been formed. There are grounds for being even more specific, and referring the period of the dislocating agency to that immediately subsequent to the Carboniferous, represented in the stratified rocks of other districts by the Permian series; for the older upturned rocks had not only been ruptured and plicated, but also denuded into the various shapes they now present, before the horizontal rocks were deposited.

The late Professor H. D. Rogers, after years of persevering and devoted study, enunciated a theory of mountain formation based on his examination of the A., which not only explains their structure, but admits of a more or less complete application to the mountain systems of the world. The many proposed theories of mountain elevation are based upon assumptions which, unfortunately, are not true; but that is an unimportant matter to the majority of our speculating geologists, and one never seen by the inventors of the theories, who allowed themselves to be led captive by a poetic imagination, instead of building their inductions on field observations. Thus, to suppose that mountains are elevated by a wedge-like intrusion of melted matter, is to give to a fluid functions incompatible with its dynamic properties. So also the supposition that the igneous rocks were intruded as solid wedges, separating and lifting the crust, is opposed to the fact, that no apparent abrasion, but generally the closest adhesion, exists at the line of contact of the igneous and stratified rocks. Equally fatal objections can be adduced against the other theories. Professor Rogers observing that the A. were formed of a series of enormous waves, and comparing this appearance with other elevated districts, especially in Belgium and Britain, enunciated a theory of their structure, of which the following is a condensed view.

Disturbed strata have a wave-like arrangement, their dip being in curved, and never in strait planes; and in extensive areas the varying angles of dip exhibit one or more wide regular curves. These undulations are in the form of long parallel waves, their parallelism being in the line of the general trend of the part of the mountain system to which they belong. When different grades of magnitude, as regards length, height and amplitude, occur, the waves of the same grade are parallel, while the different grades are not necessarily so. The waves assume three different forms,



Appalachian Range.

which are characterized as—*Symmetrical flexures* (*a*), equally steep on the two slopes; *normal flexures* (*b*), having an excess of incurvation on the one side compared with the other; and *folded flexures* (*c*), or those with a doubling under of their more incurved slopes, and among which the steepest slopes are generally directed to the same quarters. These three forms, representing different gradations in the flexure, are regular in their succession in disturbed regions, the order being the same as in the diagram—that is, when we start from the most disturbed side, we go from the folded waves to the normal ones, and from these to the symmetrical; and in the same order, the waves, as they recede from the folded side, become progressively wider apart and flatter. Resting on these facts, Professor Rogers advanced his view of the structure of elevated regions in the following words:

'The wave-like structure of undulated belts of the earth's crust, is attributed to an actual pulsation in the fluid matter beneath the crust, propagated in the manner of great waves of translation from enormous ruptures occasioned by the tension of elastic matter. The forms of the waves, the close plication of the strata, and the permanent tracing of the flexures, are ascribed to the combination of an undulating and a tangential movement, accompanied by an injection of igneous veins and dikes into the rents occasioned by the bendings. This oscillation of the crust, producing an actual floating forward of the rocky part, has been, it is conceived, of the nature of that pulsation which attends all great earthquakes at the present day.'

This theory having originated as an explanation of the phenomena of the A., is easy of application to these mountains. They are composed of a series of parallel waves, having a general direction similar to the coast-line of the Atlantic Ocean. The line of maximum disturbance is on their eastern limits; consequently, the folded flexures, with the inversion of their steep sides, are chiefly confined to the great Appalachian valley, and the Atlantic slopes south of it. The flexures of this type impart a prevailing southeast dip to the whole outcrop; their number, and the excessive difficulty of detecting and continuously tracing them, frustrates every attempt at mapping them individually. The flexures of the second type, which curve more rapidly on the one side than on the other, prevail wherever the forces that disturbed the crust were neither excessively intense nor very feeble. It is the characteristic form everywhere between the great Appalachian valley and the Alleghany Mountains. It distinguishes not only those larger waves which separate the coal—containing strata east of the Susquehanna into special basins—but the minor undulations which throw the coal measures of these basins into groups of lesser saddles and troughs. Undulations of the first or symmetrical type occur beyond the Alleghany Mountains, where two groups of them may be distinguished: the one subdividing the bituminous coal-field, with its five very broad waves, into six successive basins; the other, composed of four equidistant and very straight undulations, traversing parts of Cambria, Indiana, Somerset, and Fayette counties.

The strata thus elevated, and forming the A., belong entirely to the oldest or Palæozoic division of the fossiliferous rocks. Metamorphic rocks, consisting of felspathic, hornblendic, and micaceous gneiss, and mica-slate, exist on the eastern base of these mountains, but have not been noticed as forming part of the plicated strata of the A. Extensive formations of talcose and micaceous slates, indurated clay-slates, and chloritic and steatitic slates, exist in the more disturbed districts. These are highly metamorphosed members of the older fossiliferous, and must not be confounded with, though they so much resemble, the azoic metamorphic rocks.

The Palæozoic rocks constitute a vast succession of fossiliferous strata, commencing with the lowest deposits resting on the Metamorphic rocks, and terminating with the highest of the Coal strata. Their aggregate thickness, as measured in Pennsylvania, amounts to 35,000 feet. While exhibiting a remarkable variety of mineral character, they may be classed under the three great divisions of sedimentary rocks—viz., sandstones, slates, and limestones. Intercalated with them, as subordinate layers, there occur deposits of coal, chert, and iron ore. They are all more or less fossiliferous.

Coal Measures.—The character of the rocks of the Appalachian district of North America indicates that during the Carboniferous epoch an immense continent existed on the present site of the Atlantic, which supplied materials for the sandstone and slate. It seems to have had an extensive shallow marshy shore, of such a character as to be able to support the vegetation, which has become, in the course of ages, converted into coal. The coal-fields to the far west of the A., in Michigan, Indiana, Illinois, and Missouri, have been connected with the Appalachian coal formation, which includes all the detached basins, both anthracite and semi-bituminous of the mountain chain of Pennsylvania, Maryland, and Virginia, and also the vast bituminous trough lying to the north-west in Pennsylvania, Ohio, Virginia, Kentucky, Tennessee, and Alabama.

On the eastern slope of the A., the coal, from its proximity to the region of greatest disturbance, has lost nearly all its volatile constituents, and is converted into anthracite (q.v.). In the troughs to the westward of the Appalachian valley, where the forces that disturbed the crust were not so intense, the coal has not parted with such a large proportion of volatile matter, but is so much altered as to be characterized as semi-anthracite. Both the anthracite and semi-anthracite are mined for economical purposes, but their extent as well as their value is of little importance compared with the enormous Appalachian bituminous coal-field. From Northern Pennsylvania to middle Alabama, its length is about 875 miles, and its greatest breadth between Southern Pennsylvania and Northern Ohio is about 180 miles; it covers an area of about 56,000 square miles, and is almost the largest expanse of coal measures in the world. A single coal-seam in this field has been traced over an extent of country 225 miles long by 100 broad, showing a superficial area of 14,000 square miles. The actual depth of workable seams in the deepest part of this basin is estimated at 40 feet; but when the amount of denudation of the upper measures over large districts is taken into account, the average depth of the entire field cannot be more than 25 feet. Taking this as the thickness, the amount of coal in this great coal-field would be 1,387,500,000,000 tons. When this is compared with the estimated quantity of coal in the British coal-fields, viz., 190,000,000,000 tons, some conception may be formed of the enormous extent of coal existing in this district of North America.

Metals.—Extensive beds of magnetic, hematitic, and fossiliferous iron ores occur in many of the formations of the A., from the lowest metamorphic gneiss to the highest coal-measures. Iron ore is extensively wrought in Pennsylvania and Ohio, large quantities of the anthracite being used in the smelting furnaces. Veins of lead occur in the Metamorphic rocks, rarely stretching up into the red slate. In the Palæozoic beds, veins of copper and nickel occur in sufficient quantity to be wrought.

APPALACHICO'LA, a river of the United States, rising in Georgia, and flowing through Florida into the Gulf of Mexico, or rather into a bay that bears its own name. Reckoning from its remotest sources, the head waters of the Chatahooche, the A. is about 400 miles long, being navigable for boats throughout nearly its entire course. It is, however, only at the junction of the Chatahooche with the Flint that the name of A. is applied to the stream; and up to this point, a stretch of about 70 miles, there is a sufficient depth of water for steam-navigation; while the tides also ascend for about two-thirds of the distance.—A. is also a seaport at the mouth of the stream above mentioned. Here is shipped the produce of the river-basin, consisting chiefly of large quantities of cotton.

APPA'RENT. This term is used to express a number of important distinctions, especially in astronomy. The *A. magnitude* of a heavenly body is the angle formed by two lines drawn from the ends of its diameter to the spectator's eye; this obviously depends upon the distance of the body, as well as upon its real magnitude. A planet seen from the surface of the earth seems lower than if seen from the center of the earth—the former is its *A. altitude*, the latter its real. *A. noon* is when the sun is on the meridian; true or mean noon is the time when the sun would be on the meridian if his motion in the heavens were uniform and parallel to the equator. See EQUATION OF TIME. The daily and annual motions of the sun in the heavens are both *A. motions*, caused by two real motions of the earth.

APPARITIONS. The belief that the spirits of the departed are occasionally presented to the sight of the living, has existed in all ages and countries, and usually declines only when a people have advanced considerably in the knowledge of physical conditions and laws. Not that A. then cease to be reported—for this is far from being the case—but that the more intelligent part of the community are then usually able to explain away the alleged occurrence in some way satisfactory to themselves, not involving the admission of a possible projection of a spirit upon the living sense.

Nothing is more certain than that there are conditions of the body when spectral appearances, such as occur to us in uneasy dreams, become sensible to the waking vision. One of these conditions is that of the patient under the disease of *delirium tremens*, who not only hears ideal enemies plotting against his life in adjacent rooms or behind hedges, but thinks he sees them preparing to do him mischief, and has been known to jump overboard of a vessel into the sea, in order to escape the apprehended danger. In such excitements it is, though arising from different causes, that an intending murderer thinks he hears the prince of fallen angels tempting him on to crime, or sees before him a 'dagger of the mind' wherewith to end the life of his victim. There are also instances of spectral illusions traceable to a simply disordered state of the digestive organs. M. Nicolai, an eminent bookseller in Berlin, fell, in the early part of the year 1791, into a depression of spirits, and in that condition neglected a course of periodical bleeding which he had been accustomed to observe. The consequence was his becoming liable for some months to seeing trains of phantasmata or spectral figures, which moved and acted before him, nay, even spoke to, and addressed him. He was fortunately able, not merely to coolly observe the phenomena, but to describe them in an ample paper which he presented to the Philosophical Society of Berlin. This case may be said to have formed the basis of a theory of A., advanced by Dr. Ferrier, Dr. Hibbert, and others, amounting merely to this, that they are all to be accounted for by peculiar conditions of the organism of the individual sensible of them.

There is certainly a large class of cases which fall readily under this explanation; but, if we are to accept the whole that have been, on more or less good authority, reported, it must be admitted that a theory of a more comprehensive nature is still required in order to satisfy the duly cautious inquirer.

Let us take, for instance, an apparition story which Dr. Hibbert owns to be one of the best authenticated on record. It was thus written down in 1662 by the Bishop of Gloucester, from the recital of the young lady's father: 'Sir Charles Lee, by his first lady, had only one daughter, of which she died in childbirth; and when she was dead, her sister, the Lady Everard, desired to have the education of the child; and she was by her very well educated, till she was marriageable, and a match was concluded for her with Sir William Perkins, but was then prevented in an extraordinary manner. Upon a Thursday night, she thinking she saw a light in her chamber after she was in bed, knocked for her maid, who presently came to her, and she asked why she left a candle burning in her chamber. The maid said she left none, and there was none but what she had brought with her at that time. Then she said it was the fire; but that, her maid told her, was quite out; and she said she believed it was only a dream; whereupon she said it might be so, and composed herself again to sleep. But about two of the clock she was awakened again, and saw the apparition of a little woman between her curtain and her pillow, who told her she was her mother, that she was happy, and that by twelve of the clock that day she should be with her.

Whereupon she knocked again for her maid, called for her clothes, and when she was dressed, went into her closet, and came not out again till nine, and then brought out with her a letter, sealed, to her father: brought it to her aunt, the Lady Everard, told her what had happened, and desired that as soon as she was dead, that it might be sent to him. The lady thought she was suddenly fallen mad, and thereupon sent suddenly away to Chelmsford for a physician and surgeon, who both came immediately; but the physician could discern no indication of what the lady imagined, or of any indisposition of her body; notwithstanding the lady would needs have her let blood, which was done accordingly. And when the young woman had patiently let them do what they would with her, she desired that the chaplain might be called to read prayers; and when prayers were ended, she took her guitar and psalm-book, and sat down upon a chair without arms, and played and sung so melodiously and admirably, that her music-master, who was then there, admired at it. And near the stroke of twelve, she rose and sate herself down in a great chair with arms, and presently fetching a strong breathing or two, immediately expired, and was so suddenly cold, as was much wondered at by the physician and surgeon. She died at Waltham in Essex, three miles from Chelmsford, and the letter was sent to Sir Charles at his house in Warwickshire, but he was so afflicted with the death of his daughter, that he came not till she was buried; but when he came, he caused her to be taken up, and to be buried with her mother at Edmonton, as she desired in her letter.'

Dr. Hibbert, in treating of this case, concludes that the young lady was consumptive and about to die, and in this diseased frame of body became the subject of an illusion; but these are assumptions directly contrary to what the record bears, and there is, after all, the singular circumstance to be accounted for, the young lady's death occurred exactly at the time predicted. To a similar purport is the case of the wife of Dr. Donne, related by Izaak Walton. Donne left his wife pregnant in London, and went with Sir Robert Drury to Paris. Two days after arriving there, he stated to Drury that he had had a vision of his wife walking through his room, with her hair hanging over her shoulders, and a dead child in her arms. So impressed were they by the incident that they immediately sent a messenger to London to inquire regarding Mrs. Donne's health. The intelligence brought by the man was, that she had been brought to bed of a dead child at the hour her husband thought he had seen her in Paris. In this case, too, if the requisite disordered state of Dr. Donne were granted, the coincidence of the distant event in its particulars, and in point of time, would remain unaccounted for by Dr. Hibbert's theory.

That there is an abundance of such cases reported, will not be disputed. In what direction speculation regarding them is to move, if the insufficiency of Dr. Hibbert's theory be acknowledged, will probably depend on the general tendency of the movements of science. If psychological study were more in repute, and the phenomena of dreaming in particular were diligently examined, there might be a hope of a satisfactory theory of what are called *A.* ere the world was many years older.

APPEA'L is the right or process of bringing under the notice of a higher court the judgment of a lower court which the appellant represents as erroneous in fact or law. Formerly, this right was a valuable guarantee against political oppression and private extortion: for example, the A. to royal judges from the courts of feudal barons. Now, the object of A. is to secure uniformity in the administration of justice. This is effected not merely by the reversal of erroneous judgments which are appealed, but by the knowledge, which every judge has, of precedents in the Supreme Court, and that his own judgments are subject to A. The most important questions connected with the modern system of A. are: 1. Whether in all cases, of whatever pecuniary value, A. is allowed, and also whether at all stages, or only after final judgment; 2 On what conditions as regards time, *interim* execution, and security for costs, A. is allowed; 3. The relative constitution of the lower and higher courts.

In the civil law, the earliest form of A. was the *provocatio* from the judgment of a criminal court to the Roman people. This fell into disuse under the *Quæstiones Perpetuæ*. The *appellatio* was a veto or interdict granted upon the *intercessio* of one complaining of a judicial act. The subordination of judges increased largely under the empire, and for some time the emperor, who was tribune for life and also proconsul, was the only final court of A. Latterly, the senate and the prætorian prefects also gave final decisions. Only six months were given for A. from the most distant provinces. The law is stated in detail in the Digest, Lib. XLIX.

In the Christian Church, under the judicial system defined in the False Decreatals, frivolous appeals direct to the Roman Consistory multiplied enormously. The remonstrances of St. Bernard were gradually given effect to by the Lateran and Basel Councils, and wholesome restrictions on the right of A., and in favor of the independence of Cisalpine church courts, passed into most modern

concordats (Fleury, *Inst. du Droit Eccles.*, iv. 23; Lancelot, *Inst. du Droit Canon*, iii. 17). The famous *appel comme d'abus* in France was originally an A. to civil justice against the encroachments of church jurisdiction. Enough has been said to show how closely the question of A. is connected with the great problems of political history—national independence, the relations of central and provincial authorities, &c.

In English law, prior to the Judicature Acts, 1873 and 1875, the word A. was not commonly used. In common law courts, there was a proceeding in 'error' by 'assignment of errors' and 'joinder of errors.' The old 'writ of error' and 'writ of false judgment' are still sometimes used in bringing up the proceedings of certain inferior courts. In Chancery, the A. was formerly called 're-hearing,' the Vice-chancellor being regarded as the delegate of the Lord Chancellor. Under the modern system of 'fusion,' every judgment in the High Court of Justice (except a judgment of the Court of Probate where leave is required) may by simple motion be submitted to the Court of A., to have reversed, discharged, or varied. Interlocutory proceedings in chambers may also be appealed to a judge in chambers; and from him A. lies to the Divisional Court. In the Chancery Division, the judge has the discretion of directing the matter to be argued before him in court, or allowing A. direct to the Court of A. The A. from the London Bankruptcy Court is also to the Court of A. An A. in Divorce requires in many cases to be the full 'court,' not to the ordinary Court of A. This last court consists practically of six Lords Justices of A., sitting in two divisions; one for Common Law A.; the other for Chancery, Probate, Admiralty, and Bankruptcy A. The courts it superseded were: 1. In Chancery, the Lord Chancellor and Lords Justices; 2. At Common Law, the Court of Exchequer Chamber, consisting of the two Common Law Courts whose judgment was not under A. In 1873, it was proposed to abolish the A. to the House of Lords, but now in all cases a petition of A. may be brought from the judgments of the Court of A. (Appellate Jurisdiction Act, 1876, and Standing Orders, May 1878). In most cases, an A. to the Privy-council from an Indian or colonial court requires leave from the court below or the Judicial Committee.

As regards A. from the inferior courts in England, an A. lies from the county court to a divisional court of the High Court of Justice, if the judgment has been pronounced in the ordinary or Admiralty jurisdiction of the county court, but to the London Bankruptcy Court, if the judgment has been pronounced in the bankruptcy jurisdiction of the county court. All determinations in law by justices of the peace (including metropolitan police and stipendary magistrates) may be brought up on a case stated under 20 and 21 Vict. c. 43 for the opinion of a divisional court of the High Court of Justice. As to appeals in Ecclesiastical causes, see Phillimore, *Eccl. Law*, p. 1264.

Questions of law arising on the trial of a person convicted of treason, felony, or misdemeanor (e. g., at the Central Criminal Court, the assizes or quarter sessions), may be reserved by the judge or justice trying the case for the consideration of the Court for Crown Cases Reserved, established by the Act 11 and 12 Vict. c. 78. This court must consist of at least five judges of the High Court of Justice.

The law of A. in Ireland is practically the same as in England.

In Scotland, in the Court of Session the judgments of the Lords Ordinary sitting in the Outer House are appealed by a reclaiming note to the First or Second Division of the Inner House. The opinion of four judges is thus obtained on the opinion of one judge. These appeals are discouraged, except after final judgment by the Lord Ordinary, but they are competent at other stages, though in most cases only with leave of the judge. From all final judgments of the Inner House there is an A. to the House of Lords within a period of one year. Where the judgment is not final, leave to A. must be got, unless there has been a difference of opinion among the judges. Pending an A., the Court of Session have absolute power to regulate *interim* possession of property or execution of a decree for money.

The Court of Session has exclusive jurisdiction as a Court of Review in *civil* causes over all inferior courts, even in cases where its original jurisdiction is excluded, unless there be an express exclusion of review by statute; and where A. is excluded, the Court of Session has jurisdiction to set aside their decisions, where they have acted in excess of their statutory jurisdiction. In the latter case, the technical remedy is generally by a note of suspension or an action of reduction. The normal A., however, from final judgment in the Sheriff Court is by Note of A. under the Court of Session Act, 1868, and this goes directly to the Inner House. Cases are often brought up before judgment in the Sheriff Court for jury trial in the Supreme Court. The Court of Session also hears appeals from the Registration of Voters Courts held by the sheriffs, from the valuation committees of the commissioners of supply, and from the magistrates in burghs, and as to excise duties from the justices at quarter sessions.

Within the Sheriff Court itself, the right of A. from the sheriff-substitute to the sheriff-principal is regulated by the Sheriff Court Acts, 1853 and 1876. Appeals from the Small Debt Court are confined to certain grounds mentioned in the Act 1 Vict. c. 41 (such as malice and oppression and defect of jurisdiction in the judge), and are made to the next Circuit Court of Justiciary.

At common law, the High Court of Justiciary may review the proceedings of all inferior courts in criminal matters, but not on the merits. This is mainly done by the remedies of advocation and suspension.

As regards summary prosecutions before magistrates, the right of A. consists of a case stated for the opinion of the High Court of Justiciary or the Court of Session, according to the criminal or civil nature of the prosecution. This is regulated by the Summary Prosecutions Appeals Act, 1875. Where a question of law arises on a criminal trial by jury, whether before the sheriff or at circuit, there is no right of A. to the High Court of Justiciary. The judge presiding at circuit occasionally 'certifies' a question of law as requiring discussion at the High Court, but he is not bound to do so. There is no A. from the High Court to the House of Lords, although this right was frequently claimed last century. Prior to the Union there was no A. from the High Court to Parliament.

APPENZE'LL (from *Abbatis Cella*), a canton in the north-east of Switzerland. Area, 162 square miles. Pop. (1876) 60,786. It is divided into two districts—Innerrhoden and Ausserrhoden, the former of which is peopled by Roman Catholics, the latter by Protestants, and noted for its dense population. The surface is mountainous, especially in the south, where Mont Sentis attains an elevation of 8232 feet. The chief river is the Sittern, which flows through the center of the canton. A. holds the 13th place in the Swiss confederacy; the constitution of each half of the canton is a pure democracy. The inhabitants are chiefly employed in agriculture, cattle-keeping, cotton manufactures, and embroidery. They are fond of dancing, music, and athletic exercises, and have the reputation of being first-rate marksmen.

Appenzell, the capital of the canton of the same name, is situated on the left bank of the Sittern, in lat. 47° 29′ N., and long. 9° 24′ E. Pop. (1870) 3686. The town is ill built, and has only a small trade in linens. The other towns are Trogen (with a pop. of 2912, and manufactures of linen and muslin), Herisau (pop. 9727), &c.

APPERLEY, Charles James, the 'Nimrod' of the *Quarterly Review*, is a writer who deserves mention, if not from the intrinsic importance of the subjects on which he exercised his pen, at least from the perfection he attained in the department to which he confined himself. He was the son of a Welsh country gentleman, and was born in Denbighshire in 1777. His education at Rugby stimulated his love of field-sports more than his love of the classics. At the age of 24, he married, and went to reside at Bilton Hall, in Warwickshire, where he devoted his energies as exclusively to the chase as the great Nimrod himself could have done. He hunted everywhere in Great Britain. In 1821, he began to contribute to the *Sporting Magazine*. His clever, gossiping articles were so much relished, that in two years that periodical doubled its circulation. The proprietor Mr. Pittman, was of course highly gratified. He remunerated Mr. A. handsomely, kept a stud of hunters for him, and paid the expenses of his sporting tours; but 'Nimrod' seems to have been of rather expensive habits, and to have occasionally required an advance of money from his employer. When Mr. Pittman died, his relatives entered into a lawsuit with the 'mighty hunter,' for the recovery of this money. Nimrod, however, prudently transferred himself to France, where he chiefly resided during the rest of his life. He died on the 19th of May 1843. His best writings are *The Chase, the Turf, and the Road*, which appeared in the *Quarterly Review* (1827).

APPERT, Benjamin Nicholas Marie, a French philanthropist, was born in Paris, September 10, 1797. He began his course in 1816 by introducing into several schools a system of mutual instruction, and, in 1820, founded and conducted gratuitously a school for the prisoners at Montaign. Being suspected of having aided the escape of two prisoners, he was himself confined in the prison of La Force, where he made good use of his opportunities of becoming acquainted with the moral and physical circumstances of prisoners. After his liberation, he prosecuted his benevolent plans with renewed zeal, and undertook a journey through the whole of France, in 1825, to inspect schools, prisons, hospitals, &c. The results were given in his Journal. After the July revolution, he was employed by Louis Philippe to superintend the measures taken for the relief of the indigent classes. In his travels, he visited Belgium, Prussia, Austria, Saxony, and Bavaria, and gave the results of his observations on the management of schools, hospitals, prisons, &c., in several works. He also wrote a work entitled *Dix Ans à la Cour du Roi Louis Philippe*, and, in his *Conférences contre le Système Cellulaire*, strongly opposed the system of solitary confinement. Though one-sided in some of his views, A. is a sincere, warm-hearted and practical philanthropist.

APPERT, FRANÇOIS, a French technologist, the inventor of a method of preserving meat, vegetables, and other articles of food without the use of salt or other chemical application. This method is fully described in his work *L'Art de Conserver toutes les Substances Animales et Végétales* (4th edition, Paris, 1831). See ANTISEPTICS.

A'PPETITE. See HUNGER and THIRST.

APPIA'NI, ANDREA, styled in his day 'the Painter of the Graces,' was born at Milan, May 23, 1754. His poverty compelled him to gain a subsistence by decorative painting; but in the course of his travels, he studied the works of great masters, and formed for himself an original style, almost rivaling that of Correggio. At Rome, he devoted his attention to the frescoes of Raphael, and made such progress, that he soon excelled all living artists in fresco-painting. The best evidences of his genius are found in the cupola of the church of *Sta. Maria di S. Celso* at Milan; and in the frescoes with which he decorated the villa of the Archduke Ferdinand in 1795. Napoleon I. appointed him court-painter. In return, he executed portraits of the French emperor and several of his generals. His most beautiful frescoes are the paintings on the ceilings of the palace of Milan, which consist of allegorical illustrations of Napoleon's career; and Apollo with the Muses in the Villa Bonaparte. Almost all the palaces in Italy contain frescoes by A. His finest oil-painting is Rinaldo in the garden of Armida. The fall of his patron, Napoleon I., left A. in indigent circumstances. He died November 8, 1817.

APPIA'NUS, a native of Alexandria, who flourished during the reigns of Trajan, Hadrian, and Antoninus Pius. He was author of a Roman history, in twenty-four books, of which only eleven are extant. It was not remarkable for anything except the plan on which it was written. Instead of proceeding to exhibit chronologically the growth of the empire, from its rude beginning on Palatine Hill to the period when its power held the whole world in awe, which is at once the popular and the philosophical method, he divided his work into ethnographic sections, recording separately the history of each nation up to the time of its conquest by the Romans. First in order were the books devoted to the old Italian tribes, and afterwards followed the history of Sicily, Spain, Hannibal's wars, Libya, Carthage, and Numidia, Macedonia, Greece Proper and its colonies, Syria, Parthia, the Mithridatic war, the civil wars, and the imperial wars in Illyria and Arabia. As a historian, A. is a mere compiler, and not very accurate in his compilation. His geographical knowledge, in particular, is singularly deficient, considering the age in which he lived. One specimen of his blunders will suffice: in his section on Spain, he states that it takes only half a day to sail from Spain to Britain. The edition of A. by Schweighaüser is highly esteemed, but the most complete is that in *Bibliothèque Grecque* of Firmin Didot.

A'PPIAN WAY (Lat. *Via Appia*), well named by an ancient writer *Regina Viarum* (the queen of roads), was formed, in part at least, by Appius Claudius Cæcus, while he was censor (313 B.C.). It is the oldest and most celebrated of all the Roman roads. It led from the *Porta Capena* at Rome in a southerly direction to Capua, passing through Three Taverns, Appii Forum, Terracina, &c. Subsequently, it was carried on to Beneventum, Tarentum, and thence to Brundusium. It had an admirable substructure or foundation, from which all the loose soil had been carefully removed. Above this were various strata cemented with lime; and, lastly, came the pavement, consisting of large hard hexagonal blocks of stone, composed principally of basaltic lava, and jointed together with great nicety, so as to appear one smooth mass. The remains of it are still visible, especially at Terracina. The cost must have been enormous, for the natural obstructions are great. Rocks had to be cut through, valleys filled up, ravines bridged, and swamps embanked.

A'PPIUS CLAU'DIUS CRASSUS, a Roman decemvir (451—449 B.C.). While the other decemviri were engaged in repelling an incursion made by the Sabines, A. C. and his colleague Oppius remained in Rome, with two legions to maintain their authority. Meanwhile, A. C. had been smitten by the beauty of Virginia, daughter of a respected plebeian named Lucius Virginius, who was abroad with the army. By force and stratagem, representing that she was the born slave of Marcus Claudius, one of his clients, A. C. gained possession of the maid. His design was penetrated by Icilius, who was betrothed to Virginia, and who, aided by Numitorius, her uncle, threatened to raise an insurrection against the decemviri. Virginius, hurriedly recalled from the army by his friends, appeared and claimed his daughter; but, after another mock-trial, she was again adjudged to be the property of Marcus Claudius. To save his daughter from dishonor, the unhappy father seized a knife and slew her. The popular indignation excited by the case was headed by the senators Valerius and Horatius, who hated the decemvirate. The army returned to Rome with Virginius, who had carried the news to them, and the decemviri were deposed. A. C. died in prison by his own hand (as Livy states), or was strangled by order of the tribunes; his colleague, Oppius, committed suicide; and Marcus Claudius was banished. The *Claudia Gens* (see GENS) was one of the most numerous and important of the patrician tribes or clans of Rome; and besides the sons and grandsons of the decemvir, there were numerous persons of distinction who bore the name of Appius.

A'PPLE (*Pyrus malus*. For the generic character, see PYRUS). This well-known fruit has been very long cultivated, and by that means it has been very much improved. It was extensively cultivated by the Romans, by whom, probably, it was introduced into Britain. The wild A., or CRAB-tree, a native of Britain, and very generally found in temperate climates of the northern hemisphere, is a rather small and often somewhat stunted-looking tree, with austere, uneatable fruit, yet it is the parent of all, or almost all the varieties of apple so much prized for the dessert.

The A.-tree, even in a cultivated state, is seldom more than 30—40 feet high. It has a large round head; the leaves are broadly ovate, much longer than the petioles, woolly beneath, acute, crenate, and provided with glands; its flowers are always produced, 3—6 together, in sessile umbels, and are large, white, rose-colored externally, and fragrant. The fruit is roundish, or narrowest towards the apex, with a depression at each end, generally green, but also frequently yellow, light red, dark red, streaked, sometimes even almost black, with the rind sometimes downy, sometimes glabrous, sometimes thickish, and sometimes very thin and transparent, varying in size from that of a walnut to that of a small child's head—the taste more or less aromatic, sweet, or subacid. It is produced on spurs, which spring from branchlets of two or more years growth, and continue to bear for a series of years. The fruit of the A. is, with regard to its structure, styled by botanists a *pome* (q. v.). The eatable part is what is botanically termed the *mesocarp* (see FRUIT), which, in its first development, enlarges with the calyx, the summit of the fruit being crowned at last by the dried 5-parted limb of the calyx; the *endocarp* being, when ripe, cartilaginous, and containing in its cells seeds which do not correspond with them in size, but are so free as often to rattle when it is shaken.

The A. is now one of the most widely diffused of fruit-trees, and in the estimation of many is the most valuable of all. It succeeds best in the colder parts of the temperate zone. It is, however, to be met with on the coasts of the Mediterranean Sea, in Arabia, Persia, the West Indies, &c., but there its fruit is small and worthless as in high northern latitudes. The varieties in cultivation are extremely numerous. They have been classified

Apple-blossom.

with great care by recent German writers, by whom the classification and description of apples, pears, and similar fruits, has been treated as a sort of science, and dignified by the name of Pomology. Metzger, in his description of the pomaceous fruits of Southern Germany, describes 89 different kinds of A., all of which are constant, besides sub-varieties. New varieties are continually produced; and as they are chiefly preserved and propagated by grafting—although some of them also grow by layers and cuttings—the old ones gradually die out. The *costard*, from which dealers in apples received the name of costard-mongers, is no longer known. Many varieties are designated by the general names of *Pippins*, *Rennets*, *Codlins*, and *Calvilles*. Some kinds, not approved for the desert, are in high esteem as baking apples, and others still more acid or austere are preferred for the manufacture of CIDER (q. v.).

The A. is grown in Britain either as a standard, an espalier, or a wall-tree, and is variously trained. It is usually grafted on A. or crab-stocks, but succeeds also on hawthorn-stocks, and is in this way sometimes introduced into hedges. A very dwarf variety, called the *Paradise A.*, is often used as a stock on which to graft in order to produce dwarf-trees; and trees thus dwarfed are often very productive when little larger than current or gooseberry bushes. Some of the varieties of A. are more hardy than others,

and are therefore to be preferred for cold or exposed situations. Some of the finest kinds succeed well only when the soil and climate are good. Some kinds are much earlier than others, both in flowering and ripening.

The wood of the A.-tree is hard, durable, and fine-grained. The crab is often planted both as an ornamental tree and for the sake of its wood. The bark contains a yellow dye.—As a fruit tree, the A. requires a fertile soil and sheltered situation. The various uses of the fruit—for the dessert, for baking, preserving, making jelly, &c., as well as for making the fermented liquor called cider—are sufficiently well known. Vinegar is also made from it; and sometimes a kind of spirit, especially in Switzerland and Swabia. It contains *Malic acid*, which is extracted for medicinal purposes.—The fermented juice of the Crab A. is called *Verjuice*. It is used in cookery, and sometimes medicinally; also for the purifying of wax. Apples are an important article of commerce. Great quantities are imported into Britain, chiefly from France, Canada, and the northern parts of the United States. The A. *keeps* better than most kinds of fruit.

Beaufins or *Biffins* are apples slowly dried in bakers' ovens, and occasionally pressed till they become soft and flat. They are prepared in great quantities in Norfolk.

The SIBERIAN CRAB is perhaps the parent, by hybridization or otherwise, of some of the varieties of A. now in cultivation. Two species partake this designation, both natives of Siberia, and frequent in gardens in Britain, *Pyrus baccata* of Linnæus, and *Pyrus prunifolia* of Willdenow, which, however, scarcely differ, except that in the former the sepals (leaves of the calyx) are deciduous, in the latter they are persistent—a circumstance of very doubtful importance as a specific distinction. The fruit is sub-globose, yellowish, and rather austere, but is good for baking and preserves.

The AMERICAN CRAB or SWEET-SCENTED CRAB (*P. coronaria*) is a native of North America, especially of the southern part of the Alleghanies. It is a small tree with broad leaves and white flowers, becoming purple before they drop off, and which have a powerful smell, resembling that of violets. The fruit is flatly orbicular, of a deep green color, and sweet scented. It is very acid, but is made into cider, and also into preserves. *P. angustifolia*, a native of Carolina, much resembles this, but has much narrower leaves and smaller fruit.

The CHINESE CRAB (*P. spectabilis*) is a small tree, a native of China. It is very ornamental when in flower; the flowers being in sessile, many-flowered umbels, and of a bright rose-color. The fruit is irregularly round, about the size of a cherry, yellow, and fit to be eaten, like the medlar, only when in a state of incipient decay.

A'PPLE OF SODOM. See SOLANUM.

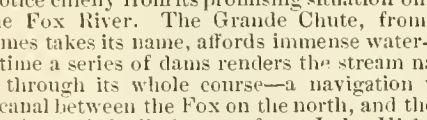
A'PPLEBERRY. See BILLARDIERA.

A'PPLEBY, the county town of Westmoreland, lies in lat. 54° 35′ N., long. 2° 28′ W. It is in the north of the county, on the river Eden, which flows past Carlisle into the Solway Firth. A. has two parishes, one each side of the river, which is here crossed by an old stone bridge of two arches. There is a castle in the town, the keep of which, called Cæsar's Tower, is still in tolerable condition. The Lent and summer assizes are held at A. Until the passing of the Reform Bill, it returned two members to parliament. It was then disfranchised, though it still possesses a municipal corporation. Pop. (1871) 1989.

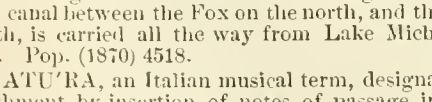
A'PPLETON, a town in Wisconsin, in the United States, worthy of notice chiefly from its promising situation on the Grande Chute of the Fox River. The Grande Chute, from which the town sometimes takes its name, affords immense water-power; and at the same time a series of dams renders the stream navigable for steam-boats through its whole course—a navigation which, with the aid of a canal between the Fox on the north, and the Wisconsin to the south, is carried all the way from Lake Michigan to the Mississippi. Pop. (1870) 4518.

APPOGIATU'RA, an Italian musical term, designating a form of embellishment by insertion of notes of passage in a melody. The A. notes are printed in a smaller character than the leading notes of the melody, and should always be given with considerable expression. When they are extemporized by a performer or singer, they serve as an indication of good or of bad taste. The time of an A. is taken from the essential note to which it belongs, as in the following example:

Written.



Played.



For APPOGIA'TO, see PORTAMENTO.

APPOI'NTMENT. In the law of England, there are frequently reserved in common law conveyances granted on a consideration, and in family settlements, certain *powers*, as they are called, such as powers of jointuring, selling, charging land with the payment of money; and the subsequent exercise of the power is called an *A.* This A.—which may be made either by deed or by will—is not considered as an independent conveyance, but is merely ancillary to the deed or instrument in which the power of A. is reserved, and from which the party in whose favor the A. is made for most purposes derives his title. The courts of Equity give relief against a defective A., or defective execution of a power, where there is what is called a 'meritorious consideration' in the person applying for such relief. As to what amounts to such meritorious consideration, Lord St. Leonards, in his work on Powers, lays down that Equity will relieve the following parties: 1. A purchaser, including in such term a mortgagee and lessee; 2. A creditor; 3. A wife; 4. A legitimate child; and 5. A charity. But in the case of a defective A. by a wife in favor of her husband, there is no relief in Equity; nor is the Equity extended to a natural child; nor to a grandchild; nor to father or mother, or brother or sister, even of the whole blood, much less of the half-blood; nor to a nephew or cousin. Against the legal consequences of an A., the Courts of Equity give no aid.

In the Scotch law, the expressions *reserved power* and *faculty to burden* correspond to the English phrase 'power of A.;' and the deed or instrument subsequently executed in virtue of the reserved power, is simply described according to the nature and quality of the conveyance so made; but the term *A.* is not a technical word in Scotland.

APPOI'NTMENTS. The 'A.' of a ship are, collectively, all her various articles of equipment and furniture. In like manner, the 'A.' of a soldier, especially a trooper, comprise many miscellaneous necessaries which can come collectively under no other name, but which, in part, will be found noticed under later headings. See EQUIPMENT, KIT, KNAPSACK.

APPO'RTIONMENT is a legal term derived from the 4 and 5 Will. IV. c. 22, called the Apportionment Act, which has given rise to much litigation in England and Scotland, and the principle of which may be stated to be this—that in the event of the termination of a life-interest by death, or of a more limited interest at a fixed period, the current rent or income shall be apportioned or paid over in such a way as to give the personal representatives of the party, or the party himself, as the case may be, a sum corresponding to the period that may have elapsed between the last date of payment and the death or other determination of the interest or estate. But the act has no application to annual sums payable by any policy of assurance, nor to any case in which a stipulation has been made that no A. shall take place.

This act was not understood to apply to Scotland till the year 1844, when it was decided by the Court of Session that it did so apply, and the judgment was afterwards affirmed by the House of Lords. But, in consequence of the act being expressed exclusively in the technical phraseology of the law of England, it has given much trouble. And a later act of 33 and 34 Vict. c. 35, extends the principle to all rents, annuities, salaries, pensions, dividends, and other periodical payments, in the nature of income, so that all these now, like interest on money lent, are considered as accruing from day to day. When a person therefore dies, the income is counted up to the day of death, and is payable at the same time as the next quarterly or other payment would be if no death had happened. In English law, A. also takes place where the tenant, under a lease, has been deprived of part of the land out of which the rent issues, by a person having a better title than the lessor, or proprietor, or where part of the rent has been surrendered by the tenant to the lessor, or where the lessor has disposed of the reversion as to part. But where the tenant has been wrongfully deprived by the act of the landlord himself, even of a part of the premises, there can be no A., but the whole rent will be suspended so long as such a state of things continues.

A. also obtains in the case of a conveyance of land to which the common of pasture is an appurtenance, the party getting the land being entitled to a proportionate use of the common.

APPOSI'TION, a term in Grammar signifying the annexing of one substantive to another, in the same case or relation, in order to explain or limit the first; as, *My brother, the physician; Thomas the Rhymer*. Whole sentences or clauses admit of A.: thus, 'Napoleon sought the way to India through Russia, a stroke of genius.' Sometimes a connecting word is used where logical propriety would require A.; as, *the city of London*, for *the city London*.

APPRAI'SERS AND APPRAI'SEMENT. An appraiser is a person employed to value property, but he must be licensed for the office. Formerly, under the 55 Geo. III. c. 184, this annual license cost only 10*s.*; but by the 8 and 9 Vict. c. 76, s. 1, on the preamble that it is expedient to increase this duty, the provision

of the 55 Geo. III. is repealed, and a duty of £2 substituted for the 10*s*. Such a license must now be taken out yearly by every person, except a licensed auctioneer, who shall exercise the occupation of an appraiser, or who, for any gain, fee, or reward, shall make any appraisement or valuation chargeable by law with any stamp-duty (see Tilsley on the Stamp-laws, 2d. ed., p. 65).

By an old English statute, passed in the reign of Edward I., appraisers are enjoined to put a reasonable price upon goods; and if they appraise them too high, they are obliged to take them at their own valuation, and to be answerable accordingly to the creditor for his debt.

Appraisement, generally, is the act of valuation made by the appraiser; but in legal application in England, this term is used to signify a valuation of goods taken under a distress for rent by two appraisers, who are sworn by the sheriff, under-sheriff, or constable, to value the goods truly, according to the best of their skill; and after such appraisement, the goods may be sold at the best price that can be procured.

The duties on appraisements are for £5 and under, 3*d*.; from £5 to £10, 6*d*.; from £10 to £20, 1*s*.; from £20 to £30, 1*s*. 6*d*.; from £30 to £40, 2*s*; from £40 to £50, 2*s*. 6*d*.; and where it shall exceed

£50, and not exceed £100,	£0	5	0
100, " " 200,	0	10	0
200, " " 500,	0	15	0
500,	1	0	0

The exemptions from such duties are appraisements or valuations made in pursuance of the order of any Court of Admiralty or Vice-admiralty, or of any Court of Appeal from any sentence, adjudication or judgment of any Court of Admiralty or Vice-admiralty; and appraisements or valuations of any property made for the purpose of ascertaining the legacy-duty payable in respect thereof.

The corresponding proceeding in Scotland is known under the term *appreciation*, which has been defined as the valuing of *poinded* or distrained goods. And by the old Scotch law, these goods were valued twice by different valuators—once in the house or on the ground where the poinding took place, and a second time at the market-cross of the local jurisdiction or chief county town. But by the 54 Geo. III. c. 137, s. 4, one valuation in the place where the goods are, is declared in every case to be sufficient.

APPREHE'ND. To A., in criminal law, means to arrest or seize, in virtue of a warrant or other legal authority, an offender taken in the act, or who is suspected. Arrest or apprehension by officers *without warrant* may be executed by the following persons: 1. By a justice of the peace, who may himself A., or cause to be apprehended, by word only, any person committing a felony or breach of the peace in his presence; 2. The sheriff; 3. The coroner; 4. The constable; 5. By the Larceny Act (24 and 25 Vict. c. 96), and by the 24 and 25 Vict. c. 97, called the Malicious Injuries Act, a person committing any offence under the same, except that of angling in the daytime, may immediately be apprehended without written warrant. Watchmen—either those appointed by the statute of Winchester (13 Edw. 1. c. 4), to keep watch and ward on all towns from sunsetting to sunrising, or such as were mere assistants to the constable, might, in virtue of their office, arrest all offenders, and particularly night-walkers, and commit them to custody till the morning; but not so now.

Any private person, and, *a fortiori*, a peace-officer, that is present when any felony is committed, is bound by the law to arrest the felon, on pain of fine and imprisonment, if he is negligently permitted to escape; and by 24 and 25 Vict. c. 95, they may apprehend any person found committing any offence against the provisions of that statute, or any indictable offence by night; that is, between nine in the evening and six in the morning of the next day. They may also, in the case of a person committing a felony in their presence, justify breaking open doors in pursuit of him. Upon probable suspicion, however, no one, being a private person, may arrest the felon or other person so suspected. And there is this distinction between the case of a peace-officer and that of a private person—that the former is protected, though it should turn out that no such crime as supposed has been in fact committed by any one, providing he had reasonable ground for suspecting the party arrested; but the latter acts more at his peril, and is not protected unless he can prove an actual commission of the crime by *some one*, as well as a reasonable ground for arresting the particular person. It is also to be observed that a private person cannot, on mere suspicion, justify breaking open doors, which a constable, though acting without a warrant, sometimes may do. Within the metropolitan police district, a constable may take into custody, without warrant, all persons whom he may find, between sunset and the hour of eight in the morning, loitering or lying about, and unable to give a satisfactory account of themselves; or persons charged with aggravated assaults; or persons offending against the metropolitan police acts, whose address cannot be ascertained. See 2 and 3 Vict. c. 47, ss. 36, 64, 65.

The Scotch law, with regard to the apprehension of criminals, is substantially the same as the English.

By the statutes passed in 45 Geo. III. c. 92, and the 11 and 12 Vict. c. 42, facilities are afforded for the apprehension of criminals in England, Ireland, or Scotland, under warrants issuing from the respective authorities of the three countries, no further formality being necessary in the case of English and Irish warrants to be executed in Scotland, and *vice versâ*, than that they should be endorsed by a judge of the territory where they are to be enforced. And by the 6 and 7 Vict. c. 34, provisions are made for the apprehension, in the United Kingdom of Great Britain and Ireland, of persons committing treason and felony in Her Majesty's dominions out of the United Kingdom, and *vice versâ*, for the apprehension in such dominions of persons offending in England, Ireland, or Scotland. By section 3, offenders may be committed to gaol until they can be sent back to the place where the offence was committed; and information of the committal, in writing, under the hand of the committing magistrate, accompanied by a copy of the warrant, is directed to be given, in Great Britain, to one of her Majesty's principal secretaries of state, and in Ireland, to the chief secretary of the lord-lieutenant; and in any other part of Her Majesty's dominions, to the governor or acting governor.

By section 10, the important enactment is made, that it shall not be lawful to endorse any warrant for the apprehension of an offender under the act, unless it shall appear upon the face of such warrant itself, that the offence is such, that if committed within that part of Her Majesty's dominions where the warrant is endorsed, it would have amounted in law to treason, or some felony such as the justices of the peace in general or quarter sessions in England have not authority to try, under the existing acts—by which the jurisdiction of general and quarter sessions is defined—or unless the depositions taken appear sufficient to warrant committal for trial. The effect of this enactment is, that the offences for which criminals may be apprehended, under the 6 and 7 Vict. c. 34, are as follows: Any treason, murder, or capital felony; or any felony which, when committed by a person not previously convicted of felony, is punishable by transportation for life, or for any of the following offences:

1. Misprision of treason. 2. Offences against the Queen's title, prerogative, person, or government, or against either house of parliament. 3. Offences subject to the penalties of præmunire. 4. Blasphemy, and offences against religion. 5. Administering or taking unlawful oaths. 6. Perjury and subornation of perjury. 7. Making or suborning any other person to make a false oath, affirmation, or declaration, punishable as perjury or as a misdemeanor. 8. Forgery. 9. Unlawfully and maliciously setting fire to crops of corn, grain, or pulse, or to any part of a wood, coppice, or plantation of trees, or to any heath, gorse, furze, or fern. 10. Bigamy, and offences against the laws relating to marriage. 11. Abduction of women and girls. 12. Endeavoring to conceal the birth of a child. 13. Offences against any provision of the laws relating to bankrupts and insolvents. 14. Composing, printing, or publishing blasphemous, seditious, or defamatory libels. 15. Bribery. 16. Unlawful combinations and conspiracies, except conspiracies or combinations to commit any offence which justices or recorder respectively have or has jurisdiction to try when committed by one person. 17. Stealing, or fraudulently taking, or injuring or destroying records or documents belonging to any court of law or equity, or relating to any proceeding therein. 18. Stealing or fraudulently destroying or concealing wills or testamentary papers, or any document or written instrument being or containing evidence of the title to any real estate, or any interest in lands, tenements, or hereditaments.

In 1870, a statute (amending statutes of 1843, &c.), was passed, by which provisions are made for carrying into effect a convention entered into between the British and foreign governments (determinable at pleasure), for the apprehension of offenders in the two countries respectively in *cases of murder, forgery, robbery, rape, larceny, embezzlement, obtaining money by false pretences, burglary, all bankruptcy crimes; frauds by bankers, factors, trustees, directors; abduction, child-stealing, arson, piracy, sinking and destroying vessels at sea*, &c. This act gets rid of the former practice of passing a separate act to regulate the extradition of criminals between Great Britain and each country, as nearly all civilized countries have now entered into this kind of confederacy. There is an exception made in favor of fugitive criminals whose surrender is demanded on the ground of offences of a political character; and the condition of surrender always is, that, when taken back to his own country, he shall not be tried for political offences.

The law encourages the apprehension of offenders by parties who simply act from a feeling of duty to assist justice. By the 7 Geo. IV. c. 64, s. 28 (amended and extended by the 14 and 15 Vict. c. 55), it is provided that when any person shall appear to any court of oyer and terminer, gaol delivery, superior criminal court of a county palatine, or any courts of sessions of the peace, to have been active in or towards the apprehension of any person charged with the various crimes contemplated by these statutes,

every such court is authorized to order the sheriff of the county to pay to the person or persons who shall appear to the court to have been active in or towards the apprehension of any person charged with any of the said offences, such sum of money as to the court shall seem reasonable and sufficient to compensate such person or persons for his, her, or their expenses, exertions, and loss of time, in or towards such apprehension; but this power is to be exercised subject to such regulations, as to the rate of allowance, as shall be made from time to time by a principal secretary of state. Provision is also made by the above statutes for compensation to the families of those who lose their lives in attempting to A. persons charged with criminal offences; but by the latter of these (14 and 15 Vict. c. 55, s. 7), this is not to interfere with the power of the criminal court to order payment to any person who shall have shown extraordinary courage, diligence, or exertion in the apprehension.

It only remains to be added, that any wilful obstruction of a lawful arrest or apprehension is esteemed an offence of a very aggravated nature. The modern enactments on this subject will be found in the statute passed in 1861 to amend the law of England and Ireland as to offences against the person, 24 and 25 Vict. c. 100, by which statute it is provided that where any person shall be convicted of any assault upon any peace-officer, or revenue-officer, in the due execution of his duty, or upon any person acting in aid of such officer, or of any assault upon any person, with intent to resist or prevent the lawful apprehension or detainer of the person so assaulting, or of any other person, for any offence for which he or they may be liable by law to be apprehended or detained; such assault shall be a misdemeanor, punishable with fine, or by imprisonment, with or without hard labor, for any term not exceeding two years.

By the before-mentioned statute it is enacted that whosoever shall unlawfully and maliciously shoot at any person, or shall, by drawing a trigger, or in any other manner, attempt to discharge any kind of loaded arms at any person, or shall stab, cut, or wound any person; with intent, in any such cases, to resist or prevent the lawful apprehension or detainer of any person; shall be guilty of felony, and be punishable with penal servitude for life, or not less than three years, or with imprisonment, with or without hard labor and solitary confinement, for not more than two years. And by the 14 and 15 Vict. c. 19, s. 12, passed for the prevention of offences at night, any one assaulting a person entitled to A. or detain him, shall be guilty of a misdemeanor, and on conviction, imprisoned, with or without hard labor, for any term not exceeding three years.

The same subject is treated in Scotch law-books under the head of *Deforcement*, which Sir Archibald Alison, in his work on the Criminal Law of Scotland (vol. i. p. 491), says, 'consists in the resistence to the officers of justice in the execution of their duty.' It is essential to such deforcement that it should be such as to defeat the warrant or other process which authorizes the apprehension. Mere unsuccessful attempts with this view are charged under the name of *resisting and obstructing the officers of the law in the execution of their duty*. See WARRANT OF APPREHENSION.

APPRE'NTICE is a person described in law-books as a species of servant, and called A. from the French verb *apprendre*, to learn, because he is bound by indenture to serve a master for a certain term, receiving in return for his services instruction in, or learning his master's profession, art, or trade; the master, upon the other hand, contracting to instruct the A., and according to the nature of the agreement, to provide food and clothing for the A., and to pay him small wages. Sometimes a premium is paid by the A., or on his behalf, to the master. By a provision of the 5 Eliz. c. 4, which remained in force until a recent period, it was in general required, that every person exercising a trade in England should have previously served as A. to it for seven years; but by later statutes, that provision was abolished, with a saving of the customs and by-laws in London and other corporations; and the term of apprenticeship is now determined by the mutual convenience of the contracting parties. By the municipal act, 5 and 6 Will. IV. c. 76, s. 14 (which does not, however, extend to London), all such customs and by-laws as had the effect of prohibiting trades and occupations to persons who had not served as apprentices, were also done away. Apprentices, in general, are bound out by their friends, though with their own consent, testified by their executing the indentures, without which the transaction is not binding.

To the same effect it is the rule of the Scotch law that although a pupil—that is, a boy under, 14, or a girl under 12 years of age—may be a party to an indenture as an A., yet he must have the concurrence of a parent or guardian, who alone can be liable to the master for the A.'s non-performance of the engagement. An A., on the other hand, who has passed the years of pupilarity, may effectually enter into an indenture by which he will be personally bound. It has been decided in England that the express assent of an infant A. to the indentures is essential to the contract; and therefore indentures of apprenticeship which have been executed by a father and master, but not by the A. himself, were held invalid. But an infant may bind himself A., because it is for his benefit; for the same reason, however, he cannot himself dissolve the contract. When an A. is bound to two partners, on the death of one of them the apprenticeship is at an end.

There is a class who are bound out by the guardians of the poor, and are called *parish apprentices*, whose binding takes place under different circumstances. For the children of poor persons might formerly, even without becoming parties of the indentures, be apprenticed out by the overseers with the consent of two justices (and may now by the guardians, without such consent), till twenty-one years of age, to such persons as are thought fitting; and these persons were formerly also compellable to take them. But by 7 and 8 Vict. c. 101, s. 13, the reception of any poor child as an A. is no longer compulsory. A variety of statutes regulate the manner in which parish apprentices are to be bound, assigned, registered, and maintained; a subject which is besides now placed under the paramount control of the Local Government Board, who make new rules from time to time, as they may think fit; and provisions are made by which the justices of the peace are empowered to settle disputes between such apprentices and their masters, and to discharge the former from their indentures, upon reasonable cause shown. Similar powers belong also to the justices, in the case of apprentices in general. (Stephen's *Commentaries*, vol. ii. p. 240, fourth edition.) It has been decided in England that a corporation cannot make a by-law limiting the number of apprentices which each member shall take, because such a regulation is deemed contrary to the laws of the land.

A mere agreement does not constitute an apprenticeship; there must be regular indentures formally executed. By statute 33 and 34 Vict. c. 97, indentures of apprenticeship in which the full sum or sums of money received, given, paid, secured, or contracted for, are not truly inserted, are void. But the act does not apply to cases where the sum is inserted in the indentures, though it is a less sum than that which was originally agreed for, and the reduction made to diminish the amount of the stamp-duty.

In the performance of the contract, a reasonable and equitable view is taken of the relative position of the parties. The master is not bound to the literal and uniform instruction of the A. by himself personally, but under his own superintendence, and by his own directions, he may avail himself of the assistance of journeymen, or other persons serving in his place of business, and even of other apprentices—the object of the agreement being that the A. shall have the full benefit of all the master's arrangements in practising his art, craft, or trade. The A., on the other hand, although in the position of a servant to some extent, is not bound to serve as such, but may rather be said to be placed under the parental control of the master; and perhaps the master may correct the A.'s faults and disobedience by moderate chastisement, if the A. is still under age; nor can he discharge the A. To that end, the master, under an unrepealed enactment of the 5 Eliz. c. 4, must complain to the justices, who decide whether the A. has merited his dismissal or not; the A., however, having a corresponding privilege in the case of his complaint against his master. But, by the Scotch law, a master can dismiss his apprentice in the case of his proving 'incorrigible.' By the custom of the city of London, a freeman may turn away his apprentice for *gaming*.

It was decided by the House of Lords, on an appeal from Scotland in 1837 and reversing the decision of the Court of Session, that a barber's A., whose indentures bound him 'not to absent himself from his master's business, holiday or week-day, late hours or early, without leave first asked and obtained,' could not be lawfully required to attend his master's shop on Sunday mornings for the purpose of shaving customers, because such employment was a violation of the old Scotch statutes still in operation, and which were enacted for enforcing the observance of the Sunday, particularly one passed in 1559, by which it is provided 'that na handy lauboring or wirking be used on the Sonday.' The Lord Chancellor (Lord Cottenham) observed in his judgment that the English law on this subject was very similar, referring in particular to the 29 Charles II. c. 7, by which it is enacted 'that no tradesman, artificer, workman, labourer, or other person whatsoever shall do or exercise any worldly labour business, or work, of their ordinary callings, upon the Lord's Day, or any part thereof, works of necessity and charity only excepted.'

An A.'s indenture is determined by the consent of all the parties to it; and also by the death of the master. But the executor of the latter may bind the A. to another master if the contract so provide; and he must also discharge any covenant or agreement for the A.'s maintenance, so far as he has assets. By the custom of London, if the master of an A. die, the service must be continued with the widow, if she continue to carry on the trade. In other cases, it is incumbent on the executor to put the A. to another master of the same trade. The bankruptcy of the master operates as a discharge of the indenture of the A., who, if he has paid an A. fee to the bankrupt, is entitled to be paid by the court at a reasonable sum out of the estate.

By the Mutiny Act, apprentices enlisting in the army, and concealing their apprenticeship when brought before a magistrate to be attested, may be indicted for obtaining money under *false pretences*; and if, after the expiration of their apprenticeship, they do not surrender to a recruiting officer, they may be apprehended as deserters.

There is some curious historical matter on this subject, relating for the most part to a state of the law now obsolete or repealed, for which see Knight's *Political Dictionary*, under this head.

APPRI'SING is the old technical term in the Scotch law, and now obsolete, for the process of adjudication. See ADJUDICATION.

APPROA'CHES, in military language, are the sunken trenches or excavated roads which are constructed by besiegers. The siege camp being usually at a considerable distance from the fortress or city attacked, the soldiers would be exposed to imminent danger while hastening across a belt of open country to enter any breaches made by the large siege guns, were it not that concealed roads are first constructed along which they may approach. In some cases the A. are not actual trenches, but merely paths shielded by a piled-up wall of sand-bags, fascines, gabions, woolpacks, or cotton-bales. The most tremendous combination of A. ever known in the history of military enterprise, was the siege of Sebastopol in 1854–5; it comprised the digging of no less than 70 miles of sunken trench, and the employment of 60,000 fascines, 80,000 gabions, and 1,000,000 sand-bags, to protect the men working in the trenches and at batteries. See SAP, SIEGE.

A'PPROBATE AND RE'PROBATE. This is a technical expression in the law of Scotland, which signifies one of those rules of justice which commend themselves by their reasonable logic, and which are to be found in all enlightened systems of jurisprudence. It simply means, that no one can be permitted to A. and R.—that is, to accept and reject the same deed or instrument. Thus, if a will or settlement, purporting to dispose of real and personal property, all of which it directs to be converted into money, and in that form either to be equally divided or apportioned among the testators' children, consisting of a son or sons, and daughters, should, owing to some flaw or material defect, be invalid for the conveyance of the real estate, which accordingly, by the operation of the law of descent, becomes the exclusive property of the eldest son as his father's heir—the law does not permit the latter to enjoy such estate, and at the same time to take benefit under the will in other respects, for this would be simultaneously to accept and reject the same instrument: he must elect between the two alternatives, and either avail himself entirely of rights at law, as heir, or claim his share of the whole estate according to the testator's manifest intention—he cannot do both. Other illustrations might be given, showing distinctions too nice perhaps for popular information. The analogous doctrine in the law of England is called ELECTION (q. v.). In one case decided by the House of Lords in 1819, the Lord Chancellor Eldon treated the rule in the Scotch and English legal systems as identical, observing that it was equally settled in Scotland as in England that no person can accept and reject the same instrument; and he puts the case of a testator giving his estate to A, but also giving the estate to which A would otherwise have been entitled, to B; in that case his lordship stated that courts of equity hold it to be against conscience that A should take the estate bequeathed to him, and at the same time refuse to effectuate the implied condition contained in the will of the testator. The court will not permit him to take that which cannot be his but by virtue of the disposition of the will, and at the same time to keep what, by the same will, is given, or intended to be given, to another person. It is contrary to the established principles of equity that he should enjoy the benefit while he rejects the condition of the gift.

It is chiefly in the case of wills and other testamentary dispositions that this legal doctrine most frequently arises in practice, although there can be no question that both in the English and Scotch systems of law it extends to all other writings, deeds, and instruments.

APPROPRI'ATION CLAUSES, THE. This was the name by which, while the discussion continued, reference was usually made to an important question which occupied a large share of the attention of the legislature and of the public between the years 1833 and 1838. The expectation that the state of Ireland would improve after the passing of the Catholic Emancipation and Reform Acts had turned out to be fallacious. Among other grave causes of complaint left untouched by these measures, was the collection of tithes by the Established Church, and from that cause proceeded very many of the evils with which Ireland was then afflicted. To such an extent was the antipathy to tithes carried, that a clergyman who ventured to exact payment by legal measures in the exclusively Catholic countries, did so at the risk of his life. Several clergymen had actually been assassinated, and others were so unpopular, that the utility of the Irish Church in three-fourths of Ireland was almost destroyed. This was a state of matters which could not be permitted to last. Coercive measures had been tried, and had failed to produce any amelioration. The remedies which then suggested themselves were three: First, the commutation of tithes into a rent-charge upon land; second, the reduction of the number of sinecures in the Irish Protestant Church; and third, the appropriation of the surplus revenues of that church to the advancement of the general education of the people.

The first of these measures the liberal cabinet of 1833 attempted, but—from leaving the commutation to take place at the option of the landlord—carried into effect in a manner so unsatisfactory, that no good whatever resulted. The second was carried out with more success. The Irish Church Temporalities Act struck off two archbishopries, ten bishopries, and various sinecures, and applied the revenues thus acquired chiefly to supply the place of an impost called 'vestry cess' (analogous to church-rates) which was abolished. This act, however, still left the church with an income greatly disproportioned to the number of her adherents. The cabinet was divided in regard to the third measure, a majority being in favor of the principle of appropriation, and a minority, consisting of the Irish Secretary, Mr. Stanley (afterwards Earl of Derby), Sir James Graham, Lord Ripon, and another, being opposed to it. The minority had influence enough to prevent government from espousing the principle, and even to procure the abandonment of the 147th clause of the Church Temporalities Bill, because the opposition asserted, though incorrectly, that it virtually embodied the principle. This was the first of the Appropriation Clauses.

In the following year, 1834, it had become fully apparent that the tithe act of 1833 had failed, and the state of Ireland rendered it more imperative than ever to settle the tithe question. Mr. Ward, throughout a steady supporter of the principle of appropriation, moved in the House of Commons, on 27th May, 1834, 'that it was right that the state should regulate the distribution of church property in such a manner as parliament might determine.' This raised the whole question of appropriation, and that greatly to the annoyance of ministers. The split in the cabinet was well known not to have been healed, and while Mr. Ward was speaking, news reached Lord Althorp that the minority had resigned. This stopped the debate for the night. The ministers left in office found themselves relieved of a portion of their difficulties, but as they were aware that the King was strongly opposed to the appropriation principle, and that there was no prospect of the House of Lords assenting to it, they were most anxious to find some means to delay committing themselves in the matter. A commission was accordingly appointed to collect information; and on June 2, Lord Althorp met the Commons, impressed on them how useless it was to discuss a mere abstract principle, and on Mr. Ward refusing to withdraw his motion, moved and carried the previous question by a large majority.

The short lived ministry of 1835, under Sir Robert Peel, was in office when the appropriation question next came before parliament. The Liberals were in opposition; and Lord John Russell, who had succeeded to the Whig leadership in the Commons, on Lord Althorp's removal to the House of Lords, was now prepared to commit his party to the appropriation principle. When Sir Robert Peel brought forward a tithe commutation bill to supplement the bungled measure of 1833, Lord John Russell proposed two resolutions, which gave rise to one of the longest and most important of the numerous debates which have taken place on the question. On the one side, the chief speakers were Ward, Lord Howick, Sheil, and O'Connell; and on the other, Peel, Stanley, Sir James Graham, and Gladstone. Much of the interest which attended the discussion was caused by its involving the whole question of church establishments, and by a fear, on the part of the English Conservatives, that the doctrines of utility and expediency, so freely referred to in connection with the Church of Ireland, might one day be turned against the Church of England. On 2d April 1835, the House of Commons pronounced, by a majority of 33, 'that any surplus which might remain, after fully providing for the spiritual instruction of the members of the Established Church of Ireland, ought to be applied to the moral and religious education of all classes, without distinction of religious persuasion;' and a few days afterwards, a subsequent resolution was passed, 'That no settlement of the tithe question would be satisfactory unless it embodied the preceding principle.' In consequence of these resolutions, the Conservatives resigned, and the Liberals returned to power.

There was now in office a ministry pledged to the appropriation principle. In 1836, ministers brought forward a tithe commutation bill, containing clauses carrying out the principle fully and explicitly. The bill passed the Commons, but the A. C., were struck out by the Lords. The bill was thereupon abandoned. In 1837, a government tithe commutation bill again passed the Commons with A. C., and again these clauses were struck out by the Lords. On the motion of the ministers, the Commons rejected the amended bill. After the general election of 1837, the Melbourne ministry found themselves with a very narrow majority in the Commons. The liberal members had made the appropriation question a prom

ment topic at the election; but it was too apparent that England and Scotland were becoming weary of the interminable discussions upon Irish affairs. In the meantime, the state of Ireland was little better, and with an increasing party in the House of Commons to back them, there was no prospect of the Lords giving away upon the appropriation question. Still, it was necessary that something should be done, and the choice of the ministry lay between carrying a commutation bill without A. C., and resignation. The former course was chosen. The tithe measure was introduced, and ministers solaced themselves for their desertion of principle by the reflection, that after all there might be no surplus to appropriate, and that it would therefore be useless to prolong a collision with the Upper House on a matter of no practical importance. This conduct emboldened the opposition, and Sir Thomas Acland, on 14th May 1838, moved the recall of the celebrated resolutions of 1835 The discussion which followed was most damaging to the ministers, but they were saved, by a majority of 19, from the humiliation of having the resolutions recalled. A last effort in support of the principle was made in July 1838, by Mr. Ward, who then moved the insertion of A. C. into the government tithe bill. He was opposed by the whole ministerial force, and more strangely still, by the Irish members. O'Connell, who in 1835 had spoken of the one magical word 'appropriation,' which was to bring peace to Ireland, declared now that nothing would satisfy the Irish people except the total abolition of tithes. Thus deserted and opposed, Mr. Ward's motion was lost by a large majority. The government tithe measure passed in August 1838, and tithes were commuted into a rent-charge of three-fourths of their amount. After that, they were collected with comparative facility, and the appropriation question, once the topic of discussion over the whole country, fell into oblivion, until the disendowment of the Episcopal Church in Ireland, in 1869, revived it in a new shape.

APPRO'VER, or PROVER, in the law of England, is a person who had been an accomplice in the perpetration of a crime, but who is admitted to give evidence against the prisoner. It had not so simple and intelligible a meaning in the ancient practice of the criminal law, in which *approvement* was a kind of confession of a complicated nature. Where a person in a prosecution for treason or felony confessed the fact before pleading to the indictment, and, at the same time, accused others, his accomplices, of the same crime, in order to obtain his pardon, he was called an A. or P. But, as the condition of the pardon he thus expected was the conviction of the accomplice he accused, if that failed, the A. received judgment of death upon his own confession. If, on the other hand, the accused accomplice was found guilty, the A. was entitled to his pardon *ex debito justitiæ*. But 'this course of admitting approvements,' says Blackstone, writing about a century ago, 'hath long been disused; for the truth was, as Sir Matthew Hale observes, that more mischief arose to good men by these kinds of approvements, upon false and malicious accusations of desperate villains, than benefit to the public by the discovery and conviction of real offenders; and, therefore, in the times when such appeals were most frequently admitted, great strictness and nicety were held therein; though, since their discontinuance, the doctrine of approvements is become a matter of more curiosity than use.'

The modern practice is to admit accomplices to give evidence for the prosecution, or, as it is said, to become *Queen's evidence*, upon an implied promise of pardon, on condition of their making a full and fair confession of the whole truth. The admission, however, of an accomplice to give evidence against his fellows, requires the previous sanction of the judges of jail delivery, and a motion is usually made at the trial to the judge for leave to admit the accomplice for that purpose. The testimony of an accomplice is in all cases, however, regarded with just suspicion; and unless his statement is corroborated in some material part by unimpeachable evidence, the jury are usually advised by the judge to acquit the prisoner; and if the accomplice, after having confessed the crime, and being admitted as Queen's evidence, does not satisfy the condition on which he was so received by failing to give full information without equivocation, reservation or fraud, he then forfeits all claim to protection, and may be tried, convicted and punished on his own confession. Accordingly, upon a trial at York, towards the commencement of the present century, before the late Mr. Justice Buller, the accomplice denied in his evidence all that he had before confessed, upon which the prisoner was acquitted. But the judge ordered an indictment to be preferred against the accomplice for the same crime, and on his previous confession and other circumstances, he was convicted and executed.

The term in the law of Scotland analogous to that of A. is *socius criminis*, and the principles on which such socius is admitted, and on which his evidence is left to the jury, are the same as in England. But the criminal courts in Scotland go further in protecting and assuring safety to the approver than the English practice does. Sir Archibald Alison, in his *Practice of the Criminal Law of Scotland*, vol. ii., p. 453, says: 'It has long been an established principle in our law, that by the very act of calling the *socius*, and putting him in the box, the prosecutor debars himself from all title to molest him for the future with relation to the matter libelled. This is always explained to the witness by the presiding judge as soon as he appears in court, and consequently he gives his testimony under a feeling of absolute security as to the effect which it may have upon himself. If, therefore, on any future occasion the witness should be subjected to a prosecution on account of any of the matters contained in the libel on which he was examined, the proceedings would be at once quashed by the supreme court. This privilege is absolute, and altogether independent of the prevarication or unwillingness with which the witness may give his testimony. Justice, indeed, may often be defeated by a witness retracting his previous disclosures, or refusing to make any confession after he is put into the box; but it would be much more put in hazard if the witness was sensible that his future safety depended upon the extent to which he spoke out against his associate at the bar. The only remedy, therefore, in such a case, is committal of the witness for contempt or prevarication, or indicting him for perjury, if there are sufficient grounds for any of these proceedings. In this respect the security of the *socius*, and the safeguard against the contamination of the sources of evidence, is much stronger in this country than in England, where it is held that the circumstance of having been adduced by the crown is not a bar to trial, but only the foundation for a recommendation to the crown for mercy, and is entirely dependent on the witnesses making a full and fair disclosure.' And Sir Archibald mentions a case where a soldier, who was adduced as an A. or *socius*, and who was under confinement as a military delinquent for the same offence, was nevertheless allowed to give evidence; and upon its being suggested as an objection to the soldier's being admitted as a witness, that he would still be open to be tried by a court-martial, the court declared that they had the power to protect him from such an ordeal, and that they would not fail to interfere on his behalf, if he were in any way endangered in consequence of his evidence.

It was chiefly on the evidence of an accomplice named William Hare, that Burke the notorious criminal was convicted before the High Court of Justiciary in 1828. See this case noticed previously in ANATOMY.

APPROXIMA'TION, a term commonly used in mathematical science to designate such calculations as are not rigorously correct, but approach the truth near enough for a given purpose. Thus in logarithmic and trigonometrical tables nearly all the numbers are mere approximations to the truth. The calculations of astronomy generally are of this nature. Even in pure mathematics there are parts in which approaches to the truth, by means of interminable series, are all we are able to gain. The solution of equations beyond the fourth degree can be got only by approximation.

APPUI (French), a stay or support. In military tactics, the *points d'A.* are such parts of the field of battle as are suited to give support or shelter. As the wings of an army (like the extreme sides of a chess-board) are the weakest points of resistance to attack, they especially require support or protection, and are placed, when it is possible, in localities which serve to obstruct the attacking forces. Lakes, morasses, woods, streams, and steep declivities may thus serve as *points d'A.*

APPULEI'US, or, less properly, APULEIUS, a satirical writer of the 2d c., was born at Madaura, in Africa, where his father was a magistrate, and a man of large fortune. A. first studied at Carthage, which at that time enjoyed a high reputation as a school of literature. Afterwards he went to Athens, where he entered keenly upon the study of philosophy, displaying a special predilection for the Platonic school. The fortune bequeathed to him at his father's death enabled A. to travel extensively. He visited Italy, Asia, &c., and was initiated into numerous religious mysteries. The knowledge which he thus acquired of the priestly fraternities, he made abundant use of afterwards in his *Golden Ass*. His first appearance in literature arose from a law-suit. Having married a middle-aged lady, named Pudentilla, very wealthy, but not particularly handsome, he drew down upon his head the malice of her relations, who desired to inherit her riches, and who accused the youth of having employed magic to gain her affections. His defence (*Apologia*, still extant), spoken before Claudius Maximus, proconsul of Africa, was an eloquent and successful vindication of his conduct. After this event, his life appears to have been devoted zealously to literature and public oratory, in both of which he attained great eminence. He was so extremely popular, that the senate of Carthage, and other states, erected statues in his honor.

The *Golden Ass*, the work by which his reputation has survived, is a romance or novel, whose principal personage is one *Lucian*, supposed by some, though on insufficient evidence, to be the author himself. It is generally understood to have been intended as a satire on the vices of the age, especially those of the priesthood,

and of quacks or jugglers affecting supernatural powers, though Bishop Warburton, and other critics, fancy they can detect in it an indirect apology for paganism. Its merits are both great and conspicuous, as are also its faults. Wit, humor, satire, fancy, learning, and even poetic eloquence abound, but the style is disfigured by excessive archaisms, and there is a frequent affectation in the metaphors, &c., which proves A. to have been somewhat artificial in his rhetoric. The most exquisite thing in the whole work is the episode of Cupid and Psyche (imitated by La Fontaine).

It is supposed to be an allegory of the progress of the soul to perfection. Besides the *Apologia* and *Golden Ass*, we have from the pen of A. an Anthology in four books, a work on the Dæmon of Socrates, one on the doctrines of Plato, one on *The Universe*, &c. A considerable number of his works also are lost. The most recent and careful edition of the whole works of A. is that published at Leipsic in 1842, by G. F. Hildebrand. The *Golden Ass* was translated into English by T. Taylor (1822), and again by Sir G. Head (1851). An English version of the works of A. was published in London, 1853.

APRA'XIN, THEDOR MATVAYEVICH, a distinguished Russian admiral, was born in 1671. When hardly twelve years of age, he entered the service of Peter the Great, who conceived a great attachment for him, which lasted during the whole life of the monarch. In 1699, he took part in the first manœuvres of the Russian fleet at Taganrog on the sea of Azof. After the year 1700, he became the most powerful and influential person at the court of the czar, who made him chief-admiral of the Russian navy, of which, in fact, A. may be considered the creator. While Peter was fighting the Swedes in the north, A. was building war-vessels, fortresses, and wharfs in the south. In 1707, he was appointed president of the Admiralty; in 1708, he defeated the Swedish general, Lübecker, in Ingermannland, and saved the newly-built city of Petersburg from destruction; in 1710, he captured the important town of Viborg, in Finland; and in 1711, commanded in the Black Sea during the Turkish war. The following year he returned to the north; and in 1713, with a fleet of 200 vessels, he sailed along the coast of Finland, took Helsingfors and Borgo, and defeated the Swedish fleet. The result of his great successes was, that at the peace of Nystadt, in 1721, Russia obtained some most valuable advantages, being confirmed in her possession of Finland, just conquered, and of Esthonia. In spite of his brilliant reputation, however, he twice suffered an apparent eclipse of imperial favor. In 1714—15 he was charged with embezzlement, tried, and condemned to pay a fine; and a few years later, was denounced by Peter himself as 'an oppressor of the people,' and again condemned to pay a fine; but his services were too useful to be dispensed with, and in both instances the czar neutralized the effect of the condemnation, by conferring upon him additional riches and dignities. In 1722, he accompanied Peter in his Persian war, and was present at the siege of Derbend. His last naval expedition was in 1726, when he repaired with the Russian fleet to Revel, to defend that place against an expected attack by the English. He died at Moscow, 10th November, 1728, in the 57th year of his age.

A'PRICOT (*Prunus Armeniaca*), a species of the same genus with the PLUM (q. v.), is a native of Armenia, and of the countries eastward to China and Japan; a middle-sized tree of 15—20, or even 30 feet high, with ovate, acuminate, and cordate, smooth, doubly-toothed leaves on long stalks; solitary, sessile, white flowers which appear before the leaves, and fruit resembling the peach, roundish, downy, yellow, and ruddy on the side next the sun, with yellow flesh. The A. was brought into Europe in the time of Alexander the Great, and since the days of the Romans has been diffused over all its western countries. It has been cultivated in England since the middle of the 16th c. It is only in the south of England that it is ever trained as a standard, nor is it grown in the more northern parts, even as an espalier, but almost always as a wall-tree. More than twenty kinds are distinguished, amongst which some excel very much in size, fine color, sweetness, and abundance of juice. The *Moorpark* is generally esteemed the finest variety, and the *Breda* as best suited for standards in the south of England, and in Scotland even for the wall, except in the most favorable situations.—The A. is generally budded on plum or wild cherry stocks. The fruit keeps only for a very short time, and is either eaten fresh, or made into a preserve or jelly. Apricots split up, having the stone taken out, and dried, are brought from Italy as an article of commerce, in particular from Trieste, Genoa, and Leghorn; in the south of France, also, they are an article of export in a preserved and candied state. Dried Apricots from Bokhara are sold in the towns of Russia, the kernels of which are perfectly sweet, like those of the sweet almond. The kernels are sweet in some kinds, and bitter in others—the bitterness being probably more natural, and the sweetness, as in the almond, the result of cultivation. Generally speaking, they may be used for the same purposes as almonds. From the bitter kernels, which contain Prussic acid, the *Eau de noyaux* is distilled in France. The charred stones yield a black pigment similar to Indian ink. The wood of the tree is good only for the purposes of the turner.

The BRIANÇON A. (*Prunus Brigantiaca*) very much resembles the common A. The fruit is glabrous. It is found in Dauphiné and Piedmont. At Briançon, an oil, called *Huile de marmotte*, is expressed from the seeds.

The SIBERIAN A. (*P. Sibirica*) is also very like the common A., but smaller in all its parts. The fruit is small. It is a native of Siberia, especially of the southern slopes of the mountains of Dahuria.

The A. PLUM is an excellent kind of plum, much cultivated in some parts of France, and which, preserved in sugar, dried, and packed in shallow boxes, forms a considerable article of trade.

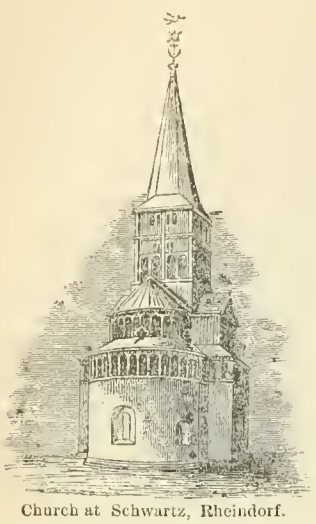
A'PRIL. The Romans gave this month the name of *Aprilis*, from *aperire*, to open, because it was the season when the buds began to open; by the Anglo-Saxons it was called Ooster, or Easter-month; and by the Dutch Grass-month. The custom of sending one upon a bootless errand on the first day of this month, is perhaps a travesty of the sending hither and thither of the Saviour from Annas to Caiaphas, and from Pilate to Herod, because during the middle ages this scene in Christ's life was made the subject of a miracle-play (q. v.) at Easter, which occurs in the month of A. It is possible, however, that it may be a relic of some old heathen festival. The custom, whatever be its origin, of playing off little tricks on this day, whereby ridicule may be fixed upon unguarded individuals, appears to be universal throughout Europe. In France, one thus imposed upon is called *un poisson d'Avril* (an A. fish). In England, such a person is called an A. fool; in Scotland, a gowk. Gowk is the Scotch for the cuckoo, and also signifies a foolish person. The favorite jest in Britain is to send one upon an errand for something grossly nonsensical—as for pigeon's milk, or the History of Adam's Grandfather; or to make appointments which are not to be kept; or to call to a passer-by that his latchet is unloosed, or that there is a spot of mud upon his face. When he falls into the snare, the term A. fool or gowk is applied with a shout of laughter. It is curious that the Hindus practise precisely similar tricks on the 31st of March, when they hold what is called the Huli Festival.

A-PRIO'RI reasoning or demonstration is that which rests on general notions or ideas, and is independent of experience. Reasoning from experience is called *a-posteriori* reasoning. A. predilection for one or the other of these forms of reasoning forms one of the most important distinctions among schools of philosophy. Plato may be taken as typical of the A-P. school, Locke and Bacon of the other. A-P. speculation is more in accordance with the genius of the Germans than with that of the practical British. A-P. philosophy claims for its conclusions the character of necessary truths, and denies that there can be a-posteriori proof of anything, that kind of reasoning furnishing only a confirmation or verification. The opposite school maintain that the general notions or principles on which A-P. reasoning rests, are themselves the results of experience, and that, therefore, all truth rests really on *a-posteriori* grounds.

A'PRON. This word is employed both in military and in shipping affairs. The A. of a cannon is a piece of sheet-lead which covers the touch-hole, tied by two pieces of white rope. In shipbuilding, the A. is a piece of curved timber fixed behind the lower part of the stem, and just above the foremost end of the keel; its chief use is to fortify the stem, and connect it more firmly with the keel. The name of A. is also given to the plank-flooring raised at the entrance of a dock, a little higher than the bottom, to form an abutment against which the gates may shut.

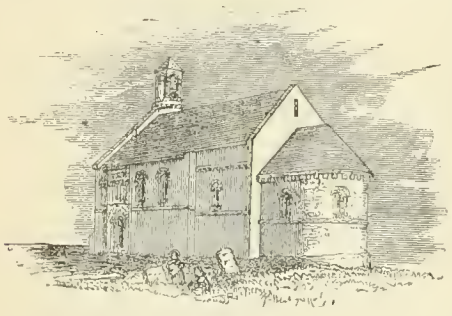
APSE (Lat. *apsis*), a semicircular recess usually placed at the east end of the choir or chancel of a romanesque, or what is commonly called in England an Anglo-Saxon or Anglo-Norman church. The origin of this peculiar termination to the choir is so curious, and has been so clearly established by recent German writers, that we shall endeavor to state it in a very few words. It is well known that the heathen structure from which the early Christians borrowed the form of their churches, was not the temple but the Basilica or public hall which served at once for a market-place and a court of justice. The Basilica, for the most part, was a parallelogram, at one of the shorter sides of which, opposite to the entrance, there was a raised platform destined for the accommodation of the persons engaged in, and connected with, the distribution of justice. This portion of the building was the prototype of the rounded choir, to which the name of *A.* was given, and which is still to be seen in so many of the Rhenish churches. For the prætor's chair which was placed in the center of this semicircular space, the altar was substituted; and the steps which led to the seat from which he dispensed justice, were destined henceforth to lead to the spot where the Fountain of all justice should be worshiped. Many A.'s are to be met with in English churches, an enumeration of which will be found in Mr. Parker's excellent Glossary

of Architecture. But as the structure is not only much more frequent, but continued to be used to a much later period on the continent, we shall describe it as it may still be seen in almost every little village along the banks of the Rhine. The lower part of the A. is there usually pierced by two or three round arched windows, often of irregular size and height, over which there is invariably an external gallery supported by pillars, in the form of which the rude idea of a Roman pillar is at once apparent; and the whole is joined to the end of the nave, which rises considerably above it, by a roof in the form of the segment of a cone.



Church at Schwartz, Rheindorf.

Where the churches are larger, there is a complete row of windows of the same rounded form, divided by pillars similar to those by which the gallery is supported, and under them frequently a line of arches of corresponding construction, whilst one or two small and irregular holes of the same form give a scanty light to the crypt beneath. Many of the smaller churches have no aisles; and the semicircular A. forms the termination of, or rather contains the chancel. The more complete specimens of the style, however, such as the minster at Bonn, afford—with the exception



Church of Dalmeny.

of the transepts and the towers, which are later additions—about the most perfected examples to be found on this side the Alps of the form of the Roman basilica, at first adapted to Christian uses. Several examples of the A. are to be seen in the earlier ecclesiastical structures of Scotland; as instances, we may mention the churches of Dalmeny and Kirkliston in Linlithgowshire, and of Leuchars in Fife.

A'PSIDES (Gr. *apsis*, connection), the two extreme points in the orbit of a planet—one at the greatest, the other at the least distance from the sun. The term A. is also applied in the same manner to the two points in the orbit of a satellite—one nearest to, the other farthest from, its primary; corresponding, in the case of the moon, to the perigee and apogee. A right line connecting these extreme points, is called the line of A. In all the planetary orbits, this line has no fixed position in space, but makes a forward motion in the plane of the orbit, except in the case of the planet Venus, where the motion is retrograding. The fact in the orbit of the earth gives rise to the anomalistic year (q. v.). This advancing motion of the line of A. is especially remarkable in the orbit of the moon, where it amounts to 40° 40′ 32″·2 annually, an entire revolution thus taking place in rather less than nine years.

A'PTEROUS INSECTS are insects without wings. In the Linnæan system, the *Aptera* form an order of insects; but more important distinctive characters being found to belong to the insects included in it, it is no longer retained as an order or principal division in the best entomological systems.

A'PTERYX (Gr. 'wingless') a bird of New Zealand which forms a family of the order to which the ostrich-like birds belong, as also the extinct dodo and æpyornis. The beak is long and slender; the legs and thighs strong; the claws of the three anterior toes are used as weapons of offence. The wings are merely rudimentary, and concealed by the loose, almost hair-like plumage. The feathers of the dorsal plumage are lanceolate, and composed externally of long, disunited filaments, the downy portion towards the root much developed. The wings have not the accessory plumage so highly developed in some of the struthious birds. The skin is very tough. Four species have been described; the largest (*Apteryx haasti*) stands about three feet high; the smallest (*A. Mantelli*) is about 23 inches from tip of beak to toe. The other two species are *A. Australis* (of which perhaps *A. Mantelli* is only a variety) and *A. Owcni*. Worms are the A.'s chief food, in search of which it deftly insinuates its flexible beak into the soft earth. The A. also eats insects, grubs, and some berries. It is nocturnal in its habits, and its nest is at the base of a hollow tree, or in deep holes in the ground. The native name is *kiwi-kiwi*.

Apteryx Australis.

A'PTHÆ are small vesicles formed of the superficial layer of a mucous membrane, elevated by fluid secreted by the latter. They are usually whitish in color, and the fluid may be serous or puriform. At the end of a few hours or days, the apthous vesicle bursts at its summit, and shrivels up, exposing an inflamed and painful patch of the mucous membrane. The most common site of A. is the mucous membrane of the lips and mouth, but they occasionally appear wherever mucous membrane approaches the skin.

Infants are liable to an apthous eruption termed *thrush* (q. v.). A. in adults are generally the consequences of fevers and other diseases, or a symptom of disturbance of the digestive system. In some cases of pulmonary consumption, they form a painful addition to the patient's sufferings. In ordinary cases of A., a preparation of borax, or some astringent wash, generally effects a rapid cure.

APU'LIA, a part of ancient Iapygia (so named after Iapyx, son of Dædalus), now includes the south-eastern part of Italy as far as the promontory of Leuca, and also the extreme peninsula of Calabria. Here, in ancient times, lived three distinct peoples—the Messapians or Salentini, the Peuceni, and the Dauni or Apulians. According to old Latin traditions, Daunus, king of the Apulians, when banished from Illyria, settled in these parts of Italy. Later traditions say that Diomedes, the Ætolian, with several other heroes returning from the Trojan war, came to Italy, and, in his war with the Messapians, was assisted by Daunus, but was afterwards deprived of his territory, and put to death. Roman poetry has preserved these old names; but in history, no mention is made of any king of A., though we find the names of its principal cities —Arpi, Luceria, and Canusium. The second Punic war was for some time carried on in A. In the present day A. (now styled PUGLIA) is merely the name of a geographical district, and has no political meaning. The whole territory, including the Neapolitan provinces, Capitanata, Terra di Bari, Terra d'Otranto, &c., is but a shadow of its former self, in the time of the Greek colonies, under Roman dominion, or even under the Normans, who took possession of it in 1043 A.D. The towns are depopulated, industry has disappeared, and commerce, once so flourishing, has passed away. Agriculture is in a very low condition, and the few roads are infested by banditti. The people are generally ignorant and superstitious, but deserve praise for their hospitality to travelers.

APU'RE, a river of the United States of Colombia and Venezuela, which rises in the East Andes, near lat. 7° N., and long. 72° W. After receiving the Portuguesa and the Guarico from the north, it joins the Orinoco, in lat. 7° 40′ N., and long. 66° 45′ W. It waters the towns Nutrias and San Fernando.

APU'RIMAC, a river of Peru, which, after a course of 500 miles, assumes the name of Tambo, and then of Ucayali, which finally joins the Tangaragua to form the Amazon. The A. proper rises to the north-west of the table-land of Lake Titicaca, receiving from it, however, no portion of its waters. Among the tributaries of the Amazon, it is one of the most southerly; while among them it approaches, perhaps the nearest to the Pacific. The A., from its source, drains the eastern face of the Andes, till it changes its name, as above, meanwhile receiving several considerable affluents, more especially the Villcamayo, from the opposite quarter. The A. and its feeders partake of the nature rather of mountain torrents than of navigable rivers; and even for traveling by land, their rocky and rugged banks are always difficult, and often impracticable. The valleys vary in climate and productiveness according to their elevation. The upper ones yield wheat and barley, and most of the fruits of Europe; while the lower, or at least the lowest ones, abound in sugar and cotton, plantains and pine-apples. The basin of the A., as a whole, is said to be the finest part of Peru, and to contain the largest proportion of native population—the best specimens apparently of the aboriginal civilization.

A'QUA FORTIS, literally, *strong water*, was the term used by the alchemists to denote nitric acid, and is still the commercial name of that acid.

A'QUA MARINE, a name sometimes popularly given to the Beryl (q. v.). Some green and blue varieties of topaz have also been styled A.

A'QUA REGI'NÆ, literally, *queen's water*, is a mixture of concentrated sulphuric acid (oil of vitriol) and nitric acid, or of sulphuric acid and nitre. Either mixture evolves much fumes, and may be used as a disinfectant, as similar mixtures are sold under the name of *everlasting disinfectants*.

A'QUA REGIS, or REGIA, literally, *royal water*, is the common name applied to a mixture of 1 part of nitric acid, and 2, 3, or 4 parts of hydrochloric acid. The general proportion is 1 to 2. The term aqua regia (royal water) was given to the mixture from the power it possesses of dissolving gold, which is the *king of the metals*.

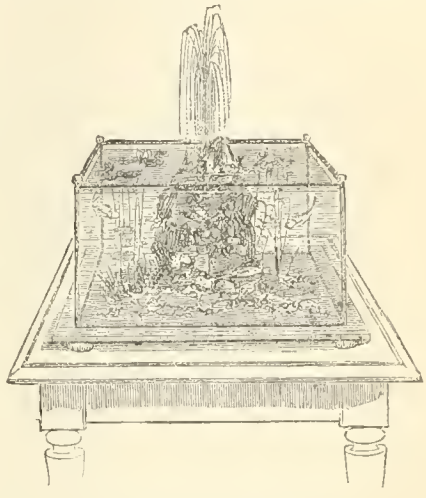
AQUA'RIUM, a tank or vessel containing either salt or fresh water, and in which either marine or fresh-water plants and and animals are kept in a living state. The name was formerly sometimes given to a tank or cistern placed in a hot-house, and intended for the cultivation of aquatic plants. The A., as now in use—originally *Vivarium* or *Aquavivarium*, and intended chiefly for animals, became extremely common about twenty years ago. From 1854 to 1860, there was a mania for these scientific toys: they became not only an aid to study, but a source of rational amusement, depending in principle upon the relations discovered by science between animal and vegetable life, and particularly upon the consumpt by plants, under the action of light, of the carbonic acid gas given forth by animals, and the consequent restoration to the air or water in which they live of the oxygen necessary for the maintenance of animal life. The A. must therefore contain both plants and animals, and in something like a proper proportion. Zoophytes, Annelides, Mollusca, Crustacea, and fishes may thus, with due care, be kept in health, and their habits observed. The water must be frequently *aerated*, which can be accomplished by taking up portions of it and pouring them in again from a small height.

The fresh-water A. is frequently provided with a fountain, which produces a continual change of water; but even where this is the case, the presence both of plants and animals is advantageous to the health of both. When sea-water cannot easily be procured for the Marine A., a substitute may be made by mixing with rather less than 4 quarts of spring water 3½ ounces of common table-salt, ½ ounce of Epsom salts, 200 grains troy of chloride of magnesium, and 40 grains troy of chloride of potassium. With care, the water may be kept good for a long time. No dead animal or decaying plant must be permitted to remain in it. Salt water, artificially prepared, is not fit for the reception of animals at once; but a few plants must first be placed in it, for which purpose some of the green algæ, species of Ulva and Conferva, are most suitable. The presence of a number of molluscous animals, such as the common periwinkle, is necessary for the consumption of the continually growing vegetable matter, and of the multitudinous spores (seeds), particularly of confervæ, which would otherwise soon fill the water, rendering it greenish or brownish, and untransparent, and which may be seen beginning to vegetate everywhere on the pebbles, or on the glass of the tank. In a fresh-water A., molluscous animals of similar habits, such as species of *Lymnæa* or *Planorbis*, are equally indispensable. For large aquaria, tanks of plate-glass are commonly used; smaller ones are made of bottle-glass or of crystal.

Simple form of an Aquarium.

Of course, the plants and animals with which the A. is stocked are various, according to taste and opportunities, or the desire to make particular kinds the subjects of careful and continued observation. Blennies, gobies, and gray mullets are perhaps the kinds of fish most commonly seen in marine aquaria; gold-fishes, sticklebacks, and minnows are frequent enough in fresh-water ones. These have the advantage of being more easily kept in good health than many other kinds, and a further recommendation is found in their small size, and in the fine colors of the gold-fish. The nests of sticklebacks are a subject of unfailing interest.

Crabs of various species, and actiniæ or sea-anemones, are very generally among the larger inmates of the A. Serpulæ contribute much both to its interest and beauty, as they spread out their delicate and finely tinted branchiæ from the mouth of their shelly tube, and withdraw within it, quick as thought, upon the slightest disturbance. Balani or acorn-shells are very beautiful objects when they are seen opening their summit-valves, and rapidly stretching out and retracting their little nets. Even periwinkles and limpets are interesting, particularly when they are watched by the aid of a magnifying-glass, as they feed upon the spores of the confervæ which have just begun to vegetate on the glass of the A., moving slowly along, with continual opening and shutting of the mouth, like cows at pasture, when the structure and motions of their mouths may be observed, and the singular beauty and brilliancy of colors never fails to command admiration. The use of a good magnifying lens adds greatly to the interest of the A., and zoophytes of exquisite forms and colors may be watched in the actual processes of life. The feeding of fishes, crabs, sea-anemones, &c., is a source of amusement, and it is interesting even to note how the inmates of the A. occasionally feed on their fellow-prisoners.



Aquarium, with Fountain for Aerating.

The idea of the A. seems to have originated from Mr. Ward's invention of the *cases* which bear his name (see WARDIAN CASES), and in which delicate ferns and other plants grow so well even in towns; but the late Sir John Graham Dalzell began to keep living marine animals in his house in Edinburgh so early as 1790, and continued to do so till the year 1850. Mr. Warrington appears to have been the first to make experiments on its practicability, and the name of Mr. Gosse is intimately associated with its early development and introduction to popularity as a scientific plaything. A Mr. Price also conducted some very successful experiments as to the balance of animal and vegetable life in aquaria. The largest aquaria in the world are those at Brighton and Hamburg, and there is also one of large dimensions at the Crystal Palace, Sydenham, as well as others in various parts of England, and in Scotland.

AQUA'RIUS, *the Water-bearer*, the eleventh sign of the zodiac, through which the sun moves in part of the months of January and February. It is also the name of a zodiacal constellation, whose position in the heavens may be found by producing a line in a southerly direction through the stars in the head of Andromeda and the wing of Pegasus.

AQUA'TIC plants and animals are those that live either wholly or partly in water. The term is very vaguely used, those plants being often called A. which grow in ponds, ditches, &c., although not only their inflorescence, but great part of their foliage, is above the surface of the water, as well as those which more completely belong to that element; and a similar latitude of meaning prevails with regard to animals. Few phanerogamous (or flowering) plants exist entirely under water, although there are a few, like the common *Zostera marina*, or Grass-wrack, which do so, and produce even their flowers in that condition; others, of which the greater part of the plant is usually under water, produce their flowers upon, or considerably above, its surface, as those of the genera *Valisneria*, *Anacharis* (q. v.), &c. The leaves, as well as the flowers, of many float upon the water, of which the water-lilies furnish well-known and beautiful examples; whilst in *Ranunculus aquatilis*, that exquisite ornament of our river margins, we have an instance of a kind not unfrequent, of great diversity between the lower leaves which remain submersed, and the upper leaves which float. Of cryptogamous plants, one great order, Algæ is exclusively A., and these seem

Aquatic plant.

adapted to perform under water all the functions of their life. A. plants are, in general, of less compact structure than is usual in other plants, and are thus lighter and better adapted for rising in their growth towards the surface of the water; in order to which also some of the algæ, as may be seen in more than one of the most common sea-weeds of our coasts, are provided with air-bladders of considerable magnitude.

All this is the more necessary, as plants completely A. have generally little firmness of stem, and if their weight made them fall to the bottom, would lie in a mass, as they do when withdrawn from the water, in which, however, they gracefully float, their flexibility of stem enabling them to adapt themselves to waves or currents which would destroy them if they were more rigid. So admirably are all things in nature harmonized.

Many animals, to a considerable extent A. in their habits, must not only breathe air, but are adapted for spending great part of their existence on dry land. Such are chiefly those that seek their food in the water. The peculiarities of structure by which they are fitted for wading, for swimming, for diving, and for remaining under water a longer time than other animals can, are very interesting and admirable. Even the fur of the beaver, the otter, the water-rat, and other animals of this description, is not liable to be drenched like that of the other quadrupeds; and the plumage of water-fowls exhibit a similar peculiarity. The feet of many are webbed, so as to enable them to swim with great facility; and to this the general form, as in water-fowls, likewise exhibits a beautiful adaptation. The webbed feet in some, of which the habits are most thoroughly A., as seals, assume the character of a sort of paddle, admirably fitted for use in the water, but by means of which they can only move very awkwardly on land. The forms of whales and fishes are remarkably adapted for progression in water; whilst, instead of the limbs by which other vertebrate animals are enabled to move upon the land or to fly in the air, their great organ of locomotion is the tail, or rather the hinder part of the elongated body itself, with the tail as the blade of the great oar, which all the principal muscles of the body concur to move. Remarkable provision is made in A. animals of the higher vertebrate classes for the maintenance of the requisite animal heat, by the character of the fur or plumage; a purpose which the blubber of whales also most perfectly serves. In the colder-blooded animals, where no such provision is requisite, the structure of the heart is accommodated to the diminished necessity for oxygenation of the blood; and although reptiles in their perfect state must breathe air, many of them can remain long under water without inconvenience. Fishes, and the many other animals provided with branchiæ or gills, breathe in the water itself, deriving the necessary oxygen, which in their case is comparatively little, from the small particles of air with which it is mingled. They cannot subsist in water which has been deprived of air by boiling. Some A. insects carry down with them into the water particles of air entangled in hairs with which their bodies are abundantly furnished.

AQUATI'NTA, a mode of etching on copper, by which imitations of drawings in Indian ink, bister, and sepia are produced. On a plate of copper a ground is prepared of black resin, on which the design is traced; a complicated series of manipulations with varnish and dilute acid is then gone through, until the desired result is attained. The process of A. has fallen into comparative disuse.

A'QUA TOFA'NA, a poisonous liquid which was much talked of in the south of Italy about the end of the 17th c. Its invention is still a matter of dubiety, but is ascribed to a Sicilian woman named Tofana, who lived first at Palermo, but was obliged, from the attention of the authorities having been attracted to her proceedings, to take refuge in Naples. She sold the preparation in small phials, inscribed 'Manna of St. Nicholas of Bari,' there being a current superstition that from the tomb of that saint there flowed an oil of miraculous efficacy in many diseases. The poison was especially sought after by young wives that wished to get rid of their husbands. The number of husbands dying suddenly in Rome about the year 1659, raised suspicion, and a society of young married women was discovered, presided over by an old woman named Spara, who had learned the art of poisoning from Tofana. Spara and four other members of the society were publicly executed. Tofana continued to live to a great age in a cloister, in which she had taken refuge, but was at last (1709) dragged from it, and put to the torture, when she confessed having been instrumental to 600 deaths. According to one account she was strangled; but others affirm that she was still living in prison in 1730.

The A. T. is usually described as a clear, colorless, tasteless, and inodorous fluid; five or six drops were sufficient to produce death, which resulted slowly and without pain, inflammation, or fever; under a constant thirst, a weariness of life, and an aversion to food, the strength of the person gradually wasted away. It is even stated that the poison could be made to produce its effect in a determined time, long or short, according to the wish of the administrator—a notion generally prevalent in those ages respecting secret poisoning. The most wonderful stories are told of the mode of preparing this poison; for example, the spittle of a person driven nearly mad by continued tickling was held to be an essential ingredient. Later investigations into the real nature of the A. T. lead to the belief that it was principally a solution of arsenic.

A'QUA VI'TÆ (Lat., water of life) is a common term applied to ardent spirits. During the alchemical epoch, brandy or distilled spirits was much used as a medicine, was considered a cure for all disorders, and even got the credit of prolonging life; and as Latin was the tongue employed in the conveyance of knowledge in those days, this restorer of health and prolonger of life was naturally christened A. V.

A'QUEDUCT (Lat. *Aquæ ductus*), an artificial course or channel by which water is conveyed along an inclined plain. When an A. is carried across a valley, it is usually raised on arches, and where elevated ground or hills intervene, a passage is cut, or, if necessary, a tunnel bored for it. Aqueducts were not unknown to the Greeks; but there are no remains of those which they constructed, and the brief notices of them by Pausanias, Herodotus, and others, do not enable us to form any distinct notion of their character. The aqueducts of the Romans were amongst the most magnificent of their works, and the noble supply of water which modern Rome derives from the three now in use, of which two are ancient, gives the stranger a very vivid conception of the vast scale on which the ancient city must have been provided with one of the most important appliances of civilization and refinement, when nine were employed to pour water into its baths and fountains.

The following are the names of the Roman aqueducts, chronologically arranged:

1. The *Aqua Appia*, begun by and named after the censor Appius Claudius about 313 B.C. It ran a course of between 6 and 7 miles, its source being in the neighborhood of Palestrina. With the exception of a small portion near the Porta Capena, it was subterranean. No remains of it exist.

2. *Anio Vetus*, constructed about 273 B.C. by M. Curius Dentatus. It also was chiefly underground. Remains may be traced both at Tivoli and near the Porta Maggiore. From the point at which it quitted the river Anio, about 20 miles above Tivoli, to Rome, is about 43 miles.

3. *Aqua Marcia*, named after the prætor Quintus Marcius Rex, 145 B.C., had its source between Tivoli and Subiaco, and was consequently about 60 miles long. The noble arches which stretch across the Campagna for some 6 miles on the road to Frascati, are the portion of this A. which was above ground.

4. *Aqua Tepula* (126 B.C.) had its source near Tusculum, and its channel was carried over the arches of the last-mentioned A.

5. *Aqua Julia*, constructed by Agrippa, and named after Augustus 34 B.C. Like the Tepulan, it was carried along the Marcian Arches, and its source was also near Tusculum. Remains of the three last-mentioned aqueducts still exist.

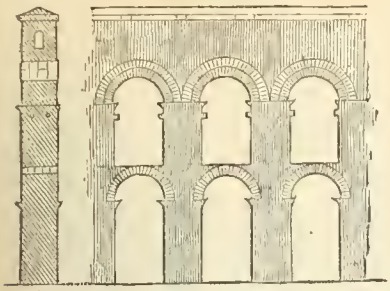
6. *Aqua Virgo*, also constructed by Agrippa, and said to have been named in consequence of the spring which supplied it having been pointed out by a girl to some of Agrippa's soldiers when in search of water. The Aqua Vergine, as it is now called, is still entire, having been restored by the Popes Nicholas V. and Pius IV. 1568. The source of the Aqua Virgo is near the Anio, in the neighborhood of Torre Salona, on the Via Collatina, and about 14 miles from Rome. The original object of this A. was to supply the baths of Agrippa; its water now flows in the Fontana Trevi, that of the Piazza Navona, the Piazza Farnese, and the Barcaccia of the Piazza di Spagna. The water of the Aqua Virgo is the best in Rome.

7. *Aqua Alsietina*, constructed by Augustus, and afterwards restored by Trajan, and latterly by the popes. This A., now called the Aqua Paola, is situated on the right bank of the Tiber, and supplies the fountains in front of St. Peter's and the Fontana Paola on the Montorio. Its original object was to supply the Naumachia of Augustus, which was a sheet of water for the representation of sea-fights.

8. *Aqua Claudia*, commenced by Caligula and completed by Claudius, 51 A.D. A line of magnificent arches which formerly belonged to this A. still stretches across the Campagna, and forms one of the grandest of Roman ruins. It was used as a quarry by Sextus V. for the construction of the Aqua Felici, which now supplies the fountain of Termini, and various others in different parts of the city.

9. *Anio Novus*, which was the most copious of all the Roman fountains, though inferior to the Marcia in the solidity of its structure; it was also the longest of aqueducts, pursuing a course

of no less than 62 miles. By the two last-mentioned aqueducts, the former supply of water was doubled. In addition to the aqueducts already mentioned, there was the Aqua Trajana, which may, however, be regarded as a branch of the Anio Novus, and several others of later construction, such as the Antoniana, Alexandrina, and Jovia, none of which were to be compared with the older ones in extent and magnificence.



Section.

Aqua Alexandrina.

Nor was it for the uses of the capital alone that aqueducts were constructed. The A. of Trajan, at Civita Vecchia, which conveys the water a distance of 23 miles, and that in the vicinity of Marzana, near Verona, with others that might be mentioned, still attest the existence of aqueducts in the smaller towns of Italy in Roman times. Even during the unpromising period which succeeded, the habit of their construction was not abandoned, that of Spoleto having been built by the Lombard Duke Theodolapius in 604. The extraordinary A. by which the fountain of Siena is supplied, is said to have occupied two centuries in building; and the modern A. of Leghorn, which is not unworthy of the Roman models after which it was designed, is surpassed in magnificence by that of Pisa, with its thousand arches. In the more distant provinces which fell under the Roman power, aqueducts were likewise constructed—at Nicomedia, Ephesus, Smyrna, Alexandria, Syracuse, and in many of the towns in Gaul and in Spain. At Merida there are the remains of two aqueducts, of one of which there are thirty-seven piers still standing, with three tiers of arches.

But the most magnificent structure of this class in Spain, is the A. of Segovia, in Old Castile, for which Spanish writers claim an antiquity beyond that of the Roman dominion; but which, there is reason to believe, belongs to the time of Trajan. At Evora, in Portugal, there is likewise an A. in good preservation, with a *castellum* or reservoir at its termination in the city, consisting of two stories, the lower one being decorated with pillars. But of all the provincial aqueducts, that at Nismes, in Provence, is at once the most remarkable and the best preserved. The following description of it, which we transcribe from Mr. Murray's excellent Hand-book for France, will convey to the reader a very vivid conception not only of this A. in particular, but of the very interesting class of works to which it belongs. 'It consists of three rows of arches, raised one above the other, each one smaller than the one below it; the lowest of six arches, the center tier of eleven, and the uppermost of thirty-five; the whole in a simple if not a stern style of architecture, destitute of ornament. It is, by its magnitude, and the skilful fitting of its enormous blocks, that it makes an impression on the mind. It is the more striking from the utter solitude in which it stands—a rocky valley, partly covered with brushwood and greensward, with scarce a human habitation in sight, only a few goats browsing. After the lapse of 16 c., this colossal monument still spans the valley, joining hill to hill, in a nearly perfect state, only the upper part, at the northern extremity, being broken away. The highest range of arches carries a small canal, about 4½ feet high, and 4 feet wide, just large enough for a man to creep through, still retaining a thick lining of Roman cement. It is covered with stone slabs, along which it is possible to walk from one end to the other, and to overlook the valley of the Gardon. The height of the Pont du Gard is 188 feet, and the length of the highest arcade 873 feet. Its use was to convey to the town of Nismes the water of two springs, 25 miles distant. . . . The conveyance of this small stream was the sole object and use of this gigantic structure, an end, which would now be attained by a few iron water-pipes.' Neither the date nor the builder of the Pont du Gard is known with certainty, but it is ascribed to Agrippa, the nephew of Augustus; a conjecture which is rendered probable by the fact of his having restored the Appian, Marcian, and Anienian, and constructed the Julian A. at Rome. The importance which the Romans attached to their aqueducts may be gathered from the fact, that special officers, invested with considerable authority, and like all the higher officials, attended by lictors and public slaves, were appointed for their superintendence. Under the orders of these 'guardians of the waters,' we are told that, in the time of Nerva and Trajan, about 700 architects and others were employed in attending to the A. These officials were divided into various classes, and known by different names, according as their duties related to the care of the course of the A., the Castella or reservoirs at its termini, the pavement of the channel, the cement with which it was covered, and the like.

The construction of aqueducts in recent times is comparatively rare, water being now generally conveyed in pipes; but two instances are worthy of notice—the *Lisbon* A., and the *Croton* at New York. The former, completed in 1738, is about 3 leagues in length; near the city, it is carried over a deep valley for a length of 2400 feet, by a number of bold arches, the largest of which has a height of 250 feet, and a span of 115. The Croton A., which conveys the waters of the Croton river for a distance of 38 miles to the city of New York, is one of the greatest undertakings of modern times. It was commenced in 1837, and finished in 1842, and is calculated to discharge upwards of 60,000,000 gallons in 24 hours. As the magnificence of aqueducts depends upon the height and number of arches requisite to carry them across valleys, it may give some idea of that under consideration when it is stated that Harlem River is crossed by fifteen arches, seven of which are of 50 feet span, and eight of 80 feet, the greatest height being 150 feet from the foundation to the top of the mason-work. See AQUEDUCT in AM. SUPP.

A'QUEOUS HUMOR is the fluid which occupies the space in the eye between the back of the cornea and the front of the lens, which, in fœtal life, is divided into an *anterior* and *posterior* chamber by the membra pupillaris (q. v.), and in adult life by the iris. It consists of water, with, according to Berzelius, about a fiftieth of its weight made up of chloride of sodium and extractive matters held in solution.

Anatomists are not agreed as to the spring of this watery secretion, and are inclined to doubt the existence of a special secreting membrane, which used to be taken for granted. However, a layer of delicate epithelial cells, which exist at the back of the cornea (q. v.), is probably concerned in its formation. It is rapidly re-secreted if allowed to escape by any wound in the cornea, and in some cases is formed in such quantity as to cause dropsy of the eye (*hydrophthalmia*).

A'QUEOUS ROCKS. In Geology, every layer which forms a portion of the solid crust of the earth is called a rock, it matters not whether its particles are incoherent, like soil or sand, or compacted together, like limestone and sandstone—to all alike, irrespective of popular usage, the geologist applies the term *rock*. In this wide sense, the rocks of the earth's crust are either igneous (q. v.) or sedimentary. These sedimentary rocks have an aqueous origin, with the exception of a very limited number, like drift-sand, which are brought into their present position by the action of the wind. Unlike the igneous rocks, whose particles have assumed their present form in the position they occupy, the materials of the A. R. have evidently been brought from a distance. They owe their origin to some older rock, whose decomposition or destruction has afforded the materials. The parent rock can often be identified. Its distance is indicated by the condition of the materials, whether they are rounded and water-worn, or angular and shingly.

The agents now at work, and which have been active in past geological ages, rubbing down and transporting the materials from which these rocks are formed, are the following: 1. *The sea*, destroying the rocks and cliffs, and beaches which form its boundary, and carrying off the eroded materials to form new rocks below the level of the sea. 2. *Rivers*, including the action of their smallest tributary rills, and even of the drops of rain, for these abrade and carry off the almost imperceptible particles from the surface where they fall; and when united, they form the rill with its suspended sediment, and these again unite to form the river, which in its course not only retains what it has got, but scoops up more from its own bed, and carries all to the sea or lake, to deposit it there as a new stratum. It is difficult to estimate the influence of this agency. Sir Charles Lyell calculates that the Nile annually deposits in the Mediterranean 3,702,758,400 cubic feet of solid matter. 3. *Glaciers and icebergs*. These enormous moving masses of ice are not only loaded with rock-fragments, which are deposited as the ice melts, but are ever abrading the rocks over which they pass, and thus supply materials to form new layers. 4. Several stratified rocks have an evidently *organic origin*, such as chalk, and some limestones chiefly composed of animal remains, and coal consisting of vegetable carbon; but even these have been influenced in their formation by water so much as to justify us in classifying them with A. R. 5. The same remark applies to rocks which have been *precipitated from a fluid* with which the materials existed in chemical combination, as has been the case with beds of salt, gypsum, and calcareous tufa.

As the result of these various actions, we have a series of rocks which, from their composition, may be classed as Arenaceous, Argillaceous, Calcareous, Carbonaceous, Saline, and Silicious. We must refer to these terms for the descriptions of the various rocks included under them.

The arrangement of the A. R. depending on their different ages, is of more importance in modern geology than that depending on their internal constitution. When a section of the earth's crust is examined, it is found to be composed of a series of layers which have been produced in succession. Comparing this with sections in other districts, it is noticed that there is a regularity

in the several parts; for beds of the same structure are found in different localities, and these occupy the same relative position to the adjacent beds. A number of observations have shown that the crust of the earth is composed of a *regular* series of earthy deposits formed one after another, during successive periods of time. This general induction forms the basis of the following classification. For the description of the included strata we must again refer to the names of the different divisions:

I. Tertiary or Kainozoic Epoch—1. Superficial Deposits or Recent Period; 2. Pleistocene Period; 3. Pliocene or Upper Tertiary Period; 4. Miocene or Middle Tertiary Period; 5. Eocene or Lower Tertiary Period.

II. Secondary or Mesozoic Epoch—6. Cretaceous Period; 7. Oolitic Period; 8. Triassic Period.

III. Primary or Palæozoic Epoch—9. Permian Period; 10. Carboniferous Period; 11. Devonian or Old Red Sandstone Period; 12. Silurian Period; 13. Cambrian Period.

AQUIFOLIA'CEÆ, a natural order of dicotyledonous or exogenous plants, of which the common holly (q. v.) is the best known example, and the only species that is a native of Europe. The order, however, contains more than one hundred species, the greater part of which are natives of America, and many of them belong to the tropical and subtropical parts of it. The species are all evergreen trees or shrubs, with simple, leathery leaves, and without stipules. The flowers are small and axillary, with 4—6 sepals, and a 4—6-parted corolla, into which the stamens are inserted, alternating with its segments. The ovary is fleshy and superior, with two or more cells, a solitary anatropal pendulous ovule in each cell, the cells generally becoming bony as distinct *stones* in the fruit, which is fleshy. The order is allied to *Rhamnaceæ*, *Celastraceæ*, and *Ebenaceæ*. The most interesting species belong to the genus *Ilex*, or Holly (q. v.).

AQUILA. See Eagle.

A'QUILA, the capital of the Italian province of the same name, situated on the Pescara, near the loftiest of the Apennines, with a population of 14,000, ranks as a fortified town of the fourth class, though its citadel is its only strong point. A. was built by the emperor Frederic II. from the ruins of the ancient *Aniternum*, a town of the Sabines, and the birthplace of Sallust the historian. In 1703 it was almost destroyed by an earthquake, in which 2000 persons perished. A. is a bishop's see, has civil and criminal courts, and a Lyceum, and is considered one of the best built towns in the kingdom. In 1841, much political disturbance took place here, and several of the inhabitants were imprisoned and executed in consequence. Altogether, public feeling in this town and province is far more liberal than in most other parts of the kingdom.

A'QUILA, Ponticus, a celebrated translator of the old Testament into Greek, born at Sinope. He flourished about the year 130 A. D., is said to have been a relation of the Emperor Hadrian, and to have been first a Pagan, then a Christian, and finally a Jew; submitting in his last conversion to the peculiar religious ceremony of circumcision. His translation of the Old Testament—which appears to have been undertaken for the benefit of his Hellenized countrymen—was so *literal*, that the Jews preferred it to the Septuagint, as did also the Judaizing sect of Christians, called Ebionites. Only a portion of the work remains, which has been edited by Montfaucon and others.

AQUILARIA'CEÆ, a natural order of dicotyledonous or exogenous plants, containing only about ten known species, all of which are trees with smooth branches and tough bark, natives of the tropical parts of Asia. The leaves are entire; the perianth leathery, turbinate, or tubular, its limb divided into four or five segments; the stamens usually ten; the filaments inserted into the orifice of the perianth; the ovary two-celled, with two ovules; the stigma large; the fruit a 2-valved capsule, or a drupe. The order is chiefly interesting as producing the fragrant wood called Aloes Wood (q. v.).

AQUILEGIA, See Columbine.

AQUILE'JA or AGLAR (earlier, Velia or Aquila), is a small town in Austria, at the head of the Adriatic, 22 miles W. N. W. of Trieste. Pop. about 2000. It is now sunk in utter insignificance, possessing no trade or public buildings of any note, except its cathedral; but in the time of the Roman emperors, it was one of the most important places north of the metropolis. Its commerce was flourishing, for though 8 miles distant from the sea, vessels could reach it by canals connecting it with the rivers in its vicinity. It was both the central point of the transit-trade between the north and south of Europe, and the key of Italy against the barbarians. Founded by a Roman colony in 181 B.C., it became a favorite residence of Augustus; and in 168 A.D., was so strongly fortified by Marcus Aurelius, as to be considered the first bulwark of the empire on the north. It was called *Roma Secunda*, the Second Rome. Here the Emperor Maximin perished; and in the vicinity Constantius lost his life in a battle against his brother Constans. When the town was destroyed by Attila (452), it had 100,000 inhabitants. It never recovered, although it received some ecclesiastical honors, but has continued slowly dwindling down into deeper obscurity and wretchedness. There are numerous remains of its former splendor. Councils were held at A. in 381, 558, 698, and 1184 A.D.

AQUI'NAS, Thomas, or THOMAS of AQUINO, one of the most influential of the scholastic theologians, was of the family of the Counts of Aquino, in the kingdom of Naples, and was born in the Castle of Rocca Secca in 1224. He received the rudiments of his education from the Benedictine monks of Monte-Casino, and completed his studies at the university of Naples. A strong inclination to philosophical speculation determined the young nobleman, against the will of his family, to enter (1243) the order of Dominicans. In order to frustrate the attempts of his friends to remove him from the convent, he was sent away from Naples with the view of going to France; but his brothers took him by force from his conductors, and carried him to the paternal castle. Here he was guarded as a prisoner for two years, when, by the help of the Dominicans, he contrived to escape, and went through France to the Dominican convent at Cologne, in order to enjoy the instructions of the famous Albertus Magnus (q. v.). According to another account, he owed his release from confinement to the interference of the emperor and the pope.

At Cologne he pursued his studies in such silence, that his companions gave him the name of the 'Dumb Ox.' But Albert, his master, is reported to have predicted, 'that this ox would one day fill the world with his bellowing.' Thoroughly imbued with the scholastic, dialectic, and Aristotelian philosophy, he came forward, after a few years, as a public teacher in Paris. His masterly application of this philosophy to the systematizing of theology, soon procured him a distinguished reputation. It was not, however, till 1257, that A. obtained the degree of doctor, as the university of the Sorbonne was hostile to the mendicant monks. He vindicated his order in his work *Contra Impugnantes Dei Cultum et Religionem;* and, in a disputation in presence of the pope, procured the condemnation of the books of his adversaries. He continued to lecture with great applause in Paris, till Urban IV., in 1261, called him to Italy to teach philosophy in Rome, Bologna, and Pisa. Finally, he came to reside in the convent at Naples, where he declined the offer of the dignity of archbishop, in order to devote himself entirely to study and lecturing. Being summoned by Gregory X. to attend the General Council at Lyon, he was surprised by death on the way, 1274, at Fossanuova, in Naples. According to a report, he was poisoned at the instigation of Charles I. of Sicily, who dreaded the evidence that A. would give of him at Lyon.

Even during his life A. enjoyed the highest consideration in the church. His voice carried decisive weight with it; and his scholars called him the 'Universal,' the 'Angelic Doctor,' and the 'Second Augustine.' A general chapter of Dominicans in Paris made it obligatory on the members of the order, under pain of punishment, to defend his doctrines. It was chiefly the narratives of miracles said to have been wrought by A. that induced John XXII., in 1323, to give him a place among the saints. His remains were deposited in the convent of his order at Toulouse. Like most of the other scholastic theologians, he had no knowledge of Greek or Hebrew, and was almost equally ignorant of history; but his writings display a great expenditure of diligence and dialectic art, set off with the irresistible eloquence of zeal.

His chief works are—a *Commentary on the Four Books of Sentences of Peter Lombard*, the *Summa Theologiæ*, *Quæstiones Disputatæ et Quodlibetales* and *Opuscula Theologica*. He gave a new and scientific foundation to the doctrine of the church's treasury of works of supererogation, to that of withholding the cup from the laity in the communion, and to transubstantiation. He also treated Christian morals according to an arrangement of his own, and with a comprehensiveness that procured him the title of the 'Father of Moral Philosophy.' The definiteness, clearness, and completeness of his method of handling the theology of the church, gave his works a superiority over the text-books of the earlier writers on systematic theology. His *Summa Theologiæ* is the first attempt at a complete theological system. Accordingly, Pius V., to whom we owe the publication of the completest collection of A.'s works (18 vols., Rome, 1570; a newer but less trustworthy ed., 23 vols., Paris, 1636—41), ranks him with the greatest teachers of the church. In his philosophical writings, the ablest of which is his *Summa Fidei Catholicæ contra Gentiles*, he throws new light over the most abstract truths. The circumstance of A. being a Dominican, and boasted of by his order as their great ornament, excited the jealousy of the Franciscans against him. In the beginning of the 14th c., Duns Scotus (q. v), a Franciscan, came forward as the declared opponent of the doctrines of A., and founded the philosophico-theological school of the Scotists, to whom the *Thomists*, mostly Dominicans, stood opposed. The Thomists leaned in philosophy to Nominalism (q. v.), although they held the abstract form to be the essence of things, they followed the

doctrines of Augustine as to grace, and disputed the immaculate conception of the Virgin. The Scotists, again, inclined to realism (q. v.), and to the views of the Semipelagians, and upheld the immaculate conception.

AQUITA'NIA, the Latin name of a part of Gaul, originally including the country between the Pyrenees and the Garonne, peopled by Iberian tribes. Augustus, when he divided Gaul into four provinces, added to A. the country lying between the rivers Garonne and Loire. Afterwards, A. passed into the hands—first, of the West Goths, and then of the Franks; and during the Merovingian dynasty, became an independent duchy. Though subjugated by Charlemagne, the duchy again claimed independence under the weak monarchs of the Carlovingian dynasty. In 1137, it was united to the crown of France by the marriage of Louis VII. with Eleanor, heiress of A. In 1152, A. became an English possession through the marriage of Henry II. with Eleanor, whom Louis had divorced, and a long series of disputes took place between England and France respecting A., which was at length ultimately united to the crown of France by Charles VII. in 1451.

ARABESQUE (Fr.), means merely *after the Arabian manner*; and, so far as etymology is concerned, might therefore be general in its application. In practice, however, it is used to characterize a peculiar kind of fantastic decoration commonly employed in conjunction with architecture, and which the Spanish Moors are supposed to have introduced into modern Europe. But the species of enrichment to which this term is now applied, was extensively employed both by the Greeks and Romans, the latter in particular being masters of the style. The Egyptians, from whom the Moors probably derived their original notions of this and other forms of art, also employed it in enriching their monumental decorations. But the A. of the Moors differed from that of the Egyptians in entirely excluding the figures of animals, the representation of which was forbidden by the Mohammedan religion, and confining itself entirely to the foliage, flowers, fruit, and tendrils of plants and trees, curiously and elaborately intertwined. This limitation of the field of A. was again departed from when the decorations were discovered on the walls of the baths of Titus, in the time of Leo X.; and more recently those in the houses at Herculaneum and Pompeii came to form the models of imitation, and the modern A. consists usually of combinations of plants, birds, and animals of all kinds, including the human figure, and embracing not only every natural variety, but stepping without hesitation beyond the bounds of nature. The freedom with which it admits the fantastic is, indeed, the leading peculiarity of A.; and as it is found in some form amongst every people who have attempted to give a visible representation of their fancies, it is spoken of by F. Schlegel as 'the oldest and original form of fancy.' The arabesques with which Raphael adorned the galleries of the Vatican, and which he is said to have imitated from those which he had been instrumental in discovering in the baths of Titus, are at once the most famous and the most beautiful which the modern world has produced. Arabesques are usually painted, though the term is also applied to sculptural representations of similar subjects in low relief.

Arabesque Panel. From the Mosque at Cordova.

ARABAGI'R, or ARABKIR (anc. *Anabrace*), a town of Asiatic Turkey, in the vilayet of Sivas, in a mountainous and rocky district, not far from the Euphrates, and 150 miles south-south-west from Trebizond. It contains a pop. of about 30,000 nearly one-fourth being Armenians, the other three-fourths Turks. It is to the enterprise and industry of the Armenians that the town owes its prosperity. It is specially noted for the manufacture of goods from English cotton yarn. The neighboring country is inhabited by Turcomans.

ARA'BIA—called by the inhabitants, Jezirat-al-Arab (the peninsula of A.); by the Turks and Persians, Arabistân—is the great south-western peninsula of Asia, and is situated 12° 40′—34° N. lat., and 32° 30′—60° E. long. Its greatest length from N.W. to S.E. is about 1800 miles; its mean breadth, about 600; its area, 1,230,000 square miles; and its population conjectured to be not much above 5,000,000. It is bounded on the N. by the highlands of Syria, and the plains of Mesopotamia (or by the line from El Arish on the Mediterranean to the Euphrates delta); on the E., by the Persian Gulf and the Gulf of Oman; on the S., by the Arabian Sea; and on the W., by the Red Sea and the Suez Canal. Midway between Mecca and Medina runs the tropic of Cancer. Ptolemy is supposed to be the author of the famous threefold division into *Arabia Petræa*, i. e., the Arabia of the city of Petra, in the N.W.; *Arabia Felix* (an incorrect translation of Yemen, which does not signify 'happy,' but the land lying to the *right* of Mecca), along the W. and S.W. coasts; and *Arabia Deserta*, in the interior. The more precise divisions are: the *Sinaitic Peninsula* (see SINAI), between the Gulfs of Suez and Akaba; the *Hedjaz* (Land of Pilgrimage), the larger and northern strip to the E. of the Red Sea; *Yemen*, the southern and smaller strip to the E. of the Red Sea; *Hadramaut*, the region along the southern coast; *Oman*, the extreme south-eastern end of the peninsula, as large as England and Wales; *El-Hasa*, along the Persian Gulf; *Nejd*, the Central Highlands of Arabia.

In shape, A. is an irregular parallellogram, broadest at the southern end; in character, it is mainly African. The vast central plateau rises from a height of 2500 feet in the north to 7000 feet in the south-west, and is bounded by western and southern mountain chains, the former attaining, to the south of Mecca, a height of 8500 feet. Between the mountains and the sea is a low hot strip of land partially fertile, of varying width. There is a desert in the north of the interior, the mountainous country of Nejd near the very center, and to the south of Nejd another very sterile sandy desert. Hedjaz and Yemen extend from the Red Sea indefinitely towards the interior, and consist partly of the *Tehama*, or low country, along the sea, and partly of the mountain district beyond. Mecca and Medina are in Hedjaz. Yemen is on the whole well watered, has rich and fertile valleys, and contains one-fifth of the whole population of Arabia. Yemen possesses two very important commercial towns, Mocha and Loheia, situated on the coast of the Red Sea. Hadramaut is little known, but resembles the Hedjaz in character. Oman is mainly mountainous, is partly very fertile, and posssesses the good harbor of Muscat. It has some manufactures of cotton, silk, and arms. Large portions of A. are perfectly arid, but the more fertile portions are so extensive as to constitute two-thirds of the total area: one-third of the whole may be accounted desert and uninhabitable.

Our knowledge of the interior of A. is still very imperfect in detail. The largest portion of it lies in that great desert zone which stretches from the shores of the Atlantic to those of the Northern Pacific. Nejd, the northern highland or central plateau of A., is a compact settled district, culminating in the crescent-shaped Jebel Toweyk, which is intersected by numerous valleys, roaring torrents during the rains, but dry depressions at other times. North of Nejd, and separated from it by a narrow arm of Nefud, or the northern desert of A., is the smaller plateau of Jebel Shomer, crossed by the ranges of Jebel Aja and Jebel Selma. The northern desert, partly stony, and partly a burning expanse of red sand, is thinly sprinkled over with oases of wells and grass, serving as halting-places for the caravans of merchants or pilgrims. The oasis of *Jauf*, 60 miles long by 10 miles broad, contains three flourishing villages. *Dahna*, the southern and main desert of A., extends from Nejd and the Hadramaut coast range, and has never been explored by any European. It is, however, an almost absolutely sterile sand-waste. See MUSCAT, ZANZIBAR.

Politically, Hedjaz, Yemen, and El Hasa are really three Turkish provinces; the Sinaitic Peninsula is in Egyptian hands; England exercises much influence in Hadramaut through her possession of Aden; the Sultan of Oman is practically independent, and in alliance with England; Nejd, the seat of the once powerful Wahabi State (see WAHABIS), may be said to be independent, though the Emir of Shomer or Shammar, its most powerful potentate, pays a small annual tribute to the Sherif of Mecca, in recognition of Turkish supremacy.

A. has, on the whole, an African climate. Though surrounded on three sides by the sea, its chains of hills exclude in a great measure the modifying influence of currents of air from the ocean. In several parts of A. hardly a refreshing shower falls in the course of the year, and vegetation is almost unknown: in other sultry districts, the date-palm is almost the only proof of vegetable life. Over large sterile tracts hangs a sky of almost unbroken serenity. The short rainy season which occurs on the west coast, during our summer months, fills periodically the *wadis* (hollow places) with water, while slight frosts mark the winters in the center and north-east. During the hot season, the Simoom (q. v.) blows, but only in the northern part of the land. The terraced districts are more favorable to culture, and produce wheat, barley, millet, palms, tobacco, indigo, cotton, sugar, tamarinds, excellent coffee, senna, and many aromatic and spice-plants, as balsam, aloe, myrrh, frankincense, &c. A. is destitute of forests; but has vast stretches of desert grass fragrant with aromatic herbs, and furnishing admirable pasturage for the splendid breed of horses. Coffee, one of the most important exports, is an indigenous product both of A. and Africa.

In the animal kingdom, an African character prevails generally. Sheep, goats, and oxen satisfy the immediate domestic and personal necessities of the inhabitants, to whom the camel and horse are trusty companions in their far wanderings. Gazelles and ostriches frequent the oases of the deserts, where the lion, panther, hyena, and jackal hunt their prey. Monkeys, pheasants, and doves are found in the fertile districts, where flights of locusts often make sad devastation. Fish and turtle abound on the coast.

The noble breed of Arabian horses has been cultivated for several thousand years; but the most characteristic of all animals in the peninsula is the camel, which has been both poetically and justly styled 'the ship of the desert.' It may be regarded as an Arabian animal, for it seems to be proved that it is not a native of Africa, but has migrated from the peninsula with its master. The camel is not found among the figures of animals in the ancient Egyptian paintings on walls, nor does it appear to have been known to the Carthaginians. The breed of Oman is celebrated for its beauty and swiftness. Among the minerals of A. may be mentioned—iron, copper, lead, coal, basalt and asphaltum, and the precious stones, emerald, carnelian, agate, and onyx. Pearls are found in the Persian Gulf.

But the most interesting feature of the peninsula is its ancient and peculiar population. The Arab is of medium stature, muscular make, and brown complexion. Earnestness and lofty pride look out of his glowing eyes; by nature he is quick, sharp-witted, imaginative, and passionately fond of poetry. Courage, temperance, hospitality, and good faith are his leading virtues; but these are often marred by a spirit of sanguinary revenge and rapacity. His wife keeps the house and educates the children.

Arabian life is either *nomadic* or *settled*. The wandering tribes, or Bedouins, who have, however, their allotted winter and summer camping-grounds, and a strong home-feeling, entertain notions of the rights of property differing seriously from those regulating the West, yet even their most marauding tribes are not without a traditional code of law and honor. The settled tribes, styled Hadesi and Fellahs, are despised by the Bedouins, who, breathing a pure air, and living on a simple diet, are physically and morally their superiors. Arabia is the anti-industrial central point in the world;' for here centuries pass away without any improvement save what has been introduced, almost compulsorily, by foreigners. The export of coffee, dates, figs, spices, and drugs, though still considerable, is said to be only a shadow of the old commerce which existed before the circumnavigation of Africa, or when Aden was in its prime, and the Red Sea was the great commercial route. A. has few manufactures, but carries on a transit-trade in foreign fabrics, besides importing these to some extent for its own necessities.

Education is mostly confined to that within the household, where, however, a boy is instructed in reading and writing, in grammar, history, and poetry, and where he is trained to habits of politeness and self-restraint. In the few higher public schools, writing, grammar, and rhetoric compose the whole curriculum. The government is patriarchal, and chief men of the various tribes have the title of Emir, Sheik, or Imaum. Their function appears limited to leading the troops in time of war, to levying tribute, and to the administration of justice. A spirit of liberty in the people moderates the authority of their chieftains; but instances of extreme despotism have not been unfrequent both in early and modern times.

History.—The history of A. before the time of Mohammed is involved in mystery, and has little interest, on account of its want of connection with the world's general progress. As indicative of the African origin of the Arabs, the following particulars have been specified: the writings *Hamasa* and *Kitab-el-aghanee,* which represent the 'pure' Arabs as having first settled on the extreme S.W. of the Peninsula, thence spreading N. and E.; the name Himyar (dusky) which is applied to the ruling class, sometimes to the entire nation; the Himyaritic language, which, as preserved in some proper names, &c., shows decided African affinities; the kinship between the pre-Islamitic institutions of Yemen and those of the historic Egyptians, and even of the modern Abyssinians; the African bearing of the physique and manners of the pure-blooded Arabs; the facility of marriage between the southern Arabs and the Africans, and the fecundity of such unions. The earliest trustworthy records present to us an Arabia of different kingdoms and federal governments, clustered round the desert interior, and all more or less under the rule of a race of southern origin. Yemen, the most prosperous of these, must, as the fragmentary native records which have come down to our time attest, have enjoyed a considerable degree of civilization, with an extensive commerce, a poetic literature, and practical arts; its institutions showing some affinity to those of the Nile Valley, on the other side of the Red Sea. The Himyaritic dynasty long ruled in Yemen; and *Himyaritic* is still used of the relics of the oldest south Arabian tongue. Hira, in the north-easterly province of Arabian Irak, on the other hand, assimilated somewhat to the neighboring Persia; Ghassan, in the N.W., again, approaching more to a Byzantine complexion. In the fifth c. we find the Koreyah clan, from which Mohammed (q. v.) sprung, predominating in A., and masters of the sacred shrine of Káabeh within the precincts of Mecca, a possession giving them not only a religious pre-eminence in the peninsula, but the disposal of the accumulated offerings of gold, silver, jewels, &c., in the temple, a fund of wealth which they increased by commerce on the Red Sea coast. In the pre-Islamite times, too, was held the great annual fair of Okad, in a plain of the same name, and at a day's journey from Mecca; a fair at which horse-races, gymnastic sports, poetic contests, and other amusements enlivened the seriousness of trade transactions.

In the reign of Augustus, Ælius Gallus, the Roman prefect of Egypt, at the head of a large army unsuccessfully attempted the reduction of Yemen to the Roman Empire. In 529, however, Yemen was conquered by a large Abyssinian army, and was kept in subjection to the Ethiopians for seventy-six years subsequent to that date. Christianity found an early entrance into Arabia. The Jews, in considerable numbers, migrated into A. after the destruction of Jerusalem, and made many proselytes, especially in Yemen. This diversity of creeds in the peninsula was favorable to the introduction of the doctrine of Mohammed, which forms the grand epoch in Arabian history, and brings it into close connection with the general history of civilization. Now, for the first time, the people of A. became united under one sceptre and one creed, and powerful enough to erect new empires in the three quarters of the world; in Palestine, Mesopotamia, and Persia; in Egypt and the north of Africa; in Spain. The dominion of the Arabs, from the time of Mohammed to the fall of the Califat of Bagdad in 1258, or even to the expulsion of the Moors from Spain in 1492, is an important period in the history of civilization. (See the articles MOORS, CALIF.) But the movements which had such great effects on the destinies of other nations, left the peninsula itself in an exhausted condition. Then followed the subjugation of Yemen by the Turks in the sixteenth century; their expulsion in the seventeenth century; the dominion of the Portuguese over Muscat, 1508—1659; the conquests of Oman, and the temporary victories gained by the Persians at the close of the sixteenth century; and, lastly, the appearance of the Wahabis (q. v.) (1770). The progress of the latter was interrupted by Mehemet Ali (q. v.), the Pasha of Egypt, who subjugated the coast-country of Hedjaz, with some parts of the coast of Yemen. The events of the year 1840, in Syria, compelled Mehemet, however, to resign all claims upon the territories lying beyond the Red Sea. Since then, the political conditions have come to be as described above; see WAHABIS. Arab influences are, of course, still powerful beyond the limits of the peninsula, in many parts of Africa, and especially in North Africa and Egypt.

ARA'BIAN ARCHITECTURE. So inseparable is the connection between architecture and religion, that it may be stated as a general rule that no sooner is a religion engendered than it finds expression in new architectural forms. Of this we have an interesting instance in the simultaneous rise of Mohammedanism, and of the style of architecture commonly called Arabian or Moorish, but to which the name of Mohammedan might far more appropriately be given, seeing that it has everywhere followed the religion of the Crescent, and that the Arabians previously had no architecture peculiar to themselves. It is further remarkable that the style of which we speak seems to have arisen, as it were, undesignedly, or, at all events, without any conscious effort on the part of the people amongst whom it first appeared. The follow-

Moorish Gateway.

ers of the Prophet contemplated nothing peculiar in their ecclesiastical structures; and at first their mosques were built by Christian architects from Constantinople. As a natural consequence, they resembled Byzantine churches, modified in the countries of which the Moors successively possessed themselves by the features of the existing churches. Gradually the new and fanciful ornamentation known as Arabesque (q. v.) was added to the recognized features of Greek and Roman edifices. The exclusion of animal figures, which their abhorrence of the very appearance of idolatry necessitated, confined the Mohammedan artists to the imitation of vegetable productions, varied by geometrical patterns and inscriptions, of which the letters were woven into forms which suited them for architectural uses. But the most original feature in their edifices, and that by which they have continued to be marked from all others, is the horse-shoe arch. The example in the illustration presents a form which, notwithstanding its extreme beauty, has strangely enough scarcely ever been imitated in the Christian church. The pointed arch, on the other hand, and the various forms of the trefoil and quatrefoil arches, though there can be little doubt that we are indebted for them to the rich invention of the Moorish architects, have become so entirely Christian as to be no longer associated in our minds with the religion of the prophet. It is said that the pointed arch is to be found in Mohammedan buildings so early as 780 A.D. (Parker's *Glossary of Architecture*), whereas the earliest examples of its use in Christian architecture belong to the 12th c. Moorish architecture probably reached the highest point of development in the Alhambra, with the characteristics of which the English public have been made familiar by means of the court which bears its name in the palace at Sydenham.

ARABIAN GULF. See RED SEA.

ARABIAN LANGUAGE AND LITERATURE. Regarding the oldest literary culture of the Arabians, we possess but slight information. That their poetry at least must have had a very early development, may be inferred from the natural disposition of the inhabitants, who were characterized for their high spirit, courage, love of adventure, and delight in the glory of war. As far back as Solomon's time, the queen of Sheba (probably *Arabia Felix*) was noted for her sententious sayings. The nomadic tribes, living under the patriarchal rule of their sheiks, possessed everything that was favorable to the growth of a simple and natural poetry. They had quick and vivid feelings, and a rich, glowing fancy, which, operating upon the perils, the hardships and strange confederate life they led in those barren sand-deserts, and amongst naked rocks, could hardly fail to call forth a wild or vigorous minstrelsy. Before the time of Mohammed, the Arabians had celebrated poets who sang the feuds of tribes, and the praises of heroes and fair women. During the great fairs at Mecca and Okadh, poetic contests were held before the people as at the Grecian games; and the poems to which the prize was awarded, were re-written in golden characters, and suspended in the Kaaba at Mecca, the venerable national temple which the Mohammedans affirm to have been built by Abraham, or Ishmael. They are termed the *Moallakât*—i. e., 'the Suspended'—from the honor conferred on them, and are remarkable for their pathos, soaring conceptions, richness of imagery and phraseology, free and unconstrained spirit, and the glow of their love and hate. Among the famous poets of this early period are Nabegha, Asha, Shanfara—whose works were translated and published by De Sacy in his *Chrestomathie Arabe*—and, lastly, Kaab-ben-Zohair, who lived to celebrate the praises of the prophet Mohammed.

But the most brilliant of Arabic culture is that which Mohammed himself inaugurated in the Koran. His new doctrines of faith and life, collected under this title by the first calif, Abubekr, were revised and published by Othman, the third calif. The naturally adventurous spirit of the Arabs found a suitable excitement in the half-religious, half-military system of Mohammed, and, after his death, their fanaticisms prepared them for their subsequent career. Like an overwhelming torrent, they passed over the neighboring states, and in the short space of eighty years from the death of their prophet, had extended their dominion from Egypt to India, and from Lisbon to Samarcand.

During this time nothing can be said of their culture and refinement. A fanatical desire of conquest prevailed. Gradually, however, by their intercourse with civilized nations, the Arabian conquerors were themselves subjected to the humanizing influence of letters, and, after 749 A.D., or during the reign of the Abassides, literature, arts, and sciences appeared, and were generously fostered under the splendid sway, first of Almansor (754—775), and afterwards of the celebrated Harun-al-Raschid (786—808). Learned men were now invited from many countries, and remunerated for their labors with princely munificence; the works of the best Greek, Syriac, and old Persian writers were translated into Arabic, and spread abroad in numerous copies. The Calif Al-Mamun, who reigned from 813 to 833, offered to the Greek emperor five tons of gold and a perpetual treaty of peace, on condition that the philosopher Leo should be allowed for a time to give instruction to the former. There are few instances of such a price offered for lessons in philosophy. Under the sway of the same Al-Mamun, excellent schools were founded in Bagdad, Basra, Bokhara, and Kufa; while large libraries were collected at Alexandria, Bagdad, and Cairo. In Spain, the high school of Cordova rivaled the literary fame of Bagdad, and, generally, in the 10th c., the Arabs appeared everywhere as the preservers and distributers of knowledge. Pupils from France, and other European countries, then began to repair to Spain in great numbers, to study mathematics and medicine under the Arabs. There were fourteen academies, with many preparatory and upper-schools in Spain, and five very considerable public libraries; that of the Calif Hakem containing, as is said, more than 600,000 volumes. This state of culture, when compared with that prevalent before Mohammed, shows a rapidity of progress in knowledge almost as remarkable as the career of Arabian conquest.

In geography, history, philosophy, medicine, physics and mathematics, the Arabians rendered important services to science; and the Arabic words still employed in science—such as algebra, alcohol, azimuth, zenith, nadir, with many names of stars, &c.—remain as indications of their influence on the early intellectual culture of Europe. But geography owes most to them during the middle ages. In Africa and Asia, the boundaries of geographical science were extended, and the old Arab treatises on geography and works of travels in several countries by Abulfeda, Edrisi, Leo Africanus, Ibn Batuta, Ibn Foslan, Ibn Jobair, Albiruni the astronomer, and others, are still interesting and valuable.

History was also studiously cultivated. The oldest Arabic historian of whom we know is Mohammed-al-Kelbi (died in 819). About the same period, however, flourished several other historians. After the dawn of the 10th c., history became a favorite study of the Arabs. The first who attempted a universal survey of the subject were Masudi, Tabari, Hamza of Ispahan, and Eutychius, the Christian patriarch of Alexandria. Masudi's work is entitled *Meadows of Gold and Mines of Gems*. These were followed by Abulfaraj and George Elmakin (both Christians), Abulfeda, and others. Nuvairi wrote a *History of Sicily under the Government of the Arabs*. Various sections of Arabic histories relating to the Crusades have been translated into French. On the dominion of the Arabs in Spain, several works were written by Abul-Kasem of Cordova (died in 1139), Temini, and others. For extended notices we may refer the student of Arabic literature to the translations by Quatremère and others. Von Hammer began a history, which comes down only to the 13th c. (7 vols., 1850–56). See Zenker's *Bibliotheca Orientalis*.

Arabian theology and jurisprudence are intimately connected, and both founded on the Koran, but are by no means so simple and uniform as is generally supposed. Speculation first began to prevail during the Ommaiade dynasty, and the Aristotelian philosophy to be studied by the Arabs. As a consequence the vague statements of the Koran were soon variously interpreted, and a host of sects gradually arose. Of these, four only are regarded as orthodox, leaving not less than seventy-two heretical, whose discordant tenets are stated in the work of Sharistani (edited by Cureton, London, 1842). The four orthodox sects are: the Hanefites, who do not reject tradition, but subordinate it to rationalism; the Shafites, who entirely refuse the aids of reason and philosophy in their treatment of theology; the Kambalites and the Malechites, who allow speculation on points where there is no tradition. The collection of traditions known as the *Sunna* gives an account of the sayings and doings of Mohammed, and, though pedantic in its details, is in substance more valuable than the Koran. The interpretation of the Koran constitutes the principal part of education in theological jurisprudence. The most celebrated of the commentators are Samakhshari and Baidhawi. The conquest of Algiers has rendered the study of Arabic or Mohammedan law indispensable to the French. The result is, that several most important works on that subject have appeared of late from the Paris press, such as *Précis de Jurisprudence Musulmane, selon le Rite Maléchite par Khalil-Ibn-Ishak* (translated by Perron, Paris, 1848), and *Législation Musulmane Sunnite, Rite Hanéfi* (Paris, 1848).

Arabian philosophy, which was of Grecian origin, held the same relation to the Koran as the Scholasticism of the middle ages did to the Christian Scriptures—that is, it was regarded as the servant of faith. The chief study of the Arabs was the writings of Aristotle, who became known in Spain, and subsequently in all western Europe, through translations from Arabic into Latin; though the Arabs themselves only knew the Greek philosopher in translations made during the time of the Abassides. Especial attention was paid to logic and metaphysics. The most distinguished of their philosophical writers are: Alkendi of Basra, who flourished about the beginning of the 9th c.; Alfarabi, who wrote a work on First Principles in 954; Avicenna (died 1036), who combined the study of logic and metaphysics with that of medicine, and made considerable progress in chemistry, nosology, and medical botany;

Ibn-Yahya, who acquired a high reputation as an original thinker; Alghazali (died 1111), who wrote a book entitled *The Destruction of all Idolatrous Philosophical Systems*; Abubekr-ibn-Tofail (died 1190), who taught in his philosophical novel *Hai-ebn-Yokdan* (edited by Pococke, Oxford, 1671) the development of men from animals; and his pupil, Averrhoes, greatly esteemed as an expositor of Aristotle. For an account of these men and their systems, see *Sur les Ecoles Philosophiques chez les Arabes*, &c., by Schmölders (Paris, 1842), and Ritter's *Ueber unsere Kenntniss der Arab. Philosophie* (Gött. 1844); also Renan's *Averrois et l'Averroisme* (1850).

Many of these illustrious Arabian philosophers were also physicians. The great skill which the Arabs acquired in their knowledge of the uses and properties of medicinal herbs, is traced by Humboldt to their geographical position. The southern part of Arabia 'is characterized by the highly developed vital force pervading vegetation, by which an abundance of aromatic and balsamic juices is yielded to man from various beneficial and deleterious substances. The attention of the people must early have been directed to the natural products of their native soil, and those brought as articles of commerce from the accessible coasts of Malabar, Ceylon, and Eastern Africa. Hence arose the wish to distinguish carefully from one another these precious articles of commerce, which were so important to medicine, manufacture, &c. . . . The science of medicine, when considered with reference to its scientific development, is essentially a creation of the Arabs, to whom the oldest, and, at the same time, one of the richest sources of knowledge—that of the Indian physicians—had been early opened. Chemical pharmacy (see ALCHEMY) was created by the Arabs, whilst to them are also due the first official prescriptions regarding the preparation and admixture of different remedial agents—the dispensing recipes of the present day. These were subsequently diffused over the south of Europe by the School of Salerno' (Humbolt's *Cosmos*, vol. ii. p. 581, Bohn's translation.) Pharmacy and *materia medica* naturally led to botany and chemistry. For three centuries—from the 8th to the 11th—a rich scientific culture prevailed. Schools of philosophy and medicine sprung up at Jondisahur, Bagdad, Ispahan, Firuzabad, Bokhara, Kufa, Basra, Alexandria, Cordova, &c.

In all departments of medical science a great advance was made, except in anatomy. The reason of this exception lies in the fact, that the Koran forbids the dissection of bodies. The most famous writers on medicine are Aharun, Alkendi, Avicenna (q. v.), who wrote the *Canon of Medicine*, for a long time the only hand-book on the subject; Ali-ben-Abbas, Ishak-ben-Soleiman, Abulkasem, Averrhoes (q. v.), who wrote a complete system of medicine; Ali-ben-Isa, &c.

In mathematics, the Arabs made great advances by the introduction of the numerals and mode of notation now in use, of the sine instead of the chord (in trigonometry), and of a more extended application of algebra. Astronomy was zealously studied in the famous schools and observatories of Bagdad and Cordova. Alzahan wrote upon optics; Nassireddin translated the Elements of Euclid; Jeber-ben-Afla furnished a commentary on the trigonometry of Ptolemy, &c. The *Almagest* or System of Astronomy by Ptolemy, was translated into Arabic by Alhazi and Sergius as early as 812. In the 10th c., Albaten observed the advance of the line of the apsides in the earth's orbit; Mohammed-ben-Jeber-al-Batani, the obliquity of the ecliptic; Alpetragius wrote a theory of the planets; and Abul-Hassan-Ali, on astronomical instruments.

Besides these advances in the solid branches of knowledge, the genius of the Arabs continually flowered into poetry. Numerous poets sprung up in all lands where the children of the desert had carried their irresistible faith. Their verse, however, was not like the rude, simple minstrelsy of a purely patriarchal people; it gradually allied itself to the prevailing culture, and took, especially in the golden epoch of Arabian civilization, a highly artistic form. Motenebbi, Abul-Ala, and others acquired a great reputation for their delicate Idylls; Busiri, for his eulogy of Mohammed; Hamadâni, as the first to introduce novels in verse (of which he wrote 400 under the title of *Makâmât*), a style of literature which was brought to perfection by Hariri; Azzeddin, for his ingenious allegorical poem, 'The Birds and the Flowers.' Besides these, a singularly wild and fantastic prose literature made its appearance, in which the craving for the wonderful and gorgeous, so characteristic of the restless, adventure-loving Arabs, was richly gratified. Romances and ledgendary tales abounded. The most famous of these are: *The Arabian Nights' Entertainments* (q. v.), *The Exploits of Antar*, *The Exploits of the Champions*, and *The Exploits of the Hero*. In fact, with the exception of the drama, there was no sort of poetry which the Arabs did not attempt. The effect of this universality and richness in Arabic literature was, that it exercised a powerful influence on modern European poetry. The tales of fays, charms, sorceries, and the whole gorgeous machinery of enchantment passed into the poetry of the West. During the middle ages of European history, several of the most popular and widely-spread books were of Arabic origin; such as, *The Seven Wise Masters*, and *The Fables of Bidpai*, though the Arabians themselves borrowed largely from the Persian stories and the Greek fables.

All this culture of the early ages of Mohammedanism presents a strong contrast to the ignorance which now prevails among the Arabs. The brutal fanaticism of the Turks nipped the blooming promise of the East; sunk in stupid indolence, the peoples await in apathetic resignation their deliverance and return to higher modes of life. Literature now furnishes nothing worthy of notice. Learning spends itself principally in commentaries and scholia, in scholastic discussions on the subject-matter of dogmatics and jurisprudence, and in tedious grammatical disquisitions concerning the old Arabic speech, generally acute and subtle, but always unprofitable and unenlivening. The swift and mobile genius of the East has departed, and pedantic dulness has usurped its place. There are 'Dryasdusts' even in the desert. A few modern writers have attempted, with more or less success, to imitate European forms of thought and sentiment. Of these may be mentioned, Michael Sabbagh of Syria (*La Colombe Messagère*, Arabic and French, Paris, 1805); the Sheik, Refaa of Cairo (*The Broken Lyre*, Paris, 1827; *Manners and Customs of the Europeans*, Cairo, 1834; *Travels in France*, Cairo, 1825); and Nasif-Effendi, of Beirut, who wrote the critical observations in De Sacy's edition of Hariri (*Epistola Critica*, Leipsic, 1848).

The Arabic also possesses a Christian and Jewish literature, which, however, is chiefly ecclesiastical. Its principal ornaments are Eutychius, Elmakin, and Abulfaraj. Translations of the Old Testament were made not from the Hebrew, but from the Septuagint, or from Latin versions. In the middle ages, the Spanish Jews employed Arabic for their learned compositions; and several of the most important works of Moses Maimonides, &c., were originally written in that tongue.

The Arabic *language*, it has been remarked, is at once both *rich* and *poor*. It is necessarily destitute of innumerable words describing those ideas and objects which only civilization can develop or produce; but, on the other hand, the rich and nimble fancy of the Arabians has multiplied, to an almost incredible extent, the synonyms of their desert-tongue, so that in some cases several hundreds of expressions are found for the same thing. The Arabic belongs to the so-called Semitic family of languages, among which it is distinguished for its antiquity and soft flexible grace. It is divided into two dialects—a northern and southern. The former, through the instrumentality of the Koran, became the predominant language of literature and commerce throughout the whole extent of the Arabian dominions; the latter, called the Himyarite, although in all probability the source of the Ethiopic language and writing, is known as yet only by a few inscriptions, &c. The earliest Arabic grammarian is Abul-Aswad-al-Duli, who flourished under the fourth calif, Ali. The first who reduced the prosody and the metre of the Arabian poets to a system, was Khalil-ben-Ahmed-al-Ferahidi of Basra.

Al-Jauhari, who died in 1009 A.D., drew up a dictionary of the pure Arabic speech, which he entitled *Al-Sihah* ('Purity'), and which is held in high estimation to this day. Mohammed-ben-Yakub-al-Firuzabadi, who died in 1414, was the author of an Arabic Thesaurus, entitled *Al-Kamus* ('The Ocean'), which is the best lexicon in the language, and has consequently been translated into Persian and Turkish. Jordshani has explained, in alphabetical order, the meaning of the technical terms used in Arabic art and science. His work was published by Flügel (Leip. 1845), under the title of *Definitiones*. Meidani made a large collection of Arabic 'saws,' apophthegms, &c., which was published by Freytag, Bonn, 1838. Through the conquests of the Arabs in Sicily and Spain, their language became known in Europe; but notwithstanding the numerous traces of its influence in various European tongues, it became forgotten after the expulsion of the Moors from Spain. The first European scholars who earnestly took up the subject were the Dutch, in the 17th c.; after them, the Germans, French, and English. It is now, however, beginning to be considered a necessary part of a learned theological education. The modern Arabic of the inhabitants is substantially the same as that of the Koran, but the lapse of time has gradually introduced changes in the grammatical forms of the language, as in other languages. Wright's *Arabic Grammar* (new edition) is one of the best extant; Lane's *Arabic-English Lexicon* is a standard work; and Badger's *English-Arabic Lexicon* (1881) is also excellent. The grammatical and lexicographical works of Caspari, Freytag, Fleischer, De Sacy, and Boethor, are most important.

Arabic Writing.—Like all Semitic writing, this proceeds from right to left. It is borrowed from the old Syriac, and was probably introduced into Arabia by Christian missionaries about the time of Mohammed. In its oldest form it is called Kufic, from the town of Kufa, on the Euphrates, where the transcription of the Koran was busily carried on. Its characters are rude and coarse, and it has particular symbols for only sixteen of the twenty-eight Arabic consonants. This writing, nevertheless, continued to be employed for 300 years, and for coins and inscriptions even later; but in the 10th c. it was displaced for common purposes by a current hand

writing, the *Neskhi*, introduced by Ebn Mokla. This is the character still in use. In it, the consonants which resemble each other are distinguished by points, and the vowels by strokes over and under the line

ARABIAN NIGHTS' ENTERTAINMENTS, a collection of Oriental tales, first made known to Europe by Antony Galland, a French orientalist, under the title of *The Thousand and One Nights, Arabian Stories, Translated into French*. They were published at Paris, in 12 volumes 12mo, from 1704 till 1717, and were received by many as the production of the genius of the translator himself, rather than the collection of *an unknown Arabian author*, as Galland had stated in his dedication. Oriental scholars did not hesitate at first to declare against their authenticity, and denounce them as forgeries. Having taken only an obscure place in the literature of the East, and their style unfitting them from being classed among models of eloquence or taste—having no object of a religious, moral, or philosophical kind in view, while the manners and customs delineated in them were different from all received ideas of those of the Moslem nations—their success took the critics by surprise. The work became highly esteemed by the public; it filled Europe with its fame; it had abundance of readers, and no lack of editors. Few books have been translated into so many different languages, and given delight to so large a number of readers. It may be said that, in these Oriental tales, there has sprung up a new branch of literature, for their influence on the literature of the present day is easily discernible. Here are found, depicted with much simplicity and great effect, the scenes of the town-life of the Moslem. The prowess of the Arab knight, his passion for adventure, his dexterity, his love and his revenge, the craft of his wives, the hypocrisy of his priests, and the corruptibility of his judges, are all dramatically delineated—far more vividly represented, in fact, than is possible in a book of travels; while gilded palaces, charming women, lovely gardens, and exquisite repasts captivate the senses of the reader, and transport him to the land of wonder and enjoyment. Besides entertaining the mind with the kaleidoscopic wonders of a teeming and luxurious fancy, which is their most obvious merit, they present a treasure of instruction upon life in general, and Oriental life in particular. And this is undeniable, notwithstanding the fact, that the aspects of society they depict are far from standing high in the social scale, either as to civilization or morality. In them no story is to be found that will rank in morality with the story of Joseph and his brethren, simply because the Moslem faith will not admit of that, any more than the decline of Arab civilization at the time the tales must have been originally promulgated. Indeed, the first translator, having a conviction of a demoralizing tendency of this kind, avoided giving several objectionable parts of some of the stories. The thread of the narrative in these entertainments is generally simple and clear, often leading into the departments of fable, and occasionally into the regions of the supernatural and the domains of popular superstition. The tales, even when long, are not tiresome; for they consist of shorter stories branching off the main one, or rather encased within it, the smaller within the larger, and perhaps a smaller within that, like the little boxes used by conjurors.

For many years all doubt as to the authenticity of the *Thousand and One Nights* has been dispelled. Several MS. copies have been found and no less than four editions of the Arabic text have been published. A more thorough acquaintance with medieval and modern Arab life has proven the genuineness of the stories, and the truthfulness of their general representation of the mind of the Moslem. In them there are evident signs of a declension from a refined and superior civilization; the marvelous and supernatural is predominant; despotism in all its forms is manifest; and a prevalent falsity and insincerity of character visible, not only in the narrative, but in the tone of common conversation, replete as it is with oaths and asseverations.

The origin of the work—where and by whom written—is still involved in mystery. According to some, the tales are susceptible of a threefold division. The most beautiful, and in fancy the richest, appear to have come from India, the cradle of story and fable; the tender and often sentimental love tales seem of Persian origin; while the masterly pictures of life, and the witty anecdotes, claim to be the product of Arabia. Throughout, however, everything is comformable to the character and customs of the town population of Arabia, and to the Mohammedan faith. The Baron De Sacy, in 1829, thus stated his opinion on these points. Speaking of the work he says: 'It appears to me that it was originally written in Syria, and in the vulgar dialect; that it was never completed by its author; that, subsequently, imitators endeavored to perfect the work, either by the insertion of novels already known, but which formed no part of the original collection, or by composing some themselves, with more or less talent, whence arise the great variations observable among the different MSS. of the collection; that the inserted tales were added at different periods, and perhaps in different countries, but chiefly in Egypt; and, lastly, that the only thing which can be affirmed, with much appearance of probability, in regard to the time when the work was composed, is—that it is not very old, as its language proves, but still that, when it was brought out, the use of tobacco and coffee was unknown, since no mention of either is made in the work.'

Galland's French edition was speedily translated into all the languages of Europe; edition following edition with great rapidity, some of them with enlargements, and others with modifications. A new English translation from the Arabic appeared in 1839 (new issue, edited by S. Lane Poole, in 1882). It was the work of E. W. Lane, a gentleman whose long residence in Egypt enabled him to acquire so thorough a knowledge of the language, manners and customs of the Egyptian Arabs, as furnished not only a superior version, but a series of notes embodying a portraiture of Egypto-Arabian life at once faithful and vivid. A complete translation by Payne, assisted by Captain Burton, was announced in 1882; and a translation of the tales not in Galland or Lane, by Kirby in the same year.

The popularity of this wonderful book has given rise to hundreds of imitations. Among the best of the French are—*Les Mille et Un Jours, Mille et Une Quart d'Heures*, and the *Contes d'un Endormeur;* perhaps the best of the English imitations is the *Tales of the Genii*, by Sir Charles Morell; while the best of the German appears to be one got up from the Perso-Arabic, the *Faraj bâd el Shidda* (Joy after Sorrow), a popular work, and repeatedly published.

ARABIAN NUMERALS or CIPHERS—the characters 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Properly, they should be styled Hindu or India' Numerals, for the Arabs borrowed them, along with the decimal system of notation, from the Hindus. According to one account, Gerbert (afterwards Sylvester II.) learned the use of them from the Moors in Spain in the 10th c.; others think it more probable that Leonardo of Pisa (see ALGEBRA) first introduced them from the East into Italy about 1202. Yet the use of them was long in making its way, and was not general before the invention of printing. Accounts continued to be kept in Roman numerals up to the 16th c. See NUMERALS and NUMERATION.

ARABIAN SEA, anciently *Mare Erythræum*, or the *Red Sea*, that bay of the Indian Ocean which lies between India on the east and Arabia on the west. Its northern boundary is Beloochistan; while its natural and convenient limit on the south is a line drawn from Cape Comorin in Hindustan to Cape Guardafui in Africa, and thence continued along the coast to the Strait of Bab-el-Mandeb. In E. long. it extends from 43° 32′ at Cape Bab-el-Mandeb, to 77° 30′ at Cape Comorin; and in N. lat. from 8° 5′ at Cape Comorin, to about 26° at the south-west point of Beloochistan. Including its two great arms, the Red Sea proper and the Persian Gulf, it stretches far both north and west. By the former it is, since the opening of the Suez Canal in 1869, connected with the Mediterranean Sea. In this last aspect the A. S. long occupied a most prominent place in the commerce of the world—a place which, after having lost it for more than 300 years through the doubling of the Cape of Good Hope in 1497, it has lately in a great measure regained, through the enterprise of English capitalists, the Egyptian government, and the perseverance of M. Lesseps.

In the history of navigation, also, the A. S. proper is specially entitled to notice. It was along its northern shores that Nearchus, the admiral of Alexander of Macedon, conducted the first well authenticated voyage, on a large scale, of exploration and discovery; and across it the trade-winds, blowing alternately from north-east and south-west, were wont to waft the Greeks of Egypt, without either chart or compass, about the commencement of the Christian era. See SUEZ CANAL.

A'RABINE is the essential principle of gum-arabic (q. v.), and is obtained pure by adding alcohol to a solution of gum-arabic in water, when the A. is precipitated in white flocculi.

A'RACAN, or ARRACAN, a city of British Burmah, and, till lately, the capital of the province of the same name. It is situated about 50 miles from the sea, in lat. 20° 42′ N., and long. 93° 24′ E. Lying in a swampy valley which, on almost every side, is confined by hills, A. is subject to febrile disease in all its forms. Previous to the first Burmese war—the occasion which brought it under British dominion—it is said to have contained 18,000 houses; while in 1835, after it had ceased to be the seat of government, the population had sunk to 8000. In 1877 the inhabitants of the town hardly exceeded 2000. A., now known as MRO-HOUNG ('old town'), is, in fact, interesting only from its old associations. The most striking memorial of antiquity is its dilapidated fort, consisting of three concentric walls such as only a powerful state could have constructed. Beyond the limits, too, of this citadel, the town, as a whole, appears to have been surrounded by a circumvallation of 9 miles in length, composed partly of steep and rugged eminences and partly of artifical works. These defences, which are believed to be several centuries old, the British carried by assault on 1st April 1825.

A'RACAN, or ARRACAN, the most northern division of British Burmah, is bounded on the N. by Chittagong, on the E. by Ava, on the S. by Pegu, and on the W. by the Bay of Bengal. It extends in N. lat. from 18° to 21° 33′, and in E. long. from 92° 10′ to 94° 50′. Its extreme length is 290 miles; and its breadth, from 90 miles at the N., gradually diminishes towards the S., so as to yield an average of little more than 45. The area is 14,526 sq. miles. A range of mountains, nearly parallel with the line of coast, the highest point 7000 feet above the sea-level, separates A. from Pegu and Upper Burmah. The soil of the northern portion of A. is alluvial; but the country is hilly, difficult of access, and covered with forest. The province is divided into four districts—Akyab, Sandoway, Ramree, and North Aracan. The British conquest of the province has been highly beneficial in every way. In 1825—1826, the population was only about 100,000; in 1831, it was 173,000, showing an increase of 73 per cent. in 5 or 6 years; in 1839, it had increased to 248,000; before 1854, it was upwards of 321,000; and in the returns for 1872, it is stated to be 483,363, or 33 mouths to the square mile. With these results the face of the country and the state of trade fully correspond. Rice and salt constitute the chief articles of exportation; the others are tobacco, sugar, wood, oil, betelnuts, buffalo hides and horns, elephants' teeth, dried fish, and edible birds'-nests. The imports consist of British woollens, muslin , cutlery and glass.

There have been various indications of a volcanic nature in A. In the islands of Ramree and Cheduba there exist springs of muddy water which emit bubbles of gas. Two severe earthquakes have taken place respectively in 1763 and 1833—the latter having thrown up in several places, muddy water of a sulphurous smell, and also, on one particular spot, vapor and flame to the height of several hundred feet. Of the mineral resources very little is known. Iron ore has been found, but not in such quantity and quality as to come into profitable competition with British iron. Coal also exists, which is understood to be good, but, from whatever cause, it has not been extensively worked. There are no lakes in the province, nor are there any rivers of much importance, though the Aeng, which appears to be the most available among them, is said to be navigable during spring-tides to 45 miles from its mouth.

ARACA'RI, or ARICARI (*Pteroglossus*), a genus of birds closely allied to the Toucans (see TOUCAN), and differing from them chiefly in the somewhat smaller bill, which is not so thick as the head. They are generally also of smaller size, and the prevailing color of their plumage is green, often varied with brilliant red and yellow. Like the toucans, they are natives of the warm parts of South America.

ARA'CEÆ. See ARUM.

ARACHIS, a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, natives of the warm parts of America, of which, until recently, the only known species was the A. *hypogæa*, sometimes called the underground kidney-bean, and more frequently the ground-nut. It also receives the names of earth-nut, American earth-nut, and mandubi. It is an annual plant, with hairy pinnate leaves, which have four leaflets. The flowers are yellow, the standard veined with red. After flowering, the flower-stalks elongate and bend towards the earth, into which the pods penetrate, ripening underground. The pods have a lining of a sort of net-work, and generally contain two, three, or four seeds, which are about the size of a hazelnut, of a sweet taste, with a little of the flavor which belongs to most kinds of pulse.

Arachis hypogæa.

This plant is now cultivated in all the warm regions of the globe, and its usefulness is such that its cultivation is likely to extend. It was introduced from Peru into Spain, and thence into France. It succeeds in favorable situations even in the middle of France, where it is sown after all danger of frost is thought to be over, and yields from eighty to one hundred fold. Its cultivation is so general in the western parts of Africa, and even in the interior, that doubts have been therefore entertained of its American origin, of which, however, the eminent botanists seem to be quite satisfied. The seeds are sometimes eaten raw, but more generally boiled or roasted. In New Spain, and in some parts of Africa, they form one of the principal articles of food; but the importance of the plant is chiefly owing to the fixed oil contained in them, which is used for the same purposes as olive or almond oil, and is quite equal to olive oil either for lamps or for the table. This oil is also much used in Spain in the manufacture of soap and of chocolate. A bushel of the seeds yields one gallon of oil, when expressed cold; if heat is applied, the quantity is greater, but the quality inferior. It has become a considerable article of commerce. The *A. hypogæa* delights in a light and sandy, but at the same time fertile, soil. The seeds are dug up as roots or tubers usually are. The root has qualities resembling those of liquorice, for which it is sometimes used. The herbage is good for cattle. Several new species of this genus have been discovered in Brazil.

ARA'CHNIDA, or ARACHNIDES (Gr. *arachne*, a spider), a sub-class of Tracheate Arthropoda (q. v. under ARTICULATA), including scorpions, spiders, mites, &c., and first separated by Lamarck from the *Insecta* of Linnæus. The body is usually divided into cephalo-thorax and abdomen, the latter destitute of appendages, the former possessing six pairs, of which the posterior four pairs are walking limbs, thus furnishing a ready means of distinction from insects, which have three pairs only. The two anterior pairs known as cheliceræ and pedipalpi are of various forms, the former usually chelate or sub-chelate; the latter chelate, ambulatory, or antenniform. Respiration is effected by means of tracheal tubes, or by pouches—the so-called respiratory sacs.

Those A. with segmented abdomen are termed *Arthrogastra*, and include five families, of which *Scorpio*, *Thelyphonus*, *Chelifer*, *Galeodes*, and *Phalangium* are types. These show a distinct gradation to true spiders or *Araneina*, which are easily recognized by their unsegmented abdomen usually furnished with spinning glands, opening by four to six posterior papillæ, and by their sub-chelate cheliceræ and ambulatory pedipalpi. The mites and ticks (*Acarina*) have the unsegmented abdomen continuous with the thorax, and the cheliceræ and pedipalpi are modified into a sucking or piercing apparatus. The *Linguatulida* (*Pentastomum*), the *Tardigrada*, and the *Pycnogonida*, have usually been reckoned as highly modified Arachnides, somewhat akin to the *Acarina;* the most recent anatomists, however, tend to remove them from the A. altogether. On the other hand, it has lately been clearly shown that the Silurian *Eurypterida*, and the ancient, but still persistent *Limulus* (see KING-CRAB), must be reckoned rather as Arachnides than as Crustaceans, and thus the two great divisions of the Arthropoda, the Tracheata and the Branchiata, are shown to have diverged in palæozoic times. See ACARUS, MITE, SCORPION, SPIDER and TICK; also Huxley's *Anat. of Invertebrated Animals*, Balfour's *Comparative Embryology*, and Cambridge's memoir in *Encyc. Britannica*, ninth edition.

ARA'CHNOID MEMBRANE, one of three coverings of the brain and spinal cord, is a thin glistening, serous membrane, which, by its parietal layer, adheres inseparably to the dura-mater on its outer side, and more loosely to the pia-mater which is between it and the brain substance. Between the pia-mater and the A. M. in some situations there are considerable intervals (sub-arachnoid spaces); they are filled with a fluid named cerebro-spinal, the presence of which is necessary to the proper action of the nervous centers. See CEREBRO-SPINAL FLUID—PIA-MATER.

ARAD, a town in the district of A. in Upper Hungary. It is situated on the right bank of the Marosh, an affluent of the Theiss, and is also styled Old A., to distinguish it from New A., which is built on the opposite side of the river. A. has a population (1880) of 35,718, including many Jews, who are very wealthy. It carries on a large trade in corn, tobacco, &c., and was at one time the greatest cattle-market in Hungary, and is even yet only inferior to Pesth and Debreczin. During the 17th c., it was often captured, and at last destroyed by the Turks. Its new fortifications, erected in 1763, made A. an important position in the revolutionary war of 1849, when it was occupied for a considerable time by the Austrian general Berger, who capitulated here in July 1849. From this place Kossuth issued his proclamation of August 11, 1849, in which he expressed in impassioned terms his despair of the Hungarian cause for the present. After the catastrophe of Világos, on the 17th August, A. was surrendered to the Russians through the treachery of Görgey.

NEW A., a town in the Banat of Temesvar, contains (1880) 5141 inhabitants, including many Germans, who are the principal persons in the place. The district or province of A. has an area of 1700 sq. m., and contains (1886) 303,964 inhabitants. The eastern district is occupied by a branch-chain of the Carpathian mountains, which contain marble quarries, and mines of copper and iron; the west is level; and produces wheat, maize, and several varieties of wine, as well as abundance of fruits. The inhabitants are chiefly Wallachians.

ARÆO'METER. See AREOMETER.

A'RAFAT, MOUNT, or *Jebel-er-'rahme* ('Mountain of Mercy'), is a granite hill about 15 miles S.E. of Mecca, which is believed by

the Mohammedans to be the spot where Adam, conducted by the angel Gabriel, met again his wife Eve, after a punitive separation of 200 years, on account of their disobedience in Paradise. It is not above 200 feet high, but its circuit is a mile and a half. Its importance since the time of Mohammed arises from its being the scene of a yearly procession of the faithful who visit Mecca. Burckhardt, who witnessed the procession of 1814, states that not less than 70,000 people were present, and that at least forty different languages were spoken. The principal part of the religious ceremony of this pilgrimage is a sermon, the hearing of which entitles all to the name and privileges of a Hadji.

A'RAGO, Dominique, a celebrated French astronomer and natural philosopher, was born February 26, 1786, at Estagel near Perpignan, in the department of the Eastern Pyrenees. At the early age of seventeen, he entered the Polytechnic School at Paris, where the spirit, promptitude, and vivid intelligence he exhibited in his answers to the questions of Legendro, excited the admiration of every one. In 1804, he became secretary to the Observatory at Paris. Two years afterwards, he was engaged, with Biot and others, by the French government, to carry out the measurement of an arc of the meridian, which had been commenced by Delambre and Méchain. A. and Biot had to extend it from Barcelona to the Balearic Isles. The two *savans* established themselves on the summit of Mount Galatza, one of the highest of the Catalonian branch of the Eastern Pyrenees. Here they lived for many months, communicating by signals with their Spanish collaborateurs, across the Mediterranean in the little isle of Iviça, though many a night the furious tempests destroyed their hut along with the labor of weeks. Visitors they had none, except two Carthusian monks, who were wont to come up and spend a portion of the evening in converse with them. Before A. had completed his calculations, Biot had returned to France, and war had broken out betwixt the two nations. A. was now held to be a spy; his signals were interrupted; and with great difficulty he succeeded in making his escape to Majorca, where he voluntarily imprisoned himself in the citadel of Belver, near Palma. At last he obtained his liberty on condition of proceeding to Algiers, which he did; but was captured, on his return to France, by a Spanish cruiser, and sent to the hulks at Palamos.

He was, however, liberated after a time, and sailed once more for France; but almost as he was entering the port of Marseille, a tempest arose which drove the vessel across the Mediterranean all the way to Algiers. The former dey, to whose demands he had owed his liberation from the hulks, was dead; his successor, a ferocious tyrant, placed him on his list of slaves, and intended to employ him as interpreter. After some time, he was released at the request of the French consul, and, narrowly escaping another capture by an English frigate, finally found his way to Marseille in July 1809. As a reward for his suffering in the cause of science, the Academy of Sciences suspended its standing rules in his favor; and though only twenty-three years of age, he was elected member in the place of Lalande, who had just died, and was appointed Professor of Analytical Mathematics in the Polytechnic School. Afterwards his attention was devoted more to astronomy, magnetism, galvanism, and the polarization of light. In 1811, he read a paper to the Academy, which may be considered the foundation of 'chromatic polarization.' In 1812, he commenced his extraordinary course of lectures on astronomy, &c., which fascinated all Paris—the savans, by their scientific rigor and solidity; the many, by their brilliancy of style. In 1816, along with Gay Lussac, A. established the *Annales de Chimie et de Physique*, and confirmed the truth of the undulatory theory of light. In the same year he visited England for the first time, and made the acquaintance of various persons distinguished in science, especially Dr. Thomas Young. In 1818 appeared his *Recueil d'Observations géodésiques, astronomiques, et physiques*. In 1820, he turned his facile and inventive genius into a new channel, and made several important discoveries in electro-magnetism. Oersted had shown that a magnetic needle was deflected by a voltaic current passing along a wire. A. pursued the investigation, and found that not only a magnetic needle, but even non-magnetic substances, such as rods of iron or steel, became subject to deflection also, exhibiting, during the action of the voltaic current, a positive magnetic power, which, however, ceased with the cessation of the current. Some time after, he demonstrated that a bar of copper, and other non-magnetic metals, when moved circularly, exert a noticeable influence on the magnetic needle. For this discovery of the development of magnetism by rotation, he obtained, in 1825, the Copley Medal of the Royal Society of London; and in 1834, when he again visited Great Britain, especial honors were paid to him by the friends of science in Edinburgh and Glasgow. Four years previous to this second visit to Great Britain, he had received the honor he most coveted—that of being made Perpetual Secretary of the Academy. It was while holding this office that he wrote his famous *éloges* of deceased members, the beauty of which has given him so high a place among French prose-writers.

As a politician, also, his career was remarkable. He was a keen republican, and took a prominent part in the July revolution (1830). In the following year he was elected by Perpignan as member of the Chamber of Deputies, where he occupied a position on the extreme left. In the February revolution of 1848, he was chosen a member of the provisional government, and appointed minister of war and marine. In this position he resisted the proposed measures of the Socialist party, regarding the constitution of the United States as the beau-ideal of democracy. His popularity in his own province was the means of preventing the discontented population of the East Pyrenees from proceeding to lawless and violent measures. On the question of the presidency, A. opposed Louis Napoleon, declared himself against the policy of the new ministry, and refused to take the oath of allegiance after the *coup d'état* of 1852. The emperor, in a letter, paid a high eulogium on his talents and virtues, and made a special exception in his case. A. died October 3, 1853. In his general character A. was sociable, energetic, and fond of fame. He was the intimate friend of Alexander von Humboldt.

Arago, Jacques Étienne Victor, brother of the great savant, was born in 1790. In 1817 he accompanied the expedition, under Freycinet, in a voyage round the world. Afterwards, we find him engaged, first at Bordeaux, and then at Toulouse, in several branches of light literature, industriously writing, in company with other scribes, a multitude of vaudevilles, besides publishing several poems and romances. In the year 1835, he undertook the management of the theater at Rouen; but having become afflicted with blindness, he was compelled to resign this post in 1837. To his early voyage round the world, we owe two very pleasant books of travel: *Promenade autour du Monde* (Paris, 1838); *Souvenir d'un aveugle. Voyage autour du Monde* (Paris, 1838). In 1849, though deprived of sight, he formed a company of speculators; placed himself at the head of it, and departed for California, to search for gold on a large scale. His companions mutinied, and left him, deserted and disappointed, at Valparaiso. On his return he published his painful experiences, under the title, *Voyage d'un aveugle en Californie et dans les Regions aurifères* (Paris, 1851). He died, January 1, 1855.—A., Étienne, another brother of the astronomer, was born 1802, and is well known in France as a popular *feuilletonist* in the *Siècle*, and other journals. He held an appointment under the provisional government, as director-general of the post-office, in which he displayed great vigor, promptitude, and sense, and achieved several postal reforms; was elected member of the National Assembly; was compromised by the insurrection in June, and sentenced to exile for life. In 1859 he returned to France; and at the time of the Franco-Prussian war was mayor of Paris—an office which he resigned in November 1870—A. Jean, another of the brothers A., born 1789, died 1836, was general of the republican army in Mexico, and wrote, in Spanish, a history of Mexico.

A'RAGON, once a kingdom, then a province in the N.E. of Spain, lies between 40° 2′ and 42° 54′ N. lat., and long. 2° 10′ W. and 0° 45′ E. Greatest length from north to south, 190 m.; breadth, 130. Area, 17,900 sq. m. Pop. (1877) 894,727. It is bounded, N. by the Pyrenees, separating it from France; W., by Navarre, and Old and New Castile; S., by Valencia, and part of New Castile; and E., by Catalonia, and part of Valencia. The river Ebro, which descends from the northern heights of Old Castile, flows through the middle of A. in a south-easterly direction, receiving numerous tributaries both from the lofty regions of the Pyrenees, and from the Sierras in the south; of the former, the principal are—the Noguera, which forms the boundary-line between Aragon and Catalonia, the Essera, and the Gallega; of the latter, the principal are—the Guadalope, the San Martin, and the Salon. The province is naturally divided into the level country, along the Ebro, and the northern mountainous district of Upper Aragon. The central plain is sterile, poorly supplied with water, and intersected by deep ravines (*barancos*). Agriculture is here confined to the raising of maize vines, and olives; but on the sides of the Ebro, where water abounds, rice and other grains are abundantly produced; and in the valleys of Upper A., which are at once the most beautiful and fertile of all the Pyrenean valleys, we find a splendid vegetation, and a soil that enables the inhabitants, in spite of the wretchedness of their agriculture, to grow considerable quantities of wheat, rye, maize, barley, &c. The climate of the province is various; comparatively cool in the mountain-districts, but often very sultry on the plains. Spurs of the Pyrenees strike down into the province a long way. It is between these ridges that the rich valleys lie, some of them upwards of 20 miles long. The slopes of the hills are clothed with forests of oak, beech, and pine, and the felled timber is floated down the rivers into the Ebro, and thence down to Tortosa at its mouth. The minerals of the province are copper, lead, iron, salt, alum, saltpetre, coal, and amber. The manufactures are inconsiderable. A., peopled by a brave, active, enduring, but obstinate race, has frequently been the arena of sanguinary warfare. It early became a Roman province; and, on the

fall of the Empire, passed into the hands of the West-Goths, but was conquered by the Moors in the beginning of the 8th c. The rulers of A., after it had been recovered from the Moors, and united with Catalonia (1137), became powerful; obtained possession of the Balearic Isles in 1213, of Sicily in 1282, of Sardinia in 1326, and of Naples in 1440. By the marriage of Ferdinand with Isabella, heiress of Castile, in 1469, the two States of A. and Castile were united, and formed the foundation of the great Spanish monarchy. After Ferdinand's death in 1516, the union of the states was made permanent. In the war with the French, 1808—9, Saragossa, the capital of A., was remarkable for its heroic defence under Palafox; and in recent Spanish wars, the people of A. have displayed the same courage which marked their conduct on that memorable occasion. Upper A. was on the side of the queen; but lower A. generally adhered to the party of Don Carlos. The province is now divided into three departments—Saragossa, Teruel, and Huesca. The chief towns are Saragossa, Calatayud, Huesca, and Teruel. See SARAGOSSA, &c.

ARAGO'NA, a town of Sicily, 8 miles north-north-east from Girgenti. It is a poor town, and stands in the midst of bare green downs; but the hills above it are clothed with pines, cypresses, olives, almonds, and carobs. The only object of interest is the old castle of the princes of Aragona, a huge building, in the Renaissance style, which has fallen much into decay. Pop. 7947.

ARAGUAY', a large river of Brazil, rising in S. lat. 18° 10′ and W. long. 51° 30′. Like most of the considerable rivers of the country, it flows towards the N. After a course of about 1000 miles to San Joao, it there joins the Tocantins, which again, after a northerly course of 300 miles more, mingles its estuary with that of the Amazon round the Isle of Marajo. Like most of the rivers in this part of Brazil, the A. is of difficult navigation, being frequently interrupted by rapids.

A'RAL, LAKE, next to the Caspian Sea, from which it is separated by the plateau of Ust-Urt, is the largest lake in the steppes of Asia. It lies wholly within the limits of Russian Central Asia, between 43° 42′ and 46° 44′ N. lat., and 58° 18′ and 61° 46′ E. long. It is fed by the river Sir (the ancient Jaxartes) on the N.E. side, and the Amu (or ancient Oxus) on the S.E. It is shallow, and has no outlet. Its level is 117 feet above that of the Caspian, and 33 feet above that of the Black Sea. Like other lakes which are drained only by evaporation, it is brackish. Owing to the shallowness of its waters, navigation is difficult; but Russian steamers have been launched upon it, and took part in the operations against Khiva in June 1873. The history of the Sea of Aral is very remarkable. Sir Henry Rawlinson and Colonel Yule have recently collected references made to it in Greek, Latin, Arabic, and Persian writers, and have established the fact that the area it now occupies has been dry land twice within historical times—the Jaxartes and the Oxus then running south of the Sea of Aral to the Caspian. This was the case during the Greco-Roman period, and again during the 13th and 14th centuries after Christ. The Russian government has undertaken the restoration of the Oxus to its old bed.—See *Proceedings of Royal Geographical Society*, vol. xi., vol. xvi., and vol. i. (new series, 1879); also *The Shores of Lake Aral*, by Major Wood (Lond. 1876).

ARA'LIA, a genus of plants, the type of the natural order *Araliaceæ*. This order is dicotyledonous or exogenous, and consists of trees, shrubs, and herbaceous plants, resembling the *Umbelliferæ* (q. v.) both in their general habit and in their botanical characters, but differing essentially in the fruit, which is not *didymous* or formed of two separable carpels as in the *Umbelliferæ*. The fruit of the Araliaceæ consists of several one-seeded cells, and is often succulent. The order contains about 160 known species, natives of tropical, temperate and cold climates, generally possessing stimulant and aromatic properties. Poisonous qualities are not developed as in the *Umbelliferæ*. The herbage of many species affords good food for cattle, and some are used for human food. The genus ARALIA contains a considerable number of species—trees, shrubs, and herbaceous plants. It has a succulent fruit, with 5 or 10 cells, crowned with the styles. *A. nudicaulis* is a native of the United States of America, a species of humble growth, having a solitary radical leaf with a trifid stalk and ovate serrated segments, the scape is shorter than the leaf. The root is said to be equal in value to sarsaparilla as an alterative and tonic. *A. racemosa*, *A. spinosa*, and *A. hispida*, also natives of North America, produce an aromatic gum resin. *A. spinosa* is a stimulant diaphoretic. The berries, infused in wine or spirits, are employed in America as a cure for rheumatism. It is sometimes called Toothache-tree: it also bears the name of Angelica-tree. It is a native of moist woods in Virginia and Carolina, growing to a height of ten or twelve feet, with a single stem, spreading head, doubly and trebly pinnate leaves and ovate leaflets, and is very ornamental in a lawn. *A. polaris*, found in the southern island of New Zealand, and in the greatest abundance and luxuriance in Lord Auckland's Islands, is described by Dr. Hooker as a 'very magnificent plant,' a herbaceous perennial, 4—5 feet high, with large orbicular masses of green foliage and waxy flowers, presenting a very striking appearance. *A. edulis* now called *Dimorphanthus edulis*, is employed in China as a sudorific. Its shoots are very delicate and pleasant when boiled; and the roots, which have an agreeable aromatic flavor, are used by the Japanese as carrots or parsnips are in Europe. Aralias abound in the warm valleys of the Himalaya. The natives collect the leaves of many as fodder for cattle, for which purpose they are of great value in a country where grass for pasture is scarce; but the use of this food gives a peculiar taste to the butter. Chinese rice paper has been ascertained to be cut from cylinders of the pith of an A. Ginseng (q. v.), the root of a species of Panax, is one of the most important products of the order *Araliaceæ*. The astringent roots of *Gunnera scabra*, or Panke, are used in tanning, but its fleshy leaf-stalks are eaten like those of rhubarb. It has been seen on the sandstone cliffs of Chiloe with leaves nearly eight feet in diameter, each plant with four or five of these enormous leaves. It has been introduced into Britain, and is found to succeed well in the climate of Edinburgh. The only representatives of this order in the British flora are the Ivy (q. v.), and a small plant called the Tuberous Moschatel (*Adoxa moschatellina*).

A'RAM, EU'GENE, was born in 1704 at Ramsgill, in Yorkshire. His father was a gardener, and could afford to keep A. at school only for a short time; but even while assisting his father, he contrived to gratify his passion for learning. At an early period of his life he married, and became a schoolmaster, first in Netherdale, and afterwards at Knaresborough, where he continued to reside till 1745. In the town of Knaresborough lived one Daniel Clarke, a shoemaker, and an intimate acquaintance of A.'s. On one occasion Clarke happened to purchase a quantity of valuable goods, which he easily obtained on credit; but to the surprise of everybody, he soon after disappeared, and no trace of him could be discovered. Suspicion lighted upon A., not as Clarke's murderer, but as his confederate in swindling the public. His garden was searched, and in it was found a portion of the goods which Clarke had purchased. A. was arrested and tried, but acquitted for want of evidence. He now left his wife at Knaresborough, and went to London, and other parts of England, in his capacity of schoolmaster; and in spite of his nomadic mode of life, contrived to acquire a knowledge of botany, heraldry, Chaldee, Arabic, Welsh, and Irish, and was planning a great etymological work, to be entitled 'A Comparative Lexicon of the English, Latin, Greek, Hebrew, and Celtic languages,' when he was suddenly dragged away from his ushership of Lynn Academy, in Norfolk, and committed to prison on a charge of murder.

The circumstances of the remaining portion of the story are pretty well known. In 1759, a skeleton was dug up near Knaresborough, which the inhabitants suspected to be that of Clarke, for they had now come to the conclusion that the unfortunate man had met with foul-play, especially as A.'s wife had, on several occasions, made strange statements to the effect that her husband and a man named Houseman, knew more of Clarke's disappearance than they chose to admit. Houseman was now confronted with a bone of the skeleton which had been discovered. He very emphatically denied that it was Clarke's. People naturally wondered how he *could* be so positive, the bones of skeletons being, to the uneducated eye, so similar in appearance. They became convinced that if the skeleton was not Clarke's, Houseman must know where the latter was. At last he confessed that he had been a spectator of the murder of Clarke by A. and one Terry. He named the place where the body had been hidden. It was searched, the buried skeleton was dug up, and A. was tried at York, for the murder of Clarke, on the 3d August 1759. What has given so extraordinary an *éclat* to this trial, is the fact that A. conducted his own defence. He attacked, with great acumen, plausability, and curious erudition, the doctrine of circumstantial evidence; but to no effect, for a verdict of guilty was returned, and he was condemned to be executed three days afterwards. In the interval, he confessed his guilt to the clergyman who attended him. While in the condemned cell, he wrote a defence of suicide; but failed in a practical illustration of the doctrine, which he forthwith attempted.

ARAMÆ'A (from the Hebrew word *Aram*, signifying the highland in opposition to the lowland of Canaan) includes the whole of the country situated to the north-east of Palestine. Its boundaries though not rigorously defined, were as follows: N., by Mount Taurus; E., by the Tigris; S., by Arabia; and W., by Arabia, Phœnicia, and Lebanon. It embraced the countries known to the Greeks by the various names of Syria, Babylonia, and Mesopotamia. *The Aramaic language*, a branch of the Semitic, was common to the whole country, and was divided into two principal dialects—the west Aramaic or Syriac, and the east Aramaic, or, as it is improperly termed, the Chaldee. The former was that spoken almost universally in Palestine in the time of Christ. Ever since the Babylonian captivity, the pure Hebrew, in which

the whole of the Old Testament, with the exception of a few chapters in Daniel and Ezra, had been written, had gradually given place to the Aramaic. The Aramaic version of the Bible was that used in Christ's time, who quotes from it and not from the original Hebrew; as, for instance, the beginning of the 22d Psalm, which he repeats on the Cross. The Talmud, especially the Babylonian, has a large admixture of Aramaic elements. The Aramaic dialect is, in general, the harshest, poorest, and least elaborate of all the Semitic languages, and has now almost entirely died out, and given place to the Arabic and Persian. Indeed, it is only found living among some tribes in remote districts in the mountains of Kurdistan, and in two or three villages in Syria; yet it is considered highly probable that it is the root of the whole cluster of Semitic tongues.

ARA'NDA, Pedro Pablo Abarca de Bolea, Count of, born in 1718 of a distinguished Aragonese family, at first embraced a military career; but having evinced a remarkable spirit of observation, he was appointed by Charles III. ambassador to the court of Augustus III., king of Poland; which post he filled for seven years. After his return, he was appointed captain-general of Valencia, and in 1766 recalled to Madrid on account of its disturbed state, and the presidency of the Council of Castile was bestowed on him. A. not only soon restored order in the capital, but limited the power of the Inquisition, procured the expulsion of the Jesuits from Spain, and carried the salutary terror of government into the recesses of the Sierra Morena, then infested by hordes of ferocious banditti. Like many other reformers, he was not able fully to carry out all his liberal intentions. In 1773, he was removed from his high position through the influence of the clergy, the Dominican monks especially, and sent as ambassador to France. Grimaldi succeeded him in his office, and after him Count Florida Blanca; but when the latter lost his office in consequence of court intrigues, A. returned to his position; soon however, to lose it again through the agency of Godoy, Duke of Alcudia, the queen's favorite. He, however, still remained President of the Council of State, which he had organized; but upon his expressing his views regarding the war with France, he was banished to his native province of Aragon, where he died in 1799.

ARA'NEA and ARANE'IDÆ. See Spider.

ARANJU'EZ (a corruption of the Latin *Ara-Jovis*, altar of Jupiter), a town in the province of Madrid, Spain. It is situated on the left bank of the Tagus, 28 miles south south-east from Madrid, in a beautifully wooded valley, and is now connected with the Spanish metropolis by a railway. The town is built in the Dutch style, has broad and regular streets intersecting each other at right angles, and a population of 8154. It is famed for its palace and gardens. The former was long a favorite resort in spring of the royal family, during which period A. occasionally reckoned as many as 20,000 inhabitants; the latter were laid out by Philip II., who built a palace also, for there was only a shooting villa here during his father's time, but a fire destroyed a portion of it, and more was taken down by Philip V., who reconstructed the edifice in French style. The present château was completed by Charles IV. On account of its gardens, the natives call A. 'the metropolis of Flora.' These gardens are interspersed with numerous summer-houses, the most celebrated of which is the *Casa del Labrador*, or Laborer's Cottage; but their most splendid ornament are the great elm-trees brought from England by Philip II., which thrive magnificently. They radiate out from a central plot in 12 distinct rows. A. is known historically for the treaty of alliance concluded here between France and Spain on April 12, 1772, and as the scene of the abdication of Charles IV. on March 18, 1808.

ARANY, Janos, next to Petöfi the most distinguished of modern Hungarian poets, was born at Nagy-Szalonta, 2d March 1817. His father was a poor peasant, who spared no pains to get him into the church. In 1832, he entered the college at Debreczin, where he distinguished himself by his diligence; but unable to restrain his love of adventure, he joined, in 1836, a company of strolling-players, with whom he traveled about for several months, till, driven by necessity and an upbraiding conscience, he hurried home to do what he could for the support of a now blind and aged parent. At Szalonta he worked as a teacher of Latin and as a notary. When the Kisfaludy Society of Pesth offered a prize for the best humorous poem, A. sent in anonymously his *Az elveszett Alkotmány* (The lost Constitution of the Past). He was successful. Thus emboldened, he ventured, in 1847, to forward to the same society the first part of a trilogy, *Toldi*. Struck by the beauty of this purely national effort, the members published it at their own expense, and again rewarded the author. A. soon became a popular favorite, even in the lowest ranks of the community. In 1848 appeared his *Murány Ostroma* (Conquest of Murány), which, received less attention owing to the political excitement of the time. The poet himself took a slight part in the revolution, but after the dismal termination of the war, he was allowed to return to his country. He was afterwards professor of Hungarian literature, director of the Kisfaludy Society, editor of a journal, and secretary of the Hungarian Academy (1865—1870). Later works are, *Katalin*, the second part of *Toldi*, 2 vols. of lyrics, the first part of another trilogy, *Buda Halàla*, and a humorous poem recounting his early adventures (1874). Part of *Buda* has been translated into English. He died 28th Oct. 1882.

ARAPAI'MA, a genus of fresh-water fishes, the largest known fresh-water fishes in the world. They are found in the rivers of South America, and are sometimes taken in the Rio Negro 15 feet in length and of the weight of 4 cwt. They are taken with the harpoon, and are highly esteemed for food, both fresh and salted. In the salted state they have begun to form an article of commerce, and are conveyed in large quantities to Para. The genus *A.* belongs to the family of *Clupesocidæ*, a family of malacopterous fishes, allied to the *Clupeidæ* or herring family, and is remarkable for the mosaic work of strong, bony, compound scales with which the body is covered. About six species are known.

A'RARAT (Airarat, in the old Armenian dialect; i. e., the plains of the Aryans), the ancient name of the fertile plateau through which flows the river Aras or Araxes. It occupies the center of the mountainous region of Armenia, belonging partly to Turkey and partly to Russia. Notwithstanding the passage in Genesis viii. 4, where it is said that the ark rested 'on the mountains of Ararat,' it has become common to give the name A., not to the entire range, but to the mountain called by the Armenians Massis Lensar—i. e., 'mountain of the ark' (known among the Turks as Aghri-Dagh, 'steep mountain;' and among the Persians as Koh-i-Nûh, 'Noah's mountain'). It rises in two volcanic cones, known as the Greater and the Lesser Ararat; the former which attains the height of 17,212 feet above the level of the sea, is covered with perpetual snow. It is the highest elevation of Western Asia, and since the war of 1827 it forms the point where the Russian, Turkish and Persian territories meet. In 1840 the form of the mountain was partially changed by a frightful and destructive earthquake. Previous to this period, at the base of the mountain, and at a point where a stream runs from a wild gorge, there stood the village of Arguri or Aguri. It was surrounded by gardens and orchards, and inhabited by upwards of 1000 inhabitants. In the ravine, 2300 feet above the village, stood the Armenian convent of St. James; and 1000 feet higher still, a chapel dedicated to St. James. The beauty and mild air of the district made Anguri a favorite summer resort of the richer inhabitants of Erwan. It was to undergo a great change, however. On the 20th of June 1840, dreadful shocks of earthquake were felt. Great masses of the mountain were thrown into the plain, the ravine was closed, the convent and chapel disappeared, and the village, and the gardens which surrounded it, were buried under rocks, earth, and ice, and with the inhabitants utterly destroyed. Tournefort made a partial ascent of the mountain in 1700; since then, ascents have been made in 1829 by Professor Parrot of Dorpat and his companions; in 1850 by Colonel Chodzko, and a large party of Russians engaged in the Transcaucasian triangulation; in 1856 by Major Robert Stuart; and in 1870 by Dr. G. Radde and Dr. G. Sievers. These naturalists, the former of whom is director of the museum at Tiflis, have carefully explored the mountain and district in which it is situated. See their 'Reisen in Armenschen Hochland' (*Petermann's Mittheilungen* for 1871); also the *Transcaucasia and A.* of Mr. Bryce, who made the ascent in 1876.

A'RAS, the ancient *Araxes*, a river of Armenia, formed by the junction of the Bingol-Su and the Kaleh-Su, and uniting its waters with those of the Kur (ancient *Cyrus*) after a course of about 500 miles. The main stream is the Bingol-Su, which rises in the Bingol-Tagh, in lat. 41° 30′ N. and long. 41° 10′ E.; and flowing N.N.E., is joined a little below Hasan-kaleh by the Kaleh-Su, after which the combined stream is called the A. It then flows eastward, forming for some time the southern boundary of the province of Kars, till it is joined by the Arpa which flows into it from the north. After this, it divides Russian and Turkish Armenia; at some distance to the south of Erivan it turns to the south-east, along the base of Ararat; soon after which it receives the waters of the Zenghi, a river descending southward past Erivan. Near Djulfa it runs eastward for about 60 miles; after which it runs to the north-east for upwards of 125 miles, till it is joined by the large river Kur, descending from the Caucasus through Georgia. Their united waters, after a short eastward course, turn suddenly to the south, and fall by three mouths into the Gulf of Kizilgatch, in the Caspian, in lat. 39° 20′ N.

ARA'TUS, of Sicyon, a distinguished Greek statesman, was born about 271 B.C. His youth fell among the party strifes of his native town, in which his father, Clinias, met his death; and he himself was only saved by the efforts of his aunt, who had him secretly conveyed to Argos, whence he returned, in his twentieth year, and liberated Sicyon from its tyrant, Nicocles, 251 B.C. Supported by Ptolemæus Philadelphus, A. restored the republican form of government to Sicyon, and united it with the Achaian League, of which he was appointed general, 245 B.C. During his

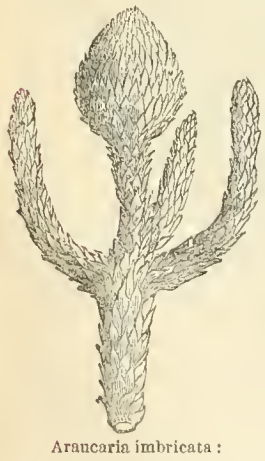
honorable but checkered career, this office was conferred on him seventeen times. His great object was to unite the Greek states, and form out of them an independent nation; but this was thwarted by their mutual jealousies. A. was a brave general, a skilful tactician, and a disinterested patriot. He died by poison administered to him by command of Philip III. of Macedon.

ARA'TUS, of Soli (or Pompeiopolis, in Cilicia), wrote about 270 B.C., a Greek didactic poem, entitled *Phænomena*, founded on the astronomical system of Eudoxos of Cnidos, and appended to it another poem, *Diosemeia*, giving rules for prognostication of the weather. A pure style and correct versification mark both poems, which were translated into Latin by Cicero, Cæsar Germanicus, and Rufus Festus Avienus. A. was a native of the same province as St. Paul, who quotes from him in his speech on Mars' Hill: 'For as certain of your own poets have said, We also are his offspring.' The best edition is that by Buhle, 2 vols. Leipsic, 1793—1801.

ARAUCA'NIA, the country of the Araucos or Araucanian Indians, in the south of Chili. The Chilian province of Arauco, lying between the rivers Biobio and Valdivia, was incorporated in 1852; but the Indians occupy a large territory in Arauco and the more southerly province of Valdivia, and still maintain their independence of the Chilian republic. The Araucanians are interesting as furnishing the only example of Indian self-government in the presence of the European races. Their country is divided from north to south into four parallel regions, varying from each other, with tolerable regularity, in soil and climate. These are the coast region, the plain region, the region of the Lower Andes, and the region of the Higher Andes. The productions of A. are similar to those of Chili. The population cannot be accurately estimated on account of the independence of the nation; but the most recent estimates set down the aboriginal population at about 70,000 souls.

A. has the proud distinction of being the only portion of the New World that has never received the European yoke. From the days of Pizarro and Almagro downwards, it has uniformly vindicated its freedom—its wars of independence having lasted, with intervals of precarious truce, from 1537 to 1773. During the war between Spain and the Chilian colonists, A. remained neutral. In 1861, a French adventurer named De Tonneins, ingratiating himself with the Indians, was elected king of A. He has twice carried on war unsuccessfully with Chili.

ARAUCA'RIA, a genus of plants of the natural order *Coniferæ* (q. v.) or Pines, consisting of lofty trees, natives of the southern hemisphere, and distinguished by having the male and female flowers on separate plants, the pollen of the male flowers contained in 10—20 cases pendent from the apex of each scale, the female flowers two under each scale; each having one ovule. The species are all evergreen, the leaves broader than in pines and firs, which, however, the trees resemble in their general manner of growth. *A. imbricata*, sometimes called the Chili Pine, a native of the Andes of Chili, forming forests on their western declivities, attains a height of 150 feet, the trunk quite straight and free from knots. The bark of the young trees is studded with leaves from the base upwards, even until 12 or 15 years of age. The branches are in whorls of 6, 7, or 8. Young trees have branches almost from the ground; old trees have tall naked stems, with a crown of branches. The female strobile (cone) is roundish ovate, 8—10 inches in diameter, the scales terminated by a long awl-shaped point, the seeds wedge-shaped, and more than an inch in length.



Araucaria imbricata: End of a branch, much reduced, showing the mode of ramification, and the manner in which the leaves are imbricated.

Araucaria imbricata: Sketched in the Botanic Gardens, Edinburgh.

The outer and inner bark of full-grown trees are each 4—6 inches in thickness; the outer bark of a cork-like texture; the inner, fungous and porous. From both outer and inner bark, and indeed from all parts of the tree, resin flows readily and in great abundance. The leaves are lanceolate, about 1½ inch in length, and ¼ inch in breadth near the base, sharp-pointed. The timber is heavy, solid, hard, fibrous, yellowish white, and beautifully veined. It is very suitable for masts of ships. The resin, which is white, has a smell like frankincense, and a not unpleasant taste. It is applied as a plaster to contusions. The seed is pleasant to the taste, not unlike the chestnut, and is a most important article of food to the Indians. It is eaten raw, boiled or roasted. A spirituous liquor is also distilled from it. A single strobile sometimes contains between 200 and 300 seeds, and one tree may be seen loaded with 20 or 30 of these great strobiles. This Araucaria was introduced into Britain in the end of the last century, and is now pretty frequently planted. It promises to add a new feature to British landscapes, as other trees of the same order, particularly the larch and spruce, have done before, and will probably prove important in an economical point of view. It is the only species which seems suited to the climate of Britain. *A. Brasiliana*, the Brazil Pine, has loosely imbricated lanceolate leaves, and a looser and more spreading habit than *A. imbricata*. The seeds or nuts are sold as an article of food in Rio Janeiro. The resin which exudes from the tree is mixed with wax to make candles. *A. excelsa*, now called *Eutassa excelsa* (and by some *Altingia*), the Norfolk Island Pine, a native of Norfolk Island, New Caledonia, &c., attains a height of 160—200 feet, free from branches to 80—100 feet, and with a trunk sometimes 11 feet in diameter. The wood is white, tough, close-grained, and so heavy as almost to sink in water. The leaves of the young trees are linear and spreading; those of the adult are ovate, and closely imbricated. The strobiles are ovate, 4—5 inches in length. *A. Cunninghamii*, now also ranked in the new genus *Eutassa* or *Altingia*, the Moreton Bay Pine, a native of the shores of Moreton Bay and banks of the Brisbane River in New South Wales, very much resembles the last. It attains a height of 60—130 feet, and a diameter of 4—8 feet. The leaves of the adult trees are lanceolate and imbricated. The wood is yellowish, and is used for boat-building house-carpentry, and the common kinds of furniture. The large seeds of *A. Bidwillii* are used for food by the natives at Moreton Bay.

Certain fossil *Coniferæ* found in carboniferous sandstone have received the name *Araucarites*. Livingstone found a forest of large silicified trees near the Zambesi, which Mr. Quekett, on examination of specimens, ascertained to be 'silicified coniferous wood of the Araucarian type.' Fossil trees of the same type occur in the carboniferous strata of Britain. A trunk, for instance, 47 feet long, was found in Craigleith Quarry, near Edinburgh, in 1830.

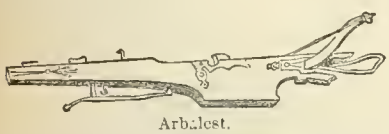
ARAUJO, D'Azeve'do Anto'nio, afterwards Count da Barca, was born at Sá, in the neighborhood of Ponte de Lima, in Portugal, on the 14th of May 1754. At the age of 11, he was sent to Oporto to study under his uncle, who held a high military command there. In 1787 he was appointed Portuguese ambassador to the Hague. Before entering on his duties, he visited England, where he omitted no opportunity of obtaining a knowledge of English manufactures, commerce, politics, &c. He next proceeded to Paris, where he similarly employed himself. Soon after his arrival at the Hague, he found himself entangled in political difficulties. The French Revolution had broken out, but the part which he played in the complication of political affairs which ensued falls to be treated more properly under the History of Portugal (q. v.).

At length he threw up his ambassadorship, and traveled through Germany, enlarging the sphere of his studies. He paid especial attention to mineralogy and chemistry, and was fortunate enough to become acquainted with Goethe, Wieland, Schiller, Herder, &c. After the Peace of Amiens, A. was sent as ambassador to St. Petersburg; in 1803 he was recalled to Lisbon, to assume the office of Secretary of State; and in 1806 he obtained the highest political dignity in the kingdom. His efforts to introduce the various agencies of civilization, while he occupied this situation, were unremitting. Glass, paper, wool, and cotton manufactures, received liberal encouragement. But the sudden approach of the French army put an end to all his improvements. The royal family, which Bonaparte had formally dethroned in his victorious proclamation, emigrated to Brazil. A. embarked also, taking along with him a complete printing apparatus, his mineralogical collection, arranged by Werner, and all necessary chemical instruments. During the first years of his residence in the New World, he devoted himself assiduously to scientific and literary pursuits; founded a school of medicine and chemistry, introduced the cultivation of tea, an improved machine for sawing wood, and a sugar-alembic, and established a porcelain manufactory. He had also a magnificent garden, the plants of which were scientifically arranged. He died on the 21st June 1817.

ARAU'RÉ, a town of Venezuela, South America. It is situated in lat. 9° 17′ N., long. 69° 28′ W., 60 miles E.N.E. of Trujillo, in a region noted for its fertility in the production of cotton, coffee, cattle, &c. The town itself is rather handsome, and contains 10,000 inhabitants.

ARAVU'LLI, a range of mountains in Western India, extending from about 22° 40′ N. lat., 74° E. long., to 26° 50′ N. lat., 75° E. long. The highest summit is Abu (q. v.). The north-eastern extremity of the range sinks into comparatively low rocky hills. The north-western side is very bold and precipitous, the south-eastern less so. There is no road practicable for wheel-carriages across this range for a distance of 220 miles.

A'RBALEST, ARCU'BALEST, or CROSS-BOW, was a weapon much in use during the feudal times. Its recognized position among military arms may be dated from about the period of Richard I. The smaller kinds of A. were bent by pressing the hand on a small steel lever called the 'goat's foot;' but the larger kinds were bent by placing the foot in a loop or stirrup at the end of the central shaft, and drawing the cord upwards with the hand. At a later period, the bow was made very strong, often of steel; in this form it required a mechanical contrivance, called a 'moulinet,' to bend it. Sometimes ordinary arrows were used with the A., but more usually arrows of a shorter and stouter kind, called 'carrials' or 'quarrels,' were employed; these had a four-sided pyramidal form of head. Occasionally stones and leaden balls were shot from the larger Arbalests. The arbalestiers, or cross-bowmen, carried a quiver with fifty arrows as an armament in some of the battles of the 13th c. They were an essential component of armies of that period, taking up their position in the van of the battle-array; some were mounted, some on foot, and they occasionally wore armor. The supply of arrows or quarrels was carried after them to the battle-field in carts. The A. continued to be a favorite weapon in England throughout the 13th c.; but in the 14th, it gave way to the long-bow, which was found to be a more convenient weapon in battle. The long-bow is described under BOW AND ARROW; and the general military system to which it belonged, under ARCHERS AND ARCHERY.


Arbalest.

ARBALESTI'NA, in the military system of the middle ages, was a small window or wicket through which the cross-bowmen shot their quarrels or arrows at an enemy besieging a fortified place.

ARBE'LA, now Erbil or Arbil, a small town of Assyria, east from Mossul, famous as having given name to the battle in which Alexander finally defeated Darius, 331 B.C. The battle was really fought near Guagamela (the 'camel's house'), to the north-west of A.

ARBITRA'TION is the adjudication by private persons appointed to decide a matter, or matters in controversy, on a reference made to them for that purpose, either by agreement of the disputants or by the order, or on the suggestion, of a court of law. The proceeding generally is called a *submission to arbitration*, or *reference;* the parties appointed to decide are termed *arbitrators* or *referees;* and their adjudication is called an *award*. This mode of settling disputes is not only frequently resorted to by litigants themselves, who are anxious to avoid the delay and expense of proceedings in the public tribunals, but the Statute-Book bears witness to the approval of it by the legislature at various times. An old act, the 9 and 10 Will. III., c. 15, testifies the benefits of A. in strong terms, declaring that 'it hath been found by experience that references made by rule of court have contributed much to the ease of the subject in the determining of controversies, because the parties become thereby obliged to submit to the award of the arbitrators,' and it proceeds to authorize and encourage merchants, traders, and others to put an end to their controversies and quarrels by means of A.; and a modern act, passed in 1833, the 3 and 4 Will. IV. c. 42, ss. 39, 40, and 41, contains still more anxious provisions for rendering references to A. effectual. Since that act was passed, the practice and feeling in favor of A. has increased, so much so that there are recent statutes which contain provisions rendering A., or private reference in certain cases, compulsory. The Railway Acts of 1845, the Public Health Act of 1848, Common Law Procedure Act of 1854, and Masters and Workmen Acts are modern examples of this legislative peculiarity.

The matters that may be determined by an arbitrator are all personal disputes and differences which might otherwise be made the subject of controversy in the courts of civil jurisdiction. Thus breaches of contracts generally, breaches of promise of marriage, trespass, assaults, charges of slander, differences respecting partnership transactions or the purchase price of property, and questions relating to tolls or the right to tithes, may all be referred to A. Questions relating to real property may also be referred, such as those relating to the partition of lands of joint tenants or tenants in common, to settlements of disputed boundaries—to differences between landlord and tenant respecting waste—and to the title to land. Pure questions of law may also be referred to the decision of an arbitrator. An arbitrator may have, therefore, to determine the liability of a party on a promissory-note or bill of exchange, or to construe an act of parliament, or to give a judicial opinion on the effect of a will or deed. Actions at law, and suits in equity, may also be settled by A.; and this kind of reference may be made at any stage of the proceedings, sometimes even after verdict, and probably by analogy, after decree in equity. Questions relating to the future use and enjoyment of property, and future or anticipated differences between parties, may likewise be referred.

A matter, however clearly illegal, cannot be made the subject of a valid reference. But where transactions between parties have been brought to a close by a general award, apparently good, the courts have refused to re-open them on a suggestion that some legal item has been admitted in account.

There are certain matters which are specially referred to A. by statute. Besides those we have already alluded to, the following matters are all referrible to A.: Questions relating to the expenses of prisoners, under 28 and 29 Vict. c. 126; to the regulation of municipal corporations in England and Wales, under the 5 and 6 Will. IV; c. 76; to the laws concerning prisons, under the 5 and 6 Vict. c. 98; to disputes between masters and workmen, under the 5 Geo. IV. c. 96, amended by 35 and 36 Vict. c. 46; to the laws relating to savings-banks, under the 26 and 27 Vict. c. 87; to the land rights and other possessions of certain ecclesiastical and collegiate corporations, under the 2 and 3 Will. IV. c. 80; to the management and improvement of episcopal and capitular estates in England under the 17 and 18 Vict. c. 116; to the conveyance of mails by railways, under the 1 and 2 Vict. c. 98; to insolvents and to insolvency, bankruptcy, and execution, under the Bankruptcy Act, 1869, 32 and 33 Vict. c. 71; to the constitution of companies incorporated for carrying on public undertakings, under the 8 and 9 Vict. c. 16; to the taking of lands for undertakings of a public nature, under 8 and 9 Vict. c. 18; to the metropolitan sewers, under the Metropolis Management Acts, 18 and 19 Vict. c., 120, 19 and 20 Vict. c. 112, 25 and 26 Vict. c. 102, and 34 and 35 Vict. c. 47; to friendly societies, under the 17 and 18 Vict. c. 56, and the 38 and 39 Vict. c. 60.

Under these acts of parliament, the class of cases which may, or which must, be referred to A., have been greatly enlarged. The railway acts, in particular, have largely contributed to this kind of amicable determination, although the parties in such cases cannot be said to have much discretion in the matter. Under the provisions, again, of the Judicature Act, 1873, and the Act 17 and 18 Vict. c. 125, ss. 3 and 6, parties may be compelled by the court to refer to official referees matters which involve intricate accounts or scientific or local examination.

Among the questions that cannot be referred to A. are matters arising out of the the administration of the criminal law in the case of felonies and relating to agreements or transactions against public policy. Felonies and offences of a public nature cannot be referred, because the public safety and good require them to be punished and for this purpose they can only be properly tried in one of the ordinary courts of the country.

With respect to matters which cannot be referred on account of their being against public policy, the rule is so obviously just that no illustration is required.

But there are certain misdemeanors which may be either settled by agreement or by means of an A., on a principle of very general application stated by Chief-justice Gibbs—that where there is a remedy, by action as well as by indictment, a reference of the matter in controversy is good. And in these cases of misdemeanor, a compromise or settlement under a reference may be made, even after conviction, but with the sanction of the court.

As to the parties who may make a reference to A., it may be stated generally, that every one capable of making a disposition of his property or release of his rights may make a submission to an award, and in this category may be placed a married woman, who has a separate estate settled to her separate use, and there are even cases where a reference between a husband and wife has been held valid; and of course a husband may submit to A. differences respecting his wife's personal estate which has not been settled to her separate use.

Respecting the powers of infants or persons under age to submit to A., there are numerous decisions in the court of law and equity: but they go upon refinements and nice distinctions more suited for the professional lawyer than for the ordinary reader, and we therefore do not think it necessary to give any explanation of them in a popular article such as this professes to be.

Partners and corporations may make references to A. on the principles already explained, and according to the relation in which they stand to the matter in dispute.

Those who cannot submit to A. are persons in the following position: Persons who cannot contract; married women without

an estate settled to their separate use; and along with them, as laid down in old ante-reformation books, persons professed in religion, and persons under duress. There is an exception to the incapacity of married women to refer to A. where the husband, by exile, banishment, or other cause, is held to be civilly dead, and when he is an alien enemy. To these exceptions it may be added, that in suits respecting the property of charities the Court of Chancery will not permit a reference, however advisable such a course may seem, unless the attorney-general gives his consent.

It has generally been the opinion of the legal profession, and held to be the doctrine of the courts, that a reference by the consent of counsel in a cause is binding on his client; and Lord Chancellor Eldon once said, that it was for the counsel to consider whether he was authorized to refer, and if so, he (the chancellor) would act on the consent so given; and the right and privilege of counsel to make a reference has been very strongly laid down in the Scotch courts, But a notable case in the Court of Common Pleas (Swinfen *v.* Swinfen), where a compromise by the counsel was successfully resisted by the client, somewhat unsettled the English law on this subject; and now the feeling of the Bar in England is, that it is unwise to refer or compromise a litigation on the independent authority of counsel.

Submissions to reference may also be made by executors and administrators, by trustees, by the committee of a lunatic, and by the officers of a public company, who is authorized by a statute to sue and be sued in the name of the company. And there are persons especially empowered to refer by the statutes which we have already enumerated.

Disputes may be referred to A. in any manner that expresses the agreement or understanding of the parties to be bound by the decision of the arbitrator; and for this purpose no formal submission, either verbal or written, is necessary; but the arrangement must be such as manifestly to show an intention to have the difference concluded by a private ajudication in the nature of an award. But where the submission is in writing, it must be executed in due form. A testator, however, cannot exclude his will from litigation by a proviso, that all differences respecting it shall be referred to A., although it is thought that the parties benefited by the will might themselves so refer. Generally speaking, it is advantageous to make the A. in such a form as that the award may be made a rule of court—that is, may be adopted by a court of law as its judgment on the matter submitted, a proceeding that affords an obvious facility in enforcing the award; and for this purpose it is necessary to make the procedure conformable to the directions of the statutes 9 and 10 Will. III., and 3 and 4 Will. IV., already referred to. Where the submission is merely verbal or constituted by a private bond or deed, it is liable to be capriciously revoked, and proceedings on the award, in such a case, can only be taken in the Court of Chancery.

The arbitrator ought to be a person who stands perfectly indifferent between the disputants; but there are no other particular qualifications for the office. And the choice by parties of the person who they agree shall decide between them, is perfectly free. Some legal writers have even gone so far as to maintain, that not only infants, and married women, but even idiots and lunatics, can be arbitrators, on the argument that every person is at liberty to choose whom he likes best for his private judge, and he cannot afterwards object to the deficiences of those whom he has himself selected. But this, it is clear, is going too far, and the policy of the law would certainly be interposed against such extreme cases. It is better to state the rule to be, that on the condition that the party selected is of ordinary intelligence, the choice of an arbitrator is absolutely unfettered. The only exception to this rule is the case of a party who, by office or position, is the person pointed out for the duty under a reference made by statute. In matters of complicated accounts, mercantile men are generally preferred. In other cases, it is usual to appoint barristers who, being accustomed to judicial investigations, are able to estimate the evidence properly, to confine the examination strictly to the points in question, and, in making the award, to avoid those informalities in respect of which it might afterwards be set aside. Both time and expense are thus saved by fixing on a professional arbitrator. It has, indeed, been wisely remarked, that an arbitrator should endeavor to arrive at his conclusions upon the same rules and principles which would have actuated the court for which he is substituted—a rule of conduct that obviously points to the expediency of a lawyer being the referee. But an arbitrator is not bound by the mere rules of practice which prevail in the ordinary courts of justice, and he has been held justified in allowing interest on both sides of an unliquidated account, although such a determination was against the practice of the Court of Chancery, where the suit, which had been referred, had been commenced.

The proceedings before an arbitrator are regulated according to the peculiar circumstances of the case submitted, but generally it is advisable to conduct them according to the forms observed in courts of law, and they usually are so conducted. Each of the parties furnishes the arbitrator with a statement of his case, which is done by giving him a copy of the briefs on each side; and on the day appointed he proceeds to hear them (either in person or by their counsel or attorneys), and to receive the evidence on each side, nearly in the same manner as a judge at an ordinary trial. Having so heard the case, the arbitrator proceeds to make his award, which need not necessarily be in writing, for a verbal award is perfectly valid; but in practice it is usual for the arbitrator to make his award on paper stamped with the proper award stamp, and this he delivers to the successful party. The unsuccessful party gets a copy of the award on unstamped paper. This award in its effect operates as a final and conclusive judgment respecting all the matter submitted, and it binds the rights of the parties for all time.

An award may be set aside on the ground of corruption and fraud in the arbitrator, and for any material irregularity or illegality appearing on the face of the proceedings. But the tendency of the courts is to favor arbitrations and maintain awards, unless such serious grounds as we have referred to can be substantiated.

Where there are two arbitrators, the submission often provides that in the case of their differing in opinion the matter referred shall be decided by a third person, called an umpire, who is generally appointed under a power to that effect, by the arbitrators themselves. But they cannot make such an appointment unless specially authorized so to do by the terms of the submission. This umpire rehears the case, and for this purpose is invested with the same powers as those possessed by the arbitrators, and bound by the same rules.

In Scotland an A. takes place in virtue of a written submission executed by the parties in favor of the chosen referee, who there is called an arbiter, instead of arbitrator, as in England; and his award is called a decree-arbitral. This submission is in the form of a regular deed, and is said to be general or special, according to the nature of the matters submitted by it, the submission specifying all the particulars of the reference, and the name of the referee—the arbiter's powers and duties, which, in the ordinary case, are of the most comprehensive character—the specification of the time within which the award or decree-arbitral is to be made—a clause obliging the parties to perform the award under a specified penalty; and other anxious provisions, which are all carefully specified in the submission. The case then proceeds before the arbiter, generally according to the forms observed in the ordinary Scotch courts; and the arbiter makes his award in a very solemn manner, the decree-arbitral commencing with a recital of the submission and of all the procedure—and after stating that the arbiter has ripely considered the whole matter, and has 'God and a good conscience before his eyes,' it gives the arbiter's judgment, and among other things ordains the submission and decree to be recorded according to the clause of registration in the former, and the extract from the registry so made forms a judgment which may be put in execution by either party against the other. The decree-arbitral, like the submission itself, must be executed and attested in the form of a regular deed. Where there are two arbiters, the submission usually provides, that in the event of their differing in opinion, they shall name an umpire or oversman, as he is called in Scotland, whose judment is final.

In conclusion, and as a remark on A. generally, it only remains to be stated, that of course, from the nature of the case, there can be no appeal on the merits of the dispute submitted to any public tribunal whatever. See ARBITRATION in AM. SUPP.

ARBO'GA, an ancient city in Sweden, in the province of Westmannland, on a small river of the same name by which, with the aid of a canal, the lakes Hialmar and Mälar are united. A. used to be an important commercial town, but it has now sunk into insignificance, and only possesses an historical interest from the antiquities in its neighborhood. Of all its churches, cloisters, and chapels there only now remain the town and parish churches, the former with an altar-piece of Rembrandt's. Several kings of the family of Vasa have resided here. Church assemblies were held here in 1396, 1412 1417, 1423, and 1474; diets in 1435, 1440, 1471, 1529, and 1561, in which last year also certain articles, known as the Arboga Articles, were passed by which Eric XIV. was enabled to limit the power of the nobles; and in 1625, Gustavus Adolphus issued an edict here, commanding that the copper coin of the realm should contain its full worth of copper. Pop. (1880) 3833.

ARBORE'SCENT (from Lat. *arbor*, a tree), a term applied to plants to signify that they possess either altogether, or in some measure, the character of trees. Even the dwarf willows and birches, on the confines of polar or alpine perpetual snow, are described as the A. vegetation of these regions.

ARBORICU'LTURE (from Lat. *arbor*, a tree), a term literally signifying the cultivation of trees, but in use generally restricted to the planting and management of timber trees, or employed as exclusive at least of the cultivation of fruit trees, which is a brauch of horticulture or gardening.

The ancients practised A. to some extent, but chiefly with the view of beautifying their villas, or of forming public walks in the

vicinity of cities. It is only for similar purposes, and on a very limited scale, that A. is yet anywhere practised in America. The planting of timber trees for economical purposes, or with a view to profit, is unnecessary whilst natural forests are abundant, and can scarcely be referred even in Britain to an earlier period than the beginning of the 16th c., nor did it become at all general till a much later date. The early forest laws of England, as of other feudal countries, had reference chiefly to game, for the sake of which it was, and in order to the enjoyment of the chase, that large tracts were depopulated and converted into *forests* by the first Norman kings. Plantations for timber and fuel were, however, certainly made in England in the 16th c.; and the importance of the subject was urged on public attention by authors of that period. In the 17th c., the greatly increased demand for oak, for the building both of ships and of houses, gave a new impulse to A., which attracted more than ever before the attention both of the government and of the great landowners; the publication of Evelyn's *Sylva* also did more than any previous work to promote a taste for it. It was in this century that nurseries for forest trees were first established. It was not until the beginning of the 18th c., that the first extensive plantations were made in Scotland, nor until towards the end of that century that A. became general in that country or in Ireland. How much the very landscape has been changed by it—how great a difference has been made by the conversion of bleak hills and barren wastes into woods—how much the scene has been changed by the new forms of foreign trees, some of which are now in many districts more abundant, than those which are indigenous, it is not easy to imagine; and how much these changes have promoted and are indicative of improvements in agriculture and increased productiveness of fields, is equally difficult to estimate.

The A. of France, Germany, and other parts of Europe, to this day, consists in a great measure of the management of natural forests; and in the more eastern parts of the continent this is almost exclusively the case. Without a careful management of the natural forests, many districts of France and Germany would soon be destitute of fuel; by means of it an increased supply of valuable timber is also obtained; and extensive domains belonging to the state, or to private proprietors, are rendered much more productive. It is in Germany that the management of the forests has received the greatest attention, and has been most systematically and scientifically conducted.

The forests trees of Britain, and of temperate climates generally, are conveniently divided into two classes—the one consisting of coniferous trees or pines and firs (*Nadelholz*, i.e., the 'needlewood' of the Germans), the other including all other kinds (*Laubholz* i.e., the 'leaf-wood' of the Germans); the latter being sometimes subdivided into *hard-wooded trees*, of which, the most important in Britain are oak, ash, elm, beech, birch, hornbeam, sycamore, walnut, and chestnut; and *soft-wooded trees*, as willow, poplar, lime, alder, and horse-chestnut. Of these and other trees, of their particular uses, and of the soils and situations to which they are adapted, notice is taken in separate articles.

Plantations are generally formed in Britain by means of trees raised from seed in a nursery; but sometimes also by sowing the seed on the ground intended for the plantation; in which case, if circumstances permit, a crop of grain is often sown along with the seeds of the trees, as these do not in general vegetate very soon; and the young plants derive advantage from the absence of choking weeds when the grain-crop is reaped, and from the protection afforded by the stubble. It has been supposed by some, but there is no sufficient evidence in support of the opinion, that more healthy and vigorous trees are obtained by sowing on the spot than by planting those which have been raised in a nursery. However, only very young trees can be planted with advantage, those which have attained a greater size requiring a degree of attention far beyond what is possible in plantations even of very moderate extent. The time of planting is from November to February. The most approved mode of planting is in small pits, in which the roots are disposed in a natural manner, and which are then carefully filled up with earth; but it is often thought sufficient when the tree to be planted is very young, to make a slit for it with a spade, or two slits, one at right angles to the other in the form of the letter T. Other methods are also adopted, particularly for rocky situations, in which the spade cannot be used. Economy is often a consideration of great importance in determining the mode of planting.

The formation of plantations by the sowing of seed has been more generally practised on the continent than in Britain. In this way the vacancies in the natural forests of France and Germany are filled up. In this way also great sandy tracts have been covered with wood on the coasts of Pomerania and of France. This has particularly been accomplished on a scale of extraordinary magnitude in the downs of drifting sand, between the rivers Adour and Gironde. The operations there were begun by M. Bremontier in 1789, and deserve to be mentioned as perhaps the most important operations in A. that have ever been performed in the world. Vast forests of pinaster now occupy what was originally loose sand destitute of vegetation.

Too little attention has hitherto been generally paid to the adaptation of the kinds of trees that are planted to the soil and climate; and to this cause many failures in A. are to be ascribed. Some trees grow well even in exposed situations, and are fit to be employed in these, either to form entire plantations, or to occupy the outer part, and so to shelter other trees, which in general are not planted until the outer zone or belt of the most hardy kinds is somewhat advanced; some succeed only in rich soils; some are incapable of enduring the sea-breeze; others, as the sycamore, the elder, and the pinaster, are comparatively unaffected by it. Some trees suffer from an amount of moisture from which alders or willows would rather derive advantage; but, in general, the thorough drainage of the land intended for a plantation is one of the circumstances most important to its success.

To the necessity of this thorough drainage we must look as compensating, or more than compensating, the influence which woods exercise in condensing the moisture of the atmosphere, and in rendering a climate cold and damp; marshy soils being in this respect still worse. The shelter afforded by plantations judiciously disposed, whether in belts or otherwise, is also of great importance in rendering them suitable for that improved agriculture in which thorough draining is of the first necessity, and which is always productive of amelioration of climate. The influence of plantations is therefore, upon the whole, beneficial, although vast masses of forests are injurious to climate; and it must be admitted that in some localities the planting of trees has been carried to excess, so that fields often suffer, particularly in autumn, from want of free circulation of air, and the landscape is often restricted to very narrow limits. The remedy in such cases is obvious; and it not unfrequently happens that within a short distance new plantations might be formed with every prospect of benefit.

Much has been written about the pruning of forest trees, with a view especially to the production of taller and straighter stems; and considerable difference of opinion exists as to the extent to which pruning should be practised. It is, however, very generally delayed till the branches to be removed have attained too great a size, and is then very rudely performed, to the spoiling of the timber rather than to the improvement of it. The practice of leaving *snags*, instead of cutting branches clean off, has particularly bad effects. Pines and firs, from their manner of growth, need pruning less than trees of other kinds. When trees have been planted, not merely for profit but for ornament, this ought to be remembered in pruning, which, however, is too often intrusted to persons utterly devoid of taste; and trees which, as they naturally grew, were very beautiful, are so treated with axe and saw that they become deformities instead of adorning the scene.

In forming plantations, different kinds of trees are very generally mixed, although masses of one particular kind are also frequently planted. It is usual, however, to plant along with those which are destined most permanently to occupy the ground, trees of other kinds as *nurses*, to be gradually removed as the plantation advances in growth. For this purpose, spruce and larch are more generally employed than any other tree; although Scotch fir and birch are also deemed suitable for certain situations. The removal of some of these nurses affords the first returns of profit from the plantation, which is afterwards thinned from time to time. Plantations far more frequently suffer from being thinned too little, than from being thinned too much. To the want of proper thinning is to be in part ascribed the failure of many of those narrow belts of *planting* which are too common in Scotland, and which having been intended for shelter, very imperfectly serve their purpose, and seem to have suffered from the hardest usage themselves. The thinning of a plantation which has been allowed to grow too thick, must, however, be very gradually performed, that it may be beneficial, and not injurious. After a sudden thinning, a plantation sometimes ceases to thrive, and many trees are often laid prostrate by the next storm; for trees accommodate themselves both in their roots and branches to the situations in which they grow.

A considerable number of years must elapse before any pecuniary return is derived from a plantation, yet this mode of employing soils is often found to be the most remunerative of which they are capable, even without reference to the improvement of adjacent lands to which shelter is afforded; and the increased demand for timber in Britain, for *sleepers* of railways and other purposes, tends to the still further encouragement of A.

The resinous products of pine-woods are not considered as a source of profit in Britain; but the tar, turpentine, and resin obtained from them in some parts of Europe, form articles of commerce. The great pinaster plantations already mentioned, on the sands between the Adour and Gironde, now yield products of this kind in large quantity. The employment of trees for ornamental purposes belongs not so much to A. as to Landscape Gardening (q. v.). The transplanting (q. v.) of large trees is only practised for ornamental purposes. Hedgerow trees are planted chiefly for ornament, although sometimes they may afford useful shelter; but where this is not the case, they can seldom be reckoned profitable,

as they are injurious to crops. Copse or coppice-wood differs so much, both in its uses and in the mode of its management, from other plantations, that it must be briefly noticed in a separate article.

A'RBOR VI'TÆ (*Thuja*), a genus of plants of the natural order *Coniferæ*, allied to the cypress, and consisting of evergreen trees and shrubs with compressed or flattened branchlets—small, scale-like, imbricated leaves—and monœcious flowers, which have 4-celled anthers, and the scales of the strobiles (or cones) with two upright ovules.—The common A. V. (*T. occidentalis*) is a native of North America, especially between lat. 45° and lat. 49°, but has long been well known in Europe. It is a tree of 40—50 feet high; its branches are horizontally expanded, and the strobiles (cones) small and obovate. The young leafy twigs have a balsamic smell, and both they and the wood were formerly in great repute as a medicine; the oil obtained by distillation from the twigs, which has a pungent and camphor-like taste, has been recently recommended as a vermifuge. The wood of the stem is reddish, soft, and very light, but compact, tough, and durable, bearing exposure to the weather remarkably well. The tree is very common in Britain, but planted chiefly as an ornamental tree, and seldom attaining so great a size as in its native country. It delights in cool, moist situations.—The CHINESE A. V. (*T. orientalis*), a native of China and Japan, which is immediately distinguishable from the former species by its upright branches and larger, almost globose and rough strobiles, is also in Britain, and upon the continent of Europe, a common ornament of pleasure-grounds; but it does not attain so great a size as the preceding, and is more sensible of the cold of severe winters. The balsamic smell is very agreeable. The tree yields a resin, having a pleasant odor, to which high medicinal virtues were formerly ascribed; hence the remarkable name *Arbor Vitæ* (Latin, signifying Tree of Life), given to this species, and extended to the genus. Other species are known, but they are less important than these. In its native country, this species also attains the size of a considerable tree.—

Arbor Vitæ (*Thuja occidentalis*): End of branch, showing mode of ramification and fruit.

There are several other species of *Thuja*, some of which seem well suited to the open air in the climate of Britain, and others require the protection of greenhouses. Amongst the former are *T. plicata*, from Nootka Sound; and *T. dolabrata*, a native of Japan, a tree of great height and thickness, and which will not improbably prove the most important of the whole genus.—A tree, common in North America, and there known by the name of WHITE CEDAR, is sometimes included in the genus *Thuja*, under the name of *T. sphæroidea*, but is more generally ranked in the genus *Cupressus* as *C. thyoides*. See CYPRESS. The timber is highly esteemed, and an infusion of the scrapings is sometimes used as a stomachic.—Closely allied to the genus *Thuja* is *Callitris*. See SANDARACH.

ARBROA'TH, ABERBRO'THWICK, or ABERBRO'THOCK, a seaport town in the east of Forfarshire, situated at the mouth of a stream called the Brothock. Here King William the Lion founded a Tyronensian abbey in honor of Thomas-à-Becket in 1178. The king was interred in it in 1214. In the abbey, Bruce and the Scottish nobles met in 1320, to resist the claim of Edward II. to Scotland. Cardinal Beaton was the last of its abbots. Next to Holyrood, the abbey was the most richly endowed monastery in Scotland. It was destroyed by the Reformers in 1560. Its ruins—which are cruciform, 270 by 160 feet—are very picturesque, presenting lofty towers, columns, Gothic windows, and a fine circular east window, 'the Round O of A.' The chief industries of A. are flax-spinning, jute-spinning, and the manufacture of sail-cloth. The new harbor, begun in 1841, admits vessels of 400 tons; it is protected by a breakwater. Serious damage was done to the wet-dock entrance in 1882 by a gale and high tide. In 1880 above 40 vessels belonged to the port. The chief exports are grain, potatoes, fish, pork, and pavement, chiefly from quarries 8 or 10 miles inland. A. is a royal burgh, and in conjunction with Montrose, Brechin, Forfar, and Bervie burghs, returns one member to parliament. Population in 1881 of parliamentary burgh, 21,758. A. is supposed to be the Fairport of *The Antiquary*, and the Redhead Crags and Coves form some of the scenes in that novel. The famous Bell-rock Light-house is 12 miles south-east of Arbroath.

ARBTU'THNOT, JOHN, a distinguished writer and physician, the contemporary of Pope and Swift, was the son of a Scottish episcopal clergyman, and born at Arbuthnot, in Kincardineshire, shortly after the Restoration. He studied medicine at Aberdeen, where he took his degree. A.'s father was obliged to resign his charge at the revolution. His son's prospects being thus blighted in their own country, they were under the necessity of going abroad to seek their fortune. John removed soon after to London, and there supported himself by teaching mathematics. In 1697 he published an examination of Dr. Woodward's account of the Deluge, which brought him into notice as a person of no common ability. Accident called him into attendance on Prince George of Denmark, who thenceforth patronized him. In 1709 he was appointed physician to the queen, and in 1710 was elected a member of the Royal College of Physicians. On the death of Queen Anne, in 1714, he lost his situation, and his circumstances were never so prosperous afterwards. In 1717, A., along with Pope, gave assistance to Gay in a farce, entitled *Three Hours after Marriage*, which, however, in spite of having the aid of a trio of wits, proved a complete failure. In 1723 he was chosen second censor of the Royal College of Physicians; in 1727 he was made an Elect, and had the honor to pronounce the Harveian oration for the year. He died at Hampstead in 1735. A. was one of the leaders in that circle of wits which adorned the reign of Queen Anne, and was still more nobly distinguished by the rectitude of his morals and the goodness of his heart. He assisted Swift and Pope in the composition of that brilliant satire, the *Memoirs of Martinus Scriblerus*, contributing those portions of it which refer to science and philosophy; and he was undoubtedly the author of the celebrated political *jeu d'esprit*, the *History of John Bull*, which has so often been imitated. Besides several medical essays, he published *Tables of Greek, Roman, and Jewish Measures, Weights and Coins* (London, 1705—1708), a work which was long the best authority on the subject. There is also a philosophical poem of his composition in Dodsley's Miscellanies, entitled *Know Thyself*.

A'RBUTUS, a genus of plants of the natural order *Ericeæ*, containing a number of species, small trees and shrubs, the greater part of which are American. The fruit is fleshy, 5-celled, many-seeded, usually dotted with little projections, whence that of some species has a sort of resemblance to strawberries; the corolla is urn-shaped.—*A. Unedo*, the STRAWBERRY TREE, is a native of the south of Europe, found also in Asia and America, and in one locality in the British Isles, the Lakes of Killarney, where its fine foliage adds much to the charm of the scenery. It requires protection in winter in the climate of Paris. In Britain, it is often planted as an ornamental evergreen. It grows to the height of 20—30 feet, but is rather a great bush than a tree. The bark is rugged; the leaves oblongo-lanceolate, smooth and shining, bluntly serrated; the flowers nodding, large, greenish white; the fruit globose, of a scarlet color, with a vapid sweetish taste. It is, however, sometimes eaten. Of late, excellent alcohol has been made from it in Italy. A wine is made from it in Corsica, which, however, is narcotic, if taken in considerable quantity, as the fruit itself is, if eaten too freely. The bark and leaves are astringent. *A. Andrachne* is also sometimes cultivated as an ornamental plant in Britain, but is impatient of severe frosts. Its fruit, and that of *A. integrifolia*, are eaten in Greece and the east. But all the species seem to possess narcotic qualities in greater or less degree; the fruit of *A. furens*, a small shrub, a native of Chili, so much as to cause delirium.—*A. aculeata*, which abounds at Cape Horn and on Staten Island, is an elegant and most pleasing evergreen, very much resembling the myrtle. It grows to the height of 3 or 4 feet, and produces small white flowers, followed by a profusion of red shining berries, which ornament the bush during winter.

Arbutus Unedo, showing branch, flowers, and fruit.

Their flavor is insipid, but somewhat astringent. Mixed with a few raisins, they have been made by voyagers into tolerable tarts.—*A. Uva ursi*, now generally called *Arctostaphylos Uva ursi*, the RED BEARBERRY, is a small trailing evergreen shrub, common in the Highlands of Scotland and in the Hebrides, and indeed in the northern parts of Europe, Siberia, and North America. It grows in dry, heathy, and rocky places. The flowers are in small crowded terminal racemes, of a beautiful rose color. The berries are austere and mealy; they are said to form a principal part of the food of bears in northern regions. Grouse also feed on them. The dried leaves are used as an astringent and tonic medicine, and as such have a place in the pharmacopœias, being principally employed in chronic affections of the bladder; but those of *Vaccinium Vitis Idæa* are often fraudulently substituted for them.—The BLACK BEARBERRY (*A.* or *Arctostaphylos alpina*)

is also a native of the northern parts of the globe, a small trailing shrub, with black berries about the size of a sloe, relished by some, but having a peculiar taste, which to others is disagreeable. The plant is found on many of the Highland mountains in Scotland.

ARC (Lat. *arcus*, a bow) is any part of a curved line. The straight line joining the ends of an A. is its *chord*, which is always less than the A. itself. Arcs of circles are *similar* when they subtend equal angles at the centers of their respective circles; and if similar arcs belong to equal circles, the arcs themselves are *equal*. The length of an A. is readily found if the angle which it subtends at the center of the circle is known, and also the length of the whole circumference. Let the whole circumference be 100, and the angle of an A. 50°, the length of the A. is

$$360° : 50° :: 100 : \frac{100 \times 50}{360} = 14 \text{ nearly.}$$

ARC. See JOAN OF ARC.

ARCA, or ARK-SHELL, a genus of bivalve shells, and lamellobranchiate mollusca, the type of a family called *Arcadæ*, or *Arcaceæ*. In the true ark-shells, the hinge is straight. But one A. is found on the British shores; there are many species in warmer seas.

ARCACHON, a bathing-place which has sprung up recently on the south side of the Basin d'Arcachon, 35 miles S. W. of Bordeaux. The fine broad sands are admirably adapted for bathing; and the place is sheltered by sand-hills, covered with extensive fir woods; and its numerous villas amongst the firs are much frequented in winter by invalids afflicted with lung disease. Pop. (1876) 4934.

ARCA'DE (Fr.), a row of arches, supported by columns, either having an open space of greater or less width behind them, or in contact with masonry. The A. in Gothic corresponds to the colonnade in classical architecture, the difference between them being that, whereas the pillars in the colonnade support straight architraves, those in the A. support arches. The term A. is sometimes applied to a row of piers, or columns and arches, by which the aisles are divided from the nave of a church, or by which cloisters, or what are erroneously called piazzas in Britain, are enclosed; but it is more generally confined to those series of smaller arches which are employed simply for purposes of ornamentation. Arcades of the latter kind are often found surrounding the square towers of English churches. Of this we have early examples in the church of Middleton Stoney, Oxfordshire, and in the still older ones of Tewkesbury, and Christ Church in Oxford. The term is also applied, improperly, to a glass-covered street or lane, with a row of shops or stalls on each side.

ARCA'DIA, the middle and highest part of Peloponnesus, was bounded on the N. by Achaia, on the E. by Argolis, on the S. by Messenia and Laconia, and on the W. by Elis. According to Pausanias, it derived its name from Arcas, the son of Callisto. Next to Laconia, A. was the largest country in the Peloponnesus. It had an area of 1700 square miles, and was girt round by a circle of mountains, which cut off to a large extent its communication with the rest of the peninsula. Mountains also intersected it in different directions. The western part of what was anciently A., is wild, bleak and rugged, and was at one time covered with huge forests; the eastern is more fertile, the mountains not so high, and the vales more luxuriant. In these eastern valleys lay all the principal cities of A. The loftiest peak in A.—the loftiest also in the Peloponnesus—is Mount Cyllene, in the north-east (778 feet). The chief river was anciently the Alpheius (q. v.). Originally A. was named Pelasgia, after its first inhabitants, the Pelasgi. Subsequently, it was divided into several small states, which formed a confederation. Of these united states, the chief were Mantinea, Tegea, Orchomenos, Pheneus, Psophis, and Megalopolis. The inhabitants, engaged chiefly in tending cattle and in hunting among the wild highlands, remained long in a state of barbarism. After civilization had advanced, and the Arcadians had become known by their love of music and dancing, they still retained some military spirit, and were sometimes engaged as mercenary soldiers. But generally their character accorded with their simple, rural mode of life; though it seems certain that human sacrifices were offered as late as the period of the Macedonian sway. The Arcadians were not remarkable for their intelligence. In fact, an 'Arcadian youth' was a synonym for a blockhead. Pan and Diana were their favorite deities. Ancient and modern poets (the latter especially in the time when 'pastorals' were popular) have described A. as the land of peace, innocence, and patriarchal manners.

ARCA'DIUS, first emperor of the East (395—408 A.D.), was born in Spain, 383 A.D., and was the son of the Emperor Theodosius, after whose death the Roman empire was divided into East and West. A. lived in oriental state and splendor, and his dominion extended from the Adriatic Sea to the river Tigris, and from Scythia to Ethiopia; but the real rulers over this vast empire were, first, the Gaul Rufinus, and afterwards the eunuch Eutropius, who openly assumed the reins of government and the command of the army, while A. reposed in luxurious indifference. In 399, the eunuch Eutropius was deposed by another usurper, Gainas, who, in his turn, soon fell a victim to his own ambition. Afterwards, Eudoxia, the wife of the emperor, assumed the supremacy. One really great man adorned this period, the virtuous and eloquent Chrysostom, who was persecuted by Eudoxia, and through her influence exiled in 404, on account of his firm opposition to Arianism, which the empress herself favored. During the reign of A., his territories suffered by barbarian incursions, earthquakes, and famine, but nothing could disturb the indifference of the monarch. He died unlamented, 408 A.D.

A'RCÉ (anc. *Arx*), a town of South Italy, in the province of Caserta, 60 miles east-south-east from Rome. It is situated on a hill near Liris; and the summit of the hill, which is lofty and precipitous is crowned by an interesting medieval fortress called *Rocca d'Arce*. This fortress was considered impregnable till it was scaled and taken by the invading army of Charles of Anjou in 1266. Numerous inscriptions in which the name of Cicero occurs have been discovered near A.; and some ruins near the town are known as *L'aja di Cicerone*, or Cicero's Barn. Pop. of commune, 5467.

ARCESILA'US, a Greek philosopher, founder of the New Academy, was born at Pitane in Æolia, Asia Minor, 316 B.C. He studied philosophy, first under Theophrastus the Peripatetic, and afterwards under Crantor. After the death of Crantor, A. became the chief master of the Academic party, or those who held to the doctrines of Plato; but he introduced so many changes that its philosophic character was completely changed. His great rivals were the Stoics, whose opinions he attacked, but he does not appear to have attained any certainty in his own convictions. He had studied under too many masters, and discussed too many different systems, to be sure of the truth of any. He denied the Stoical doctrine of a 'convincing conception,' which he affirmed to be, from its very nature, unintelligible and contradictory. He also denied the existence of any sufficient criterion of truth, and recommended abstinence from any dogmatic judgments. In practice he maintained that we must act on grounds of probability. It is not easy to determine satisfactorily what his moral character was. A wit, a poet, and a man of frank and generous disposition, which seems to have captivated his disciples even more than his philosophy, he has yet been accused by his enemies of the grossest profligacy; and whatever extravagance there may be in such an extreme charge, it is tolerably certain that he died of a debauch in his 76th year (241 B.C.). Nevertheless, his adversary Cleanthes, the Stoic, passed this high enlogium on him: 'The morality which A. abolishes in his words, he re-establishes in his actions.'

ARCH, an arrangement of bricks, stones, or other materials over an open space, by which they are made not only to support each other by mutual pressure, but to sustain a superincumbent weight. We have the excellent authority of Sir G. Wilkinson for stating that the A. was known to, and used by, the ancient Egyptians; and that the Assyrians were acquainted with its principles is placed beyond doubt by the arched gateways so frequently represented in their bass-reliefs. The A. is generally supposed to have been unknown to the Greeks—a supposition which becomes very improbable if we hold it to be proved that it was used by nations with whose works they must have been familiar. But that the Greeks did not employ it generally in their architectural structures, is certain; and as it is not less certain that the Romans did, it is to the latter people that the nations of modern Europe are indebted for their acquaintance with its general utility. The introduction of the A. by the Romans gradually effected a complete revolution in the architectural forms which they borrowed from the Greeks. The predominance of horizontal lines gave way by degrees, till, as the Romanesque passed into the Gothic style, it was superseded by the segments of a circle, placed generally more or less in a perpendicular direction. In its earliest application by the Romans, the A. did not spring from the entablature of the columns, but was generally placed behind them, and rested upon separate imposts.

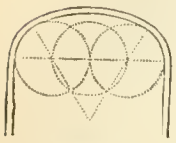
Subsequently, this arrangement was departed from, and the A. assumed the position which it has since retained above the columns; sometimes having an entablature interposed, and sometimes rising directly from the capital of the column or pier, as in the Romanesque. Before mentioning very briefly the different forms of the A., it seems natural to refer to a very simple structure, frequently met with in those early edifices in our own country which we are in the habit of designating as Saxon. It consists of two stones, their lower ends resting on rude piers, their tops leaning against each other, and thus forming two sides of a triangle, which is capable of supporting a moderate superincumbent weight. The mechanical principles on which the A. depends, though here very imperfectly employed, seem sufficiently

called into play to suggest their more extensive application; and it is not impossible that out of this rude construction the A., in its later and more elaborate forms, might have developed itself amongst ourselves without hints from foreign sources.

Of the A. itself, the following variations of form may be enumerated: The semicircle (1), the segment (2), the ellipse (3), which were the only forms employed by the ancients, and which alone were known in medieval architecture up to the time at which the pointed A. was introduced. Of these, the stilted A. (4), and the horseshoe A. (5), are modifications, in both of which the center or point from which the A. is described is above the line of the impost, but in the former of which the mouldings are continued downwards vertically; whilst in the latter they are slightly inclined inwards, or the curve is prolonged till it meets the impost. The horseshoe A. belongs peculiarly to Arabian architecture (q. v.), not only from its having originated simultaneously with the faith of the Prophet, but from its continuing to be used exclusively by his followers. Next, in point of time, though far surpassing all the others in beauty and variety, is the pointed A., the origin of which is still a subject of antiquarian controversy. The greater or less acuteness of the pointed A. depends on the position of the two center points from which its curved sides are described. Its various proportions will be better understood from the accompanying diagrams (6, 7, 8, 9) than from any verbal description

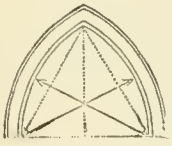
1. Semicircle.

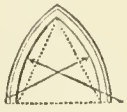
2. Segment.


3. Ellipse.

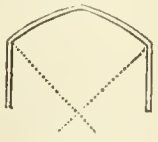
4. Stilted A.

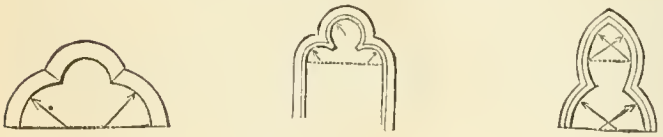
5. Horseshoe A.


6. Equilateral A.

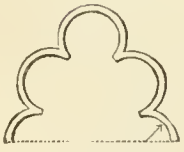

7. Lancet A.

8. Drop A.


9. Segmental A.

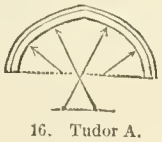

10, 11, 12 Trefoil Arches.

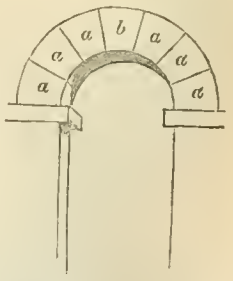
Of the foil arches (10, 11, 12, 13, 14), or arches in which the forms of a leaf are imitated, the first three are examples of the trefoil, the fourth of the cinquefoil, and the fifth of the polyfoil, the latter being met with in Arabian and Romanesque buildings. At a later period of Gothic architecture, with the decorated style, the ogee A. (15) was introduced, and the Tudor or four-cornered A. (16) appeared about the commencement of the perpendicular style. When first introduced, the proportions of this A. were bold and effective; but it was gradually depressed till the principle of the A. was lost, and its very form was again merged first in two and then in one flat stone or lintel over an opening. With the last form of the Tudor A, we thus reach almost the point of departure in the construction of the A. and complete our enumeration of its forms.


13. Cinquefoil A.

14. Polyfoil A.

15. Ogee A.


16. Tudor A.



The sides of an A. are termed *haunches* or *flanks*, and its highest part is called the *crown*. The wedge-shaped stones, bricks, or other materials of which an A. is constructed, are called *voussoirs* (*a*, *a*, *a*); the uppermost one of all (*b*) is called the *keystone;* the lowest, which is placed immediately over the impost, the *springer*, or springing-stone; the under or lower side of the voussoirs, the *intrados;* the upper side, the *extrados* or *back*. For the investigation of the mechanical principle of the arch, and of the conditions of stability, see Moseley's *Mechanical Principles of Engineering and Architecture*. See also BRIDGE, IMPOST, PIER, BUTTRESS.

ARCH, TRIUMPHAL, was a structure erected by the Romans across roads, or at the entrance of cities, in honor of victorious generals. The original triumphal arch was the Porta Triumphalis, one of the gates of Rome through which the triumphal procession entered the city. Among the earliest detached arches built at Rome was that built by Scipio Africanus (190 B.C.) on the Capitoline Hill. Under the emperors, these structures became numerous and magnificent, and were decorated with bass-reliefs and inscriptions. Three of what were properly triumphal arches still remain in Rome, those, namely, of Titus, Septimius Severus, and Constantine. Numerous similar monuments exist also in other parts of the old Roman empire, as at Rimini, Susa, Verona, Ancona, Orange (in France), Capura (in Spain).

Triumphal Arch of Constantine at Rome.

ARCHÆO'LOGY (Gr. *archaios*, ancient, and *logos*, a discourse) is the name now very generally given to the study which was formerly known as that of 'antiquities.' The term is well enough understood, although its meaning is not at all definitely fixed. In its widest sense, it includes the knowledge of the origin, language, religion, laws, institutions, literature, science, arts, manners, customs—everything, in a word, that can be learned of the ancient life and being of a people. When so used, it comprehends more or less of several branches of knowledge which are recognized as distinct or independent pursuits, such, for example, as ethnology, philology, history, chronology, biography, mythology, numismatics. In its narrower but perhaps more popular signification, A. is understood to mean the discovery, preservation, collection, arrangement, authentication, publication, description, interpretation, or elucidation of the materials from which a knowledge of the ancient condition of a country is to be attained. These materials will be found to divide themselves into three great classes: (1.) written, (2.) monumental, and (3.) traditional. 1. What may be called written A., may be again sub-divided into paiæography (q. v.), or diplomatics (q. v.)—that is, the science of ancient writings; and bibliography (q. v.), or the knowledge of printed books.

2. Monumental A. admits of almost endless sub-divisions, according to the character of the remains to be studied, which may be works of art, such as buildings, sculptures, paintings, engravings, inscriptions, coins, medals, seals, armorial-bearings, tapestry, furniture, plate, jewels, enamels, glass, porcelain, pottery; works of engineering, such as roads, canals, mines, piers, camps, forts, walls; works of unskilled labor, such as pillars of unhewn stone, caves, dikes, ditches, mounds of earth or stone; articles of dress, armor, or personal ornament; tools, weapons, implements, utensils, machines; appliances for locomotion, such as canoes, boats, ships, carriages; modes of sepulture, such as mummies, sarcophagi, urns, catacombs, graves; vestiges of man and animals, such as skulls, bones, skins. 3. Traditional A. includes as well the unwritten language and oral literature of a people, their dialect, legends, tales, proverbs, rhymes, songs, and ballads, as those sports, customs, ceremonies, rites, and superstitions now beginning to be known by the name of 'folk-lore,' and formerly called 'popular antiquities.'

The study of A. in modern Europe may be held to date from the revival of letters. It was long almost exclusively confined to

the antiquities of the Greeks and Romans. About the middle of the 16th c., Medieval A., or the antiquities of the Dark and Middle Ages, began to be cultivated. Egyptian A., or 'Egyptology,' as it is sometimes called, made comparatively little progress until the discovery of the Rosetta Stone, containing a bilingual and triliteral inscription, which enabled Young in 1819, and Champollion in 1821, to find a key to the hieroglyphics. The more recent discoveries of Botta, Layard, Rawlinson, and others, have already advanced Assyrian A. to a point beyond all expectation. Indian A. has been successfully prosecuted, especially during the last forty years, chiefly by officers of the East India Company. Something also has been done by them and others for Chinese A. Men of letters in the United States have devoted their time to the rude and scanty remains of the aboriginal inhabitants of North America. The A. of Central and South America, as it attracted attention much earlier, so its more stately and instructive monuments have much better rewarded such investigations as those of Lord Kingsborough, Messrs. Stephens and Catterwood, and others.

The study of A. has been largely promoted by the publication, at the expense of the state, in various countries, of the national chronicles, charters, and records; by societies and clubs contributing to the same end, or printing essays on questions of A; and by the establishment by the state, by associations or by individuals, of museums for the collection and classification of antiquities. In England, a society for promoting the study of antiquity was founded so early as the year 1572. The irrational jealousy of the government dissolved it in 1604. It was revived in 1707, enlarged in 1717, and incorporated by royal charter in 1751, under the name of the 'Society of Antiquaries of London.' An attempt to institute a similar society in Scotland was made about 1700, by 'some honorable and knowing gentlemen,' who resolved to continue their conferences till a complete historical account be made of the nation. But it was not until 1780 that the Society of Antiquaries of Scotland was incorporated by royal charter. The Royal Irish Academy for promoting 'the study of science, polite literature, and antiquities,' was chartered in 1786. The Society of Antiquaries of Scotland, and the Royal Irish Academy, have good museums of national antiquities. The British Museum in London (established in 1753), besides a great collection of early manuscripts and printed books, has galleries of Assyrian, Egyptian, Etruscan, Greek, Roman, British, and Medieval antiquities. One of the most remarkable collections of antiquities on the continent, is that of the Royal Society of Antiquaries of the North, at Copenhagen, arranged so as to illustrate a favorite theory of the Scandinavian archæologists—that the primitive antiquities of a country may be assigned to three successive ages or periods of stone, bronze, and iron, with as much certainty and precision as the comparative antiquity of geological strata, or periods of the world's creation, may be determined by the fossils which they are found to contain. The museums of the Louvre and the Hôtel de Cluny, in Paris, contain fine collections of Assyrian, Egyptian, Greek, and Roman antiquities, and an unrivaled collection of Medieval antiquities. The Royal Museum at Naples has gathered together the statues, paintings, vases, household utensils, and other objects recovered during the last hundred years from the ruins of Herculaneum and Pompeii. See ARCHÆOLOGY in AM. SUPP.

ARCHÆOPTERYX. See SOLENHOFEN LITHOGRAPHIC STONE.

ARCHANGEL, the chief city in the Russian department of Archangel, is situated in lat. 64° 32′ N., and long. 40° 33′ E., about 40 miles above the junction of the river Dwina with the White Sea; is the seat of an archbishop, and contains (1880) 19,540 inhabitants. Its name is taken from the monastery of St. Michael. A. is the chief commercial city for the north of Russia and Siberia, and is visited by numerous vessels—especially British—from July to September, the port being clear of ice only during that period. The houses are built chiefly of wood; and their general appearance is far from handsome. The finest edifices are the bazaar or mart, and the marine hospital. A. has an ecclesiastical college with 9 professors, schools for engineering and navigation, &c. The chief articles of traffic are fish, train-oil, skins, furs, timber, wax, iron, tallow, bristles, caviare. The town, which is the oldest seaport of the empire, and was for a long period the only one, was founded in 1584. During summer, A. has a continual market.—The government of A. has an area of 330,000 square miles, and had in 1880 a population of 307,231.

ARCHA'NGEL (from the Greek prefix *archi-* or *arch-*, denoting chief, and *angelos*, an angel), a term which occurs in the New Testament; and which, according to some, is there a title of our Saviour—but according to others, designates an angel superior in power and glory to the other angels. We read, in the Epistle of Jude, of 'Michael the A.,' and in Rev. xii. 7, of 'Michael and his angels.' In 1 Thess. iv. 16, we are told that the coming of our Lord at the last day shall be 'with the voice of the A., and with the trump of God.' We nowhere read in the Holy Scriptures of *archangels*, although the plural is popularly as much used as the singular. The notion of an angelic hierarchy certainly prevailed among the Jews, the highest place being assigned to Michael; and the same notion has extensively prevailed in the Christian church. There are passages of Scripture which seem to indicate different degrees and classes among the angelic hosts, but no clear revelation has been made upon this subject. See ANGELS.

ARCHANGEL, NEW. See SITKA.

ARCHBI'SHOP (Gr. *arch-*, and *episcopos*, overseer) is the title given to a metropolitan bishop who superintends the conduct of the suffragan bishops in his province, and also exercises episcopal authority in his own diocese. The title arose, in the 3d and 4th centuries, from the provincial synods being held once or twice a year in the chief town of the province under the presidency of the bishop of the place. Another cause of the origin of the title is said to be the custom of planting new bishoprics as Christianity spread, a slight supremacy being still retained by the original over the newly-appointed chief pastors. In the Oriental Church, the archbishops are still called 'metropolitans,' from the circumstance first mentioned. In the African Church, on the other hand, the term used was 'primus.' The great archbishoprics of the early Church were those of Jerusalem, Antioch, Ephesus, Alexandria, Constantinople, and Rome. Since the 6th c., the A. of Rome has assumed the name of Pope (papa). There is an official letter by Justinian, addressed to 'John, A. of Rome and Patriarch;' and several ecclesiastical constitutions are addressed to 'Epiphanius, A. of Constantinople and Patriarch.' The synod of Antioch, in 341, assigned to the A. the superintendence over all the bishoprics, and a precedence in rank over all the bishops of the church, who, on important matters, were bound to consult him and be guided by his advice. By degrees there arose, out of this superiority of rank, privileges which at length assumed the character of positive jurisdiction in ecclesiastical matters. Many of these rights passed to the patriarchs (q. v.) towards the end of the 4th and during the 5th centuries, and still more to the pope in the 9th. The archbishops still retained jurisdiction, in the first instance, over their suffragans in matters which were not criminal, and over those who were subject to them they acted as a court of appeal. They possessed also the right of calling together, and presiding in the provincial synods; the superintendence and power of visitation over the bishops of the metropolitan see; the power of enforcing the laws of the church; the dispensation of indulgences, and the like. The archbishops further enjoyed the honor of having the cross carried before them in their own archiepiscopate, even in the presence of the pope himself, and of wearing the *pallium*. In England, there are two archbishops, of whom the one has his seat at Canterbury, the capital of the ancient kingdom of Kent; the other at York, the capital of Northumbria. But though as ruling over a province in place of a single diocese, both have enjoyed the rank of metropolitans from the first, the A. of Canterbury has all along enjoyed, not merely precedence as the successor of Augustine and the senior A., but as possessing a pre-eminent and universal authority over the whole kingdom.

This pre-eminence is marked in the titles which they respectively assume—the A. of Canterbury being styled the Primate of all England (*metropolitanus et primus totius Angliæ*), whilst the A. of York is simply called Primate of England (*primus et metropolitanus Angeliæ*). It is also indicated by the places which they occupy in processions—the A. of Canterbury, who has precedence of all the nobility, not only preceding the A. of York, but the Lord Chancellor being interposed between them. Previous to the creation of an archbishopric in Ireland, the authority of the A. of Canterbury extended to that island. The amount of control which belongs to an A. over the bishops of his province is not very accurately defined; but if any bishop introduces irregularities into his diocese, or is guilty of immorality, the A. may call him to account, and even deprive him. In 1822, the A. of Armagh, who is primate of all Ireland, deposed the Bishop of Clogher on the latter ground. To the A. of Canterbury belongs the honor of placing the crown on the sovereign's head at his coronation; and the A. of York claims the like privilege in the case of the Queen-consort, whose perpetual chaplain he is. The province of the A. of York consists of the six northern counties, with Cheshire and Nottinghamshire. The rest of England and Wales form the province of the A. of Canterbury. The dioceses of the two archbishops—that is to say, the districts in which they exercise ordinary episcopal functions—were remodelled by 6 and 7 Will. IV. c. 77. The diocese of Canterbury comprises Kent, except the city and deanery of Rochester, and some parishes transferred by this act; a number of parishes in Sussex called 'peculiars;' with small districts in other dioceses, particularly London. The diocese of the A. of York embraces the county of York, except that portion of it now included in the dioceses of Ripon and Manchester; the whole county of Nottingham; and some other detached districts.

In Ireland, there are two Protestant and four Roman Catholic archbishops. Of the former, the A. of Armagh is primate of all Ireland; the A. of Dublin being Primate of Ireland. They for-

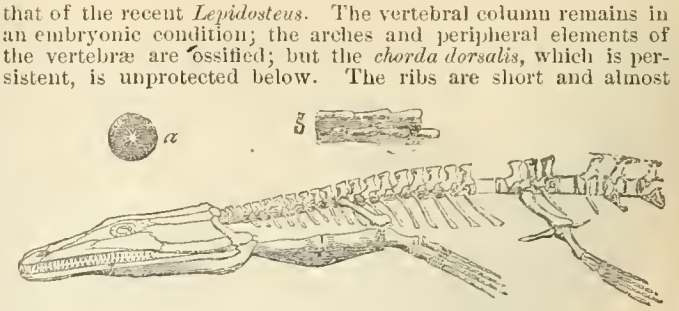
merly sat alternately in the House of Lords; the three bishops who, along with them, represented the Church of Ireland, being chosen by rotation. The election of an A. does not differ from that of a bishop (see BISHOP) but when he is invested with his office, he is said to be 'enthroned,' whereas a bishop is 'consecrated.' He also writes himself, 'by Divine Providence;' a bishop being, 'by Divine permission;' and has the title of 'Grace,' and 'Most Reverend Father in God,' whilst a bishop is styled 'Lord,' and 'Right Reverend Father in God.' The A. is entitled to present to all ecclesiastical livings in the disposal of diocesan bishops, if not filled up within six months; and every bishop, whether created or translated, was formerly bound to make a legal conveyance to the A. of the next avoidance of one such dignity or benefice belonging to his see as the A. shall choose.

ARCHDEA'CON (Gr. *arch-*, and *diaconos*, servant). An ecclesiastical dignitary whose jurisdiction is immediately subordinate to that of the bishop. The A. originally was simply the chief of the deacons, who were the attendants and assistants of the bishop in church affairs. His duties consisted in attending the bishop at the altar and at ordinations, assisting him in managing the revenues of the church, and directing the deacons in their duties. From being thus mere assistants, archdeacons in the 5th c. began to share the bishop's powers, and step by step attained to the authority which they now enjoy, which from the 9th c. became in many respects distinct from that of the bishop. Several synods protested against the innovation, but it was continued in the 11th and 12th centuries, when the archdeacons were recognized as the most influential of prelates. In the 13th c., their powers were limited by the establishment of episcopal courts. Their dignity and influence is now very much reduced in the Catholic Church. There were formerly sixty archdeaconries in England, but their number has been considerably increased since the passing of the act for carrying into effect the report of the Ecclesiastical Commissions (6 and 7 Will. IV. c. 77); and it is probable that under the provisions of that act they may be still further increased. No person can be appointed an A. till he has been six years complete in priest's orders (3 and 4 Vict. c. 113, s. 27). The duty of parochial visitation has long been regarded as belonging specially to the archidiaconal office, and it was by its exercise mainly that the archdeacons attained to the dignity of ordinary instead of delegated jurisdiction. Even in performing this function, however, and in holding general synods or visitations, ordering repairs of churches, and the like, the A. is properly to be regarded as being what the canon law called him, 'the bishop's eye.' The judge of the A.'s court, when he does not preside, is called 'the official.' There is an appeal to the Court of the Bishop, or in the case of an A. of an archbishopric, to the Court of Arches. See DEACON, DEAN, PRIEST. See also Cripps's *Law Relating to the Church and Clergy*. Edinburgh, 1857.

ARCHDU'KE. A. and Archduchess are titles now taken by all the sons and daughters of the Emperor of Austria, and by their descendants through the male line. The title of A. was gradually assumed by the dukes of Austria, as a mark of precedence over the other dukes of the empire. Duke Rudolph IV. of Austria, in 1359, called himself Palatinus Archidux, but he was not so styled by the emperor. His brothers, Albert and Leopold, did not assume the title after his death, though they had occasionally done so in his lifetime. The third son of Leopold, however, Ernest-the-Iron, revived it. Still he was addressed by the emperor simply as duke. At last the title was formally conferred on them by the Emperor Frederick III. in 1453, who himself, as duke, was the first recipient of the imperial gift. Still the usage was not uniform, for he afterwards speaks of himself as duke. The privilege was extended to the Tyrolian branch of the Austrian House in the person of Sigismund. The value of the dignity thus assumed was a cause of contention with Bavaria in 1589. The Austrian view was, that to duke it held the same relation that archbishop does to bishop. The dukes of Austria claimed to have always had precedence over the other ducal houses, and regarded the title as a mere indication of what had been universally acknowledged. Bavaria, on the other hand, relied on the greater antiquity of its dukedom. The contest was decided by the Emperor Rudolph II. in favor of Austria, the precedence of which has not since been called in question. Other dukedoms claimed the privilege of being so called, but it was invariably denied by the emperor.

ARCHEGOSAU'RUS, a remarkable fossil saurian reptile, so named by Goldfuss (*archegos*, leader; and *sauros*, lizard), as constituting the real beginning of reptilian life, which had previously been considered as not extending below the Permian series of rocks.

From the engraving, it will be seen that the head of the A. is protected by a firm dermal skeleton, composed of numerous plates, while the internal primary cartilage seems to have continued unossified. The skull is flattened and triangular, with rounded angles, the front one being somewhat lengthened. The teeth are simple cones, having a labyrinthic structure similar to that of the recent *Lepidosteus*. The vertebral column remains in an embryonic condition; the arches and peripheral elements of the vertebræ are ossified; but the *chorda dorsalis*, which is persistent, is unprotected below. The ribs are short and almost



Archegosaurus:
a, section of a tooth; *b*, scales.

straight, round and slender in the middle, expanded and flattened at the ends. The two pairs of limbs are nearly equal in size, and in structure very much resemble those of the *Proteus*. They have each four long, slender digits, which obviously supported a longish, narrow-pointed paddle, adapted for swimming. Externally, the body was protected by a covering of oblong quadrangular scales which have been preserved in some specimens.

Four species have been described.

The history of the A. is shortly this: Its remains found in the Bavarian coal-measures, had been described as those of a fish under the name of Pygopterus Lucius (Agassiz). In 1844, H. von Meyer first described it under the name of *Apateon pedestris*. This specimen was found in the coal-measures of Münster-Appel, in Rhenish Bavaria, and was supposed by Meyer to be related to the salamanders, and yet not without considerable doubt; for he says: 'its head might be that of a fish, as well as that of a lizard, or of a batrachian.' In 1847, Goldfuss figured and described three distinct species discovered in large concretionary nodules of clay-ironstone, from the coal-field of Saarbrück, giving to them the generic name of A. He considered them to be a transition state between the fish-like batrachia and the lizards and crocodiles. Professor Owen has subsequently described this fossil; he makes it a remarkable connecting link between the reptile and the fish, and on these grounds: It is related to the salamandroid-ganoid fishes by the conformity of pattern in the plates of the external cranial skeleton, and by the persistence of the *chorda dorsalis*, as in the sturgeon, while it is allied to the reptiles by the persistence of the *chorda dorsalis*, and the branchial arches, and by the absence of the occipital condyle, or condyles, as in *Lepidosiren*, and by the presence of labyrinthic teeth, as in *Labyrinthodon*, which, however, also ally it to the ganoid *Lepidosteus*. There is thus in the A. a blending together of the characteristics of reptile and fish in one animal. It occupies a position between, and equally related to, the salamandroid-ganoid fishes on the one hand, and the labyrinthodont reptiles on the other, while the latter conduct us through the *Lepidosiren* to the perennibranchiate batrachia.

ARCHELA'US, one of the Heraclidæ, who, when driven by his brothers from his native land, fled to Macedon, where he became the founder of a powerful family, of which Alexander the Great was said to be a descendant.—ARCHELAUS, natural son of the Macedonian king, Perdiccas II., came to the throne (after he had murdered the rightful heir) in 413 B.C. His reign was far better than its commencement, as he introduced several salutary measures, and was a generous patron of art and literature. Euripides and Zeuxis frequented his court; and the palace of the monarch was splendidly adorned by the paintings of the latter. It is said that Socrates refused an invitation to proceed thither, having no great respect for the character of A., which was stained with odious vices. He is believed to have been murdered by Craterus, one of his favorites; but the story of his death is told differently. —A., a general under Mithridates the Great, was sent into Greece with a large fleet and an army of 120,000 men to oppose the Romans in 87 B.C. Sulla was sent against him, and besieged him in Piræus, whence A. moved to Bœotia, and here collected all his forces. A battle took place at Chæroneia, when victory declared for the Romans. A. now retreated to Chalcis, where he waited until Mithridates had despatched another army of 80,000 men into Greece. The second fight took place at Orchomenos, in Bœotia, and, after two days' contest, the whole host led by A. was totally routed by Sulla. A., after hiding three days in a morass, escaped to Chalcis. After a treaty of peace had been effected between Sulla and Mithridates, A. fell under the displeasure of his monarch, being unjustly suspected of treason, and, fearing for his life, as also perhaps disgusted at the return he had received for his many services, he went over to the Romans at the outbreak of the second war, in 81 B.C. After this time, he appears no more in history.—A., son of the former, married Berenice, daughter of King Ptolemæus Auletes (56 B.C.), and ruled over Egypt for the short space

of six months during the banishment of Ptolemæus. The usurper lost his life in a battle against Aulus Gabinius, proconsul of Syria. His grandson, also named A., obtained from Marcus Antonius the province of Cappadocia, and retained it during the reign of Augustus. Tiberius accused him of political innovations, and condemned him to death; but, as he was old and fatuous, his life was spared. He died soon after his trial, at Rome, in 17 A.D.—A., son of Herod, the tyrant of Judea, succeeded his father in 1 A.D., and maintained his position against an insurrection raised by the Pharisees. His heirship to the throne being disputed by his brother Antipas, A. went to Rome, where his authority was confirmed by Augustus, who made him Ethnarch of Judæa, Samaria, and Idumæa. After a reign of nine years, he was deposed by Augustus, on account of his cruel tyranny, and banished to Vienna, in Gaul, where he died. His territories were added to the Roman province of Syria.

ARCHENHOLZ, JOHANN WILHELM, BARON VON, a German author, born Sept. 3, 1745, died Feb. 28, 1812. After service in the army, he gained his discharge at the close of the Seven Years' War, and passed several years in travel, visiting almost all the principal cities of Europe, and supporting himself by authorship, and, as it was generally reported, also by gambling. He wrote a *History of the Seven Years' War* (2 vols., Berlin, 1793), which, when compared with the generally dry style of his German contemporaries, deserves praise on account of its narrative interest. He also wrote *England and Italy* (2d edition, Leip. 1787), *Annals of British History* (1789—1798), and biographies of Queen Elizabeth of England, and Gustavus Vasa of Sweden.

A'RCHER FISH, a name given to certain small East Indian fishes of the Acanthopterygious family of *Squamipennes* or *Chætodontidæ*, which have the faculty of projecting drops of water with sure aim at insects, and thereby causing them to fall into the water, where they are instantly seized as prey. *Toxotes jaculator*, one of these species, is a fish about six or seven inches in length, a native of Java and other parts of the Indian Archipelago, and is that to which the name A. F. has been more strictly appropriated. It can project a drop of water to the height of four or five feet. It is the only known recent species of its genus, but there is a fossil one. *Chelmon rostratus*, also a Javanese fish, possesses the same power, and the Chinese in Java keep it in jars for their amusement, causing it to practise its art by placing insects within its range.

A'RCHERS AND A'RCHERY. Archers are soldiers whose weapons are the bow and arrow. Among the ancients eminent in this mode of warfare, were the Thracians, Cretans, Parthians, Numidians; among the moderns, the Arabians, Germans, and Saracens. The Emperor Frederick II. employed Saracenic archers in his Lombard campaign; and to them is ascribed the victory at Cortenuova in 1237. The archers belonged to the light troops, and their province was to open the battle. The Emperor Leo lauded the dexterity of the Arabian archers. Later the bow came to be employed in England, where the archers wore light armor, a short sword, and a quiver with twenty or more arrows. At first, these archers fought in small groups; in later years, in large masses. At the battle of Cressy they formed in divisions of 4000 men, 200 in line and 400 deep. The archers decided the fate of the day in several battles—such as Cressy and Potiers (1356), Agincourt (1415), Crévaut (1423), Verneuil (1424), and Rovernay (1429). The French archers never equaled the English, in spite of the pains Charles VI. and Charles VII. took with them. The latter organized in 1448 the *Franc-archers*, to which every parish had to contribute one man; but this was attended with so little success that the King took Scottish archers into his pay, to make head against the English. The French archers wore a coat of buffalo-hide lined with linen, and were accompanied by shield-bearers. Thus 2000 bowmen with their shield-bearers fought under the Count de Foix at the siege of Bayonne in 1451. The archers belonged to the élite of the troops, and received higher pay than the rest. At one period, the Arbalest or cross-bow was more in favor than the long-bow. See ARBALEST. Long after the discovery of gunpowder, we find the bow and arrow still used; as at the siege of Capua in 1500; and the siege of Peineburg in 1502. In 1572, Queen Elizabeth promised to place at the disposal of Charles IX. 6000 men, of whom half were archers. The English archers are the subject of frequent mention by our old writers. Chaucer, in his *Canterbury Tales*, speaks of the archer.

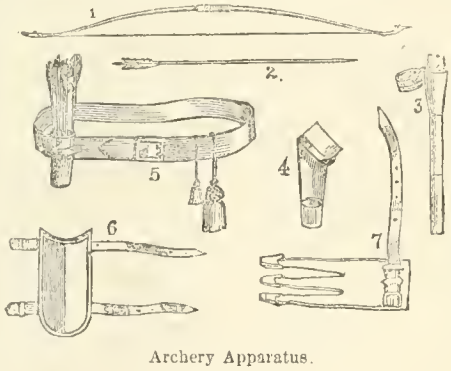
> 'Cladde in cote and hode of grene,
> A sheafe of peacock arwes brighte and kene,
> Under his belt he bare ful thriftilie.
> Wel coude he dresse his takel yewmanlie,
> His arwes drouped not with fetheres lowe,
> And in his hand he bare a mighty bowe.'

In a Treatise on Martial Discipline, by Ralph Smithe, written in the time of Queen Elizabeth, we have a picture of the English archer two centuries after Chaucer's time: 'Captens and officers should be skilful of that most noble weapon the long-bow; and to see that their soldiers, according to their draught and strength, have good bowes, well nocked, well strynged, everie strynge whippe in their nocke, and in the middes rubbed with wax braser, and shuting-glove, some spare strynges trymed as aforesaid; every man one shefe of arrows, with a case of leather defensible against rayne, and in the same four-and-twentie arrowes, whereof eight of them should be lighter than the residue, to gall or astoyne the enemye with the hailshot of light arrowes before they shall come within the danger of their harquebus shot. Let every man have a brigandine or a little coat of plate, a skull or hufkyn, a maule of leade of five foote in lengthe, and a pike, and the same hanging by his girdle with a hook and dagger.'

Among the Asiatic Turks, the Persians, the Tartars, and other nations of the east, as well as the American Indians, the bow and arrow are still used as weapons of war. In Europe, they are nearly abandoned for military purposes. The chief differences between the two kinds of weapon employed by the archers of the middle ages are noticed under ARBALEST; BOW AND ARROW.

Although archers are still included among the fighting-men of barbarous and semi-barbarous nations; in England, archery is now nothing more than a pastime, encouraged by archery clubs or societies. In this sense, however, archery is experiencing a revival, being healthful as an out-door exercise, even if no further useful. During the reign of Charles II., archery was much patronized by the court, Tothill Fields being the chief scene of exercise. After his reign, archery fell into desuetude for about a century. In 1776, a Mr. Aston revived archery in the neighborhood of London; and very shortly there were several toxophilite or archery societies formed. The system survived till 1793, when another period of inactivity supervened, lasting till 1844. In this last-named year, archery revived in Yorkshire, and has since gone on extending every year. A recommendation to the sport is that the ladies can take part in it—one of the few open-air pastimes of which this can be said. In the modern exercise of archery, there are several varieties of contests between the antagonistic parties; but the usual variety is target-shooting. In archery-matches, a number of prizes are generally awarded, the principal being for the greatest number of arrows shot in any part of the target, and for the nearest approach to the exact center. The target has a gold spot in the center, a red ring around this, then a blue ring, then a black, and outside of all a white ring bordered with green.

The merit of the shooting consists in a near approach to the exact center or 'gold.' Two targets are generally used in a match, on opposite sides of the field, each by one party. The apparatus mostly used at these archery meetings is represented in the annexed cut. 1 is a bow, varying in weight according to the strength of the person who is to use it; 2 is the arrow; 3 is the quiver, a tin case for holding arrows not immediately in use; 4 and 5 are the pouch and belt for holding the arrows actually in use. The tassel of the belt serves to clean the arrows when dusty. 6 is the brace, buckled round the left arm, to protect it from being hurt by the string when shooting; 7 is the shooting glove, formed to protect the three fingers used in drawing the string. Besides these articles and the target, archers are sometimes provided with a large case called an 'ascham,' fitted up with the necessary drawers and compartments for the reception of the bow, arrows, string, and other necessary accoutrements.



Archery Apparatus.

In archery competition, the total number and value of each person's hits are registered on a scoring-card. The shots are usually punctured on a card with a pin, as being preferable to pencil or ink marks; and the mode of ascertaining the value of the hits, which is increased in proportion as they reach the center, will be seen by the following example:

FORM OF THE SCORING-CARD.

Names.	Gold.	Red.	Blue.	Black.	White.	Total.	Value.
A	. .	....	.....	.....	.....	35	119
			.	.....	.....		
					...		
B	.	..	.....	.....	.....	26	80
			...	.	....		

It appears by the card that A has two in the gold, four in the red, six in the inner white, ten in the black, and thirteen in the

outer white, making a total of thirty-five. The real value of these is ascertained by multiplying the hits in the gold by nine; in the red, by seven; in the blue, by five; in the black, by three; and by leaving without alteration the number in the white or outer. By this process it will appear that A's numbers, according to the *value* of each circle, amount to 119, and B's to 90—hence A is the winner by 29. But A's *total* might have been less than B's, and still he might have been the winner, providing the shots had lain more towards the gold than B's.

As an instance of the skill which long and careful practice may insure, Mr. Horace A. Ford, who has written an excellent work on Archery, on one occasion, out of 144 shots, made 143 hits—765 score; on another, 144 shots, 137 hits—809 score; and on another, 75 shots, 75 hits—555 score.

A'RCHIL, or O'RCHIL, is a coloring substance obtained from various species of lichens. The A. is not originally present in the lichens, but is developed during a process of putrefaction and fermentation. The lichens, collected from rocks near the sea, are cleaned, ground into a powder with water, placed in tanks, and ammoniacal liquids—such as purified gas liquor or stale urine—added, when by the combined influence of the ammonia, air, water, and the constituents of the lichens, a violet-colored matter is generated, which appears for a time to dissolve in the water, but finally falls to the bottom of the vat in the condition of a moist powder or paste. The latter is then mixed with some substance like chalk or stucco, to give it consistence. The lichens which yield the best A. in largest quantity, are *Roccella tinctoria* and *fuciformis*. The former is called the *Archil* plant, and is obtained in large amount from the Canaries and Cape de Verd Islands, and the Levant. Another lichen *Lecanora tartarea*, collected from rocks in Sweden, is largely imported into Britain. It is sometimes called cudbear (q. v.), or cudbear lichen, and sometimes white Swedish moss. A. is soluble in water and in alcohol, to either of which it imparts a violet color, with a good deal of a crimson hue. It is much employed in the dyeing of silks, where a beautiful lilac color is required; but though a brilliant rich hue is imparted to the silken fabric, the color is not a permanent one, being easily acted upon by the rays of the sun. Hence the A. is seldom used by itself, and the cloth is first dyed lilac by another coloring matter, and is then passed through an A. dye, which imparts a brilliant lilac hue to the cloth. A. is seldom employed to dye cotton cloth, but it is often used, along with indigo, in the dyeing of woollen cloth; and besides enabling the indigo color to go much further; it imparts its peculiar rich tint to the blue or black cloth or yarn immersed in it; the color, however, so obtained is not so permanent as where the A. is left out. Cudbear (q. v.) and Litmus (q. v.) are analogous to A., and are obtained from the same lichens.

The lichen distinguished by the name of the A. plant or lichen, *Roccella tinctoria*, grows very sparingly on the southern coasts of England, but abundantly on the shores of the Mediterranean and of the neighboring parts of the Atlantic, where it often covers rocks near the sea, so as to form what has been likened to a sort of turf upon them. The Spanish name is *Orciglia*, from which the French *Orseille*, the English A. or Orchil, and even the botanical name *Roccella*, are derived. It is of a substance between cartilaginous and leathery, roundish, pretty erect, branching in a dichotomous manner, of a grayish brown color, with powdery warts (*soredia*); the *apothecia* (q. v.) orbicular, flat, horny, almost black, with a scarcely prominent border. That from the Canary Isles is generally regarded as the best. It seldom exceeds the thickness of a pin, and about an inch and a half in length. A less branched and more slender, prostrate, or pendulous variety (*Roccella hypomecha* of Bory de St. Vincent) is common at the Cape of Good Hope and in the island of Mauritius, and appears in commerce along with the other, but is of very inferior quality. A variety remarkable for its large size, or perhaps a distinct species (*R. flaccida*), is brought from Lima and other parts of the west coast of South America; it is sometimes as thick as a goose-quill, and 6 or 8 inches long, and is of excellent quality. All these, and *Roccella fuciformis*, very generally receive in commerce, and from A.-makers, the name of Orchella weed, the different kinds being distinguished according to the countries from which they are imported. They are also popularly called Dyer's Moss.—*R. fuciformis* now yields perhaps more of the A. or Orchella weed of commerce than *R. tinctoria*. It differs from *R. tinctoria* chiefly in being not rounded, but flat, and in having the *apothecia* very distinctly bordered. It grows in similar situations, and is also a native of Britain, but abundant only in warmer climates, as on the coasts of Africa, Madagascar, &c. That from Angola is reckoned of the very best quality.

Among the lichens from which A. is manufactured is the *Parelle d'Auvergne* or *Orseille de terre* (Ground A.) of the French *Variolaria orcina* or *corallina*, which is gathered for this purpose in mountainous districts of the south of France and other parts of the south of Europe, and is also an article of export (with other similar lichens) from Sweden to Holland. But the greater facility with which A. of the finest quality can be procured from the species of *Roccella*, and the increasing abundance of the supply from different quarters, particularly from Angola, tend to diminish the demand for other lichens.

ARCHI'LOCHUS of Paros, in Lydia, flourished about 714—676 B.C., and is regarded as the first of the Greek lyric poets, although the origin of the elegy is claimed for Callinus, a writer whose age seems to have slightly preceded that of A. Glimpses of his life, especially of the calamities which befell him, were frequently given in his writings. His father's name was Telesicles, his mother was a slave called *Enipo*. At an early age, becoming entangled in political contests, he abandoned his native town, and led a colony of the citizens to Thasos. While here, as he informs us in some extant verses, he lost his shield in a battle against the Thracians, yet not through cowardice. Subsequently he was banished from Sparta, to which he had gone, some say because he had vindicated his conduct in running away from the fight, others, because of the licentiousness of his verses. He is said to have gained the laurel-wreath at the Olympic games by an ode in honor of Hercules, but this is doubtful. Having returned to Paros, he took part in the war which broke out betwixt it and Naxos, in the course of which he lost his life, either in battle or by assassination. The Delphian oracle pronounced a curse upon his slayer. Variety, novelty, and satirical bitterness characterized his lyric poems; so much so, that 'Archilochian bitterness,' and 'Parian verse,' became by-words in ancient times. He scourged his enemies in the most merciless fashion, and always displayed the most malicious skill in selecting for his sarcasm the points on which they were the most sensitive. It is said that Lycambes, who had promised his daughter Neobule in marriage to A., having failed to fulfil the promise, was so severely satirized by the poet, that to escape ridicule, both father and daughter hanged themselves. Among the ancients A. was ranked with Homer. They dedicated the statues of both on the same day, and placed the head of A. beside that of Homer on the same bust. It is therefore supposed, and with high probability, that there must have been far more in A. than mere vehemence of satire. Even Plato, who was not likely to err on the side of admiration in such a case, calls him 'the very wise;' and Gorgias, the rhetorician, is reported to have said, when Plato sent forth his dialogues against the Sophists, 'Athens has given birth to a new A.' There must have been strong sense, and a keen perception of truth in the man, to have won so universal and permanent a reputation. Still the line of Horace—who was a vigorous imitator of him in many respects—proves that 'rage' was considered 'the special faculty' of A.

'*Archilochum proprio* rabies *armavit iambo.*'
Ars Poetica, line 79.
'Rage hath armed Archilochus with his own iambus.'

The word *iambus* was in use before the time of A., and was employed to denote a species of rude raillery, such as flashed out spontaneously under the inspiring excitement of the Bacchic and other festivals. A. was, however, the first to reduce these irregular and capricious effusions to fixed rules. See Iambics. The semi-pentameter, of which he made abundant use, was called after him *Archilochian verse*.

The fragments extant of his poetry have been edited by Bergk in his *Poetæ Lyrici Græcorum* (Leipsic, 1843).

ARCHIMA'NDRITE (Gr. *archi-*, chief, and *mandra*, a fold or a convent), the title of the highest order of superiors of convents in the Greek Church (see Abbot). The Russian bishops are chosen from among the archimandrites.

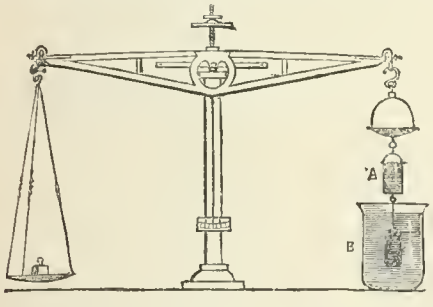
ARCHIME'DES, the most celebrated of ancient mathematicians, was born at Syracuse about 287 B.C. He is said to have been a kinsman of King Hiero, though he does not seem to have held any public office, but devoted himself entirely to science. In regard to mathematics, we cannot estimate fully the merits of A. without a more exact knowledge of the state of the science as he found it; we know, however, that he enriched it with discoveries of the highest importance, on which modern mathematicians have founded their methods of measuring curved surfaces and solids. Euclid only considers a few curved figures in relation to one another, but without comparing them with rectilineal surfaces and solids. The theorems necessary to this transition are laid down by A. in his treatises 'on the Sphere and Cylinder,' 'on Spheroids and Conoids,' and 'on the Measurement of the Circle.' His demonstration that the area of a segment of a parabola is two-thirds of the enclosing parallelogram, is the first real example of the quadrature (q. v.) of a curvilinear space. In his treatise on spirals, he rises to yet higher investigations, which, however, are not very easily understood even by masters of the subject.

A. is the only one of the ancients that contributed anything satisfactory on the theory of mechanics and on hydrostatics. He first established the truth, that a body plunged in a fluid loses as much of its weight as is equal to the weight of an equal volume of the fluid. (See the following article.) It was by this law that he

determined how much alloy the goldsmith, whom Hiero had commissioned to make a crown of pure gold, had fraudulently mixed with the metal. The solution of the problem had suggested itself to him as he was entering the bath, and he is reported to have been so overjoyed as to hasten home without waiting to dress, exclaiming: 'I have found it! I have found it!' (*Eureka! Eureka!*) Practical mechanism seems to have been an equally new science in the days of A.; for his boast, that if he had a fulcrum or standpoint, he could move the world, betrays the enthusiasm with which the extraordinary effects of his newly invented machines inspired him. Among the numerous inventions ascribed to A., is that of the endless screw, and the *cochlea* or water-screw (see ARCHIMEDES' SCREW), in which the water is made in a manner to ascend by its own gravity. During the siege of Syracuse by the Romans, he exerted all his ingenuity in the defence of the city. Polybius, Livy, and Plutarch speak with astonishment of the machines with which he opposed the attacks of the enemy.

But while giving detailed accounts of his other contrivances, they say nothing of his having set fire to the ships by means of mirrors, a story which is not very probable in itself, and rests on later narratives. When the Romans took the city by surprise (212 B.C.), A., according to the tradition, was sitting in the public square lost in thought, with all sorts of geometrical figures before him drawn in the sand. As a Roman soldier rushed upon him, he called out to him not to spoil the circle! But the rude warrior cut him down. According to his own direction, a cylinder enclosing a sphere was engraved upon his tombstone, in commemoration of his discovery of the relation between these solids—a discovery on which he set particular value. When Cicero was in Sicily as questor, he discovered the tomb hid among briers. His collected extant works were edited by Torelli (Oxf. 1792). There is a French translation with notes by F. Peyrard (Paris, 1808, 2 vols.), and one in German by Nizze (Strals. 1824). The *Arenarius* was translated into English by G. Anderson (Lond. 1784). The object of the treatise is to prove that it is possible to assign a number greater than that of the grains of sand that would fill the sphere of the fixed stars, the diameter of which A. assumes at a certain number of stadia. The difficulty lay in expressing such a vast number by means of the clumsy notation of Greek arithmetic, and the device by which the difficulty is eluded is considered as affording a striking instance of A.'s genius.

ARCHIMEDES, the PRINCIPLE OF, is one of the most important in the science of Hydrostatics, and is so called because the discovery of it is generally ascribed to the Syracusan philosopher. It may be thus stated: A body when immersed in a fluid loses exactly as much of its weight as is equal to the weight of the fluid it displaces; or: A fluid sustains as much of the weight of a body immersed in it as is equal to the weight of the fluid displaced by it. It is proved experimentally in the following way. A delicate balance is so arranged that two brass cylinders, A and B, may be suspended from one of the scale-pans, the one under the other.



The lower cylinder, B, is solid, or closed all round, and fits accurately into the upper cylinder, A, which is hollow. When the two cylinders are placed under the one scale, pan-weights are placed upon the other until perfect equilibrium is obtained. The cylinder B is now immersed in water, and in consequence of the buoyant tendency of the water exerted upon it, the equilibrium is destroyed; but it may be completely restored by filling the hollow cylinder, A, with water. The amount of weight which B has lost by being placed in the water, is thus found to be exactly the same as the weight of a quantity of water equal to its own bulk, or which is the same thing, to the quantity of water displaced by it. When bodies lighter than water are wholly immersed in it, they displace an amount of water of greater weight than their own, so that if left free to adjust themselves, they swim on the surface, only as much of their bulk being submerged as will displace a quantity of water weighing the same as themselves. Accordingly, while bodies heavier than water displace, when put into it, their own bulk, bodies lighter than water displace, when allowed to float on the surface, their own weight of the fluid. Bodies of the same weight as water, according to the principle of Archimedes, have no tendency to rise or sink in it, for the water displaced by them weighs precisely they same as they do. The pretty scientific toy called the Cartesian Diver is intended to illustrate this. Although the principle of Archimedes is generally established with reference to water, its application extends equally to bodies immersed in air or in any other fluid.

ARCHIME'DES' SCREW (called also the *spiral pump*), a machine for raising water, said to have been invented by Archimedes, during his stay in Egypt, for draining and irrigating the land. Fig. 1 represents it in its simplest form. This consists of a flexible tube bent spirally round a solid cylinder, the ends of which are furnished with pivots, so as to admit of the whole turning round its axis. The machine is placed in an inclined position, so that the lower mouth of the tube may dip below the surface of the water to be raised. In the position represented in the figure, the lowest bend (*a*) of the tube will be filled with water, and if now the handle be made to turn in the direction of the hands of a watch, the mouth of the spiral tube will be raised above the surface; and the water enclosed in the tube, having no means of escape, will flow within it until, after one revolution, it will occupy the second bend, *b*. The first bend (*a*) has meanwhile received a second charge, which, after a second revolution, flows up into the second bend (*b*), and takes the place of the first charge, which has now moved up to the third bend, *c*.

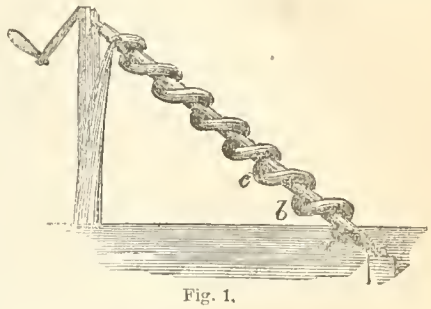


Fig. 1.

When, therefore, as many revolutions of the cylinder have been made as there are turns in the spiral tube, each of the lower bends will be filled with water; and in the course of another revolution, there being no higher bend for the water of the first charge to occupy, it will flow out of the tube by its upper mouth. At each succeeding revolution, the lowest bend will be charged, and the highest discharged. It will be seen from the figure that there is room to dispose a second tube side by side with the first, round the cylinder, in which case the screw would be called double-threaded. In the ordinary construction of these machines, the cylinder itself is hollowed out into a double or triple threaded screw, and enclosed in a water-tight case, which turns round with it, the space between the threads supplying the place of such tubes as are seen in Fig. 1. Fig. 2 represents a double-threaded A. S. of this description, with the case removed in front. It is sometimes found convenient to fix the exterior envelope, and to make the screw work within it, the outer edge of the latter being as close as possible to the former without actual contact. This modification of the A. S. receives the name of water-screw, and frequently of Dutch screw, from its being extensively used in Holland for draining low grounds.

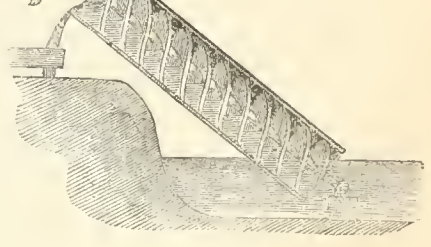


Fig. 2.

ARCHIPE'LAGO, a term (of doubtful etymology) applied originally to that gulf of the Mediterranean which separates Greece from Asia; but now extended to any sea, like it, thickly interspersed with islands, or rather to the group of islands themselves. The islands in the Greek Archipelago or Ægean Sea consist of two groups, called Cyclades and Sporades; the first from their being massed after the manner of a circle, the second from their being scattered in something of a line. The former lie to the east of Southern Greece, while the latter skirt the west of Asia Minor.

Of the Cyclades the principal islands are: Lyra, Kythnos, Thera, Tenos, Andros, Naxos, Melos, and many more of inferior size. They all belong to *Greece*, and will more conveniently be considered in connection with it. The chief islands of the Sporades are: Scarpanto, Rhodes, Cos, Patmos, Nicaria, Samos, Scio, Metelin, Lemnos, Imbros, Samothraki, Thasos, and many more of inferior size. These all belong to Turkey, and constitute a separate vilayet of the empire. Of both groups, the more considerable islands will be noticed, under the alphabetical arrangement, in their respective places.

The other Archipelagoes, loosely so called, will receive separate notice each in its proper place.

A remarkable circumstance may be mentioned in connection

with Archipelagoes. The islands of the globe rarely stand alone. With very few exceptions they may all be classified into clusters. In most clusters, again, there is generally more or less of similitude between the different members of each—similitude sometimes of one kind, and sometimes of another. Perhaps the similitude that is most obvious even on the face of an ordinary map, is that, really like the links of a chain, the members of a cluster have their lengths, as distinguished from their breadths, in one and the same direction. In the West Indies, for instance, look at the Bahamas, and look also at the Antilles, Greater and Lesser. In the East Indies, again, the same thing is seen in carrying the eye from the north end of the Philippines to the north end of Sumatra, or even of the Andamans. Lastly, on the opposite coasts of the Upper Pacific, observe the American side upwards from the south end of Vancouver's Island to Mount St. Elias, and the Asiatic side downwards from the upper extremity of Kamtchatka—which is all but an island—through the Kuriles, to the lower extremity of Japan.

ARCHITE'CTURAL PAINTING has for its subjects the exteriors or interiors of remarkable buildings; churches, castles, streets in cities, &c. It is mentioned by Vitruvius, but is comparatively a modern art. Benozzo Gozzoli, Ghirlandajo, and the Venetian school, cultivated this department of art in the middle ages; and Pinturicchio, by order of Pope Innocent VIII., painted a series of views of cities in the style of the Flemish school, which, under the brothers Van Eyck, had distinguished itself by careful treatment of architectural backgrounds, &c. For a long time, A. P. was regarded only as accessory to other styles of art; but, at the close of the 16th c., P. Neefs, in his views of the interior of Gothic churches, gave to this branch of the fine arts an independent form; and Steenwyck the younger, in the following century, extended its application in his views of the interiors of prisons, of which his picture of 'Peter Liberated from Prison' is an example. The art was still further extended and cultivated by Van der Heijden, Blick, Van Deelen, E. de Ville, Johann Ghering, and others who painted views of church interiors in the Italian style, palaces, and chambers. The interior view of the Church of Amsterdam, painted by Ruisdael, deserves especial notice. In the 18th c., the Venetian Canale and his nephew Bellotto (generally known by the name of Canaletto), painted many views of cities, but especially of the canals and buildings of Venice. Collections of their numerous works are found at Dresden, Woburn Abbey, &c.

In recent times, A. P. has been very successfully cultivated in Germany, France, England, Holland, and Belgium. Schinkel is celebrated for his fine union of classical taste with richness of decorative invention. His two most striking works are St. Peter's, and the Duomo at Milan; Paul Gropius has shown great talent in his Cathedral at Rheims, built in honor of Joan of Arc. His dioramas are well known; and Domenico Quaglio, who died in 1837, throughout his innumerable compositions, has exhibited an exquisite appreciation of perspective, and of the poetical arrangement of details. Among modern A. painters may be mentioned—in England, Prout (views of Italy, Germany, &c.), Robert (whose genius has sought for its materials in Spain and the East, and who paints the architecture of foreign lands with rare truthfulness and lively vigor), Mackenzie, Goodall, Williams, and the water-color painters Haghe, Chase, Howse, and others; in France—Granet (died 1849), the most celebrated art painter of the new French school; and the water-color painters Ouvrié, Garnery, Rochebrune, and Villeret; in Italy—Migliara and Nehrlich (a German, who has been styled 'the modern Canaletto'); in Germany—Von Bayer, Hasenpflug of Halberstadt (who paints beautifully old cloister-alleys under winter-effects), Ainmuller, Vermeersch, Pulian of Düsseldorf (who displays great skill in the representation of old streets and time-worn churches), Conrad, Gärtner, Grœb, Helfft, Dietrich, &c.; in Holland and Belgium—Waldorp, Carsen, Boosborn, Von Haanen, Ten Kate, Springer, and Bossuet.

A'RCHITECTURE (Lat. *architectura*, from the Gr. *architecton*, the chief fabricator, the architect), the art of building or constructing. In this country, A. is usually divided in Civil, Military, and Naval. In the present article we shall confine ourselves to the first, the two latter being treated of, the former under the head of FORTIFICATION, the latter under that of SHIP-BUILDING. Civil A., when taken in the widest sense, may be regarded either from an artistical, a scientific, or a utilitarian point of view. In the first case, as a means of giving external form and sensible expression to mental conceptions or ideas, it is a branch of æsthetics, or of the fine arts properly so called (see ART), and takes rank with sculpture and painting; in the second case, it consists in a knowledge of certain laws, of physical nature, and a consequent power of calling them into play, or counteracting their operation, and is consequently a branch of that wider department of science to which the name of *Mechanics* (q. v.) is given; whereas in the last it becomes a practical art, which has for its object the application of the principles, both artistic and scientific, which A. embraces, to the elevation of national and individual character, and the increase of the physical comfort and well-being of mankind. But though it admits of being thus analyzed or separated in thought, it must not be imagined that A. can exhibit in practice any one of these principles to the exclusion of the others.

The abstract conception of all-pervading deity, as embodied in the Greek temple—the religious aspiration after a personal god, as shadowed forth in the Gothic cathedral—can be realized only in accordance with the principles of mechanics, and the most rigorous adaptation of means to ends; whereas, in an opposite direction, the kraal of the Hottentot, the hut of the Indian in the American wilderness, or even the vulgar chimney-stalk in the dingy manufacturing suburb, if properly constructed for their respective purposes, will be found to have obeyed such æsthetical principles as they may have come in contact with. Nature is not self-contradictory; and art and science, beauty and utility, when rightly understood, are never in conflict. A celebrated German writer and thinker (F. Schlegel) has described A. as 'frozen music;' and the comparison is in accordance with the remarks which we have made; for music, though apparently the freest and most lawless, is in reality the most rigorously scientific of the arts. But though a strict adherence to all the principles of A. be indispensable to every genuine architectural structure, whatever be its object, it by no means follows that equal prominence must be given to each of these principles on every occasion. If a building has for its primary object the expression and commemoration of such feelings as grief, gratitude, devotion, or the like, this object manifestly will be best attained by subordinating the scientific and utilitarian to the æsthetic principles of A.; and the reverse will be the case where mere convenience, and also, though in a lesser degree, where convenience, in combination with beauty or magnificence, is sought. It is in a great measure by the prominence which they have given to one or other of these principles, that different nations have displayed their diversities of character in their A. The speculative and poetical character of the Greeks was exhibited in their temples, whilst their preference of the state to the individual appeared in the fact that these structures were designed for the worship of the protecting divinity of the city by the citizen, not for the worship of a personal god by the individual man. Amongst the Romans, again, terrestrial power and material aggrandizement were the exclusively national aspirations, and consequently their A. had their own honor and glory primarily in view. The basilicas, amphitheaters, and triumphal arches of the Romans were their own; but the temples which they raised in honor of the gods, were little else than imperfect copies from the Greek, with scarcely any assignable national characteristics. Then, when we come to medieval times, though, on the revival of spiritual tendencies, æsthetic principles again become prominent, they exhibit themselves under totally different forms; and the distinctions between heathen and Christian thought could scarcely be more distinctly stated in words than they are exhibited to the eye in the difference between a Greek temple and a Gothic cathedral. Even the relation which subsists between Christian and Mohammedan A. (Gothic A. and Arabian A., q. v.) strikingly reminds us of the fact that Mohammedanism was but a sort of bastard Christianity.

Domestic life again appeared in full purity and vigor only in modern times; and then only do we see the utilitarian principles of A. finally prevailing over the æsthetic. But apart from the mental characteristics and tendencies of a people, there are many other circumstances which modify their A. Of these, one of the most important is climate. Arrangements for the permanent and commodious residence of the family within doors could not be expected to attain much perfection amongst a race like the Greeks, whose life was spent in the open air; and the climate of Holland, as well as the genius of the people and the character of their occupations, has had much to do with the fact that the Dutch have rarely risen above a town-house. Following thus the peculiarities of national character and circumstances, it is obvious that the more widely these differ in any two nations, the more dissimilar will be the styles of A. which they produce respectively. Moreover, it is apparent that the higher the stage of national development, the more marked will be the character which the A. of a people will assume. A. thus bears a strict analogy to language. Both are an expression of thought, and in the one and in the other, the richness, variety, and precision of the expression will be in proportion to the quantity and quality of the thought to be expressed. Lastly, in the fact that all genuine A. is the expression of the ruling national ideas and forms of thought of some one particular people, we perceive the reason why a building compounded of several styles should be characterless and unpleasing; and why this should be more and more the case, the more characteristic the styles compounded, and the greater the equality preserved amongst them. The Doric pillar in itself, and still more perhaps, the Roman adaptation of it, is the simplest and most rudimentary of all pillars; and what we are in the habit of calling Saxon, is the simplest and most rudimentary of all the styles of Gothic A.; and hence the introduction of a few Tuscan pillars considerably modi-

fied into a Saxon or Romanic church, does not awaken feelings of very decided repugnance, whereas an attempt to combine equally the beauties of the Parthenon and of Cologne Cathedral in the same building would be unspeakably revolting. The limits of the present article preclude us from presenting to the reader a consecutive account of the origin and development of the different styles of A. These will be treated under separate heads (see EGYPTIAN A., INDIAN A., GREEK A., GOTHIC A., ARABIAN A.; see also ARCH, PILLAR, ARCHITRAVE, &c.); and all that can be here attempted is to trace the earlier stages through which A. passed in the historical nations, before it reached the point at which it afforded the means of expressing the feelings or supplying the wants of mankind,

1. The earliest stage of the monumental A. in every part of the world seems to have been that in which it supplied to the existing generation the means of setting a mark on the face of the earth, of a nature so ineffaceable as that it should continue to be visible to future generations. No attempt was yet made to tell the tale either by the form of the monument, or by any figure or inscription engraven on it. Apart from the tradition intended to accompany it, it was speechless—confessedly unintelligible. But it is easy to see how powerful would be the effect of such an erection in preserving that tradition from oblivion, and fixing it down to the particular locality; for so long as a conspicuous object existed, which obviously was the work of human hands, the cause of its existence would be a subject of curiosity, which could be gratified only by inquiries which must lead to a recital of the events intended to be commemorated. It was with this view that Joshua (xxiv. 26) took a stone, and set it up under an oak that was by the sanctuary of the Lord—'And said unto all the people: Behold, this stone shall be a witness unto us; for it hath heard all the words of the Lord.' To this primary class of monuments belong those tumuli or barrows, and conical heaps of stones called cairns, carns, or kearns, which, when they occur in Britain, we perhaps rightly ascribe to the Celtic portion of our forefathers, but which there is much reason to believe have been erected by every race at a certain stage of their progress. The barrow, it is true, is not wholly destitute of architectural arrangements. Occasionally it contains a passage or narrow gallery leading to a square enclosure or small chamber, in which the remains of bones, and of rude urns, drinking cups, and other articles, sometimes of Roman or Brito-Roman manufacture, are found. The barrows are always, however, of the rudest and most inartificial construction, and in considering them, we are only, as it were, on the threshold of architectural science.

2. The earliest class of erections to which this title can with any propriety be given, are those which are commonly spoken of as Druidical temples. These consist generally of separate stones, often of enormous size, raised on their ends, sometimes in a circle, and at other times so as to enclose an oblong space, which in some cases is roofed in by horizontal slabs. These roofing-stones are frequently of such prodigious weight as to give rise to many conjectures regarding the mechanical means by which, and the mechanical knowledge of those by whom, they were placed in the positions in which we see them. These strange, and, to us, almost wholly unintelligible remains of antiquity, when of great extent, assume an air of savage and gloomy majesty. Of this the most conspicuous instance anywhere to be found is that of Stonehenge (q. v.), in Salisbury Plain in Wiltshire. Wherever a Celtic population existed, these monuments are to be found. Druidical monuments are more common in France than in England; and in France, as might be expected, they exist in the greatest numbers and variety in Brittany (q. v.), though none of them approach the magnitude, or, in some respects, the workmanship of Stonehenge. The Celtic monuments of Brittany are of different classes, and have received different names—that which is most architectural in character being the dolmen, or cromlech, as it is called in England. The cromlech consists generally of two rows of perpendicular stones, arranged so as to fit pretty closely to each other, and covered with horizontal roofing-slabs, thus forming a chamber, which is generally of such height as to allow a man to walk through it upright. But the largest and most perfect specimen of the dolmen is to be seen, not in Brittany, but in the neighborhood of Saumur on the Loire. It measures more than 80 feet in length. To the same early stage in the science, though probably to a much earlier period in point of time, are to be referred those cyclopean walls and fortifications which at Tiryns and Mycenæ in Argolis excited the wonder of the later Greeks; the Etruscan walls at Fiesole; and the similar structures which are found both in Central and South America.

3. The next stage in advance of that primeval and pre-historic one of which the traces are thus so widely spread, is that at which the science seems to have culminated in all but the classical nations of antiquity, and those races which have had the benefit of their genius and invention. We have here an accurate measurement of parts, and a corresponding division of the building. The pillar also makes its appearance, though it is by no means used with the same freedom, nor does it exhibit the same variety of form to which it attained in Greek A. The stage of which we here speak was attained by the inhabitants of Central and Southern America before its discovery by Europeans; and in Mexico, even by the Toltecans, an earlier race, which had given way before the Mexicans of the days of Cortes. Peruvian A. exhibits neither columns nor arches; but the remains of the palace at Mitla possesses a portico with plain cylindrical columns; and the walls were covered with rude sculpture. In the cloisters of a building at Palenque, a species of inartificial triangular arch, formed by courses of stones projecting over each other, was found. It is very instructive as showing the natural, and, so to speak, necessary character of certain architectural forms at certain stages of national development, to find that the pyramid, which is little more than a regularly constructed cairn, is met with even more frequently in Mexico than in Egypt; and whether or not we regard it as the primary form of the pagoda of India, it certainly formed the basis both of Mexican and Egyptian A.

The discussions which have been carried on with so much keenness as to the priority of date of Indian and Egyptian A., lose much of their importance when we find a race, acting in all probability independently of both, starting from the same primary form as the one, and in the discovery of the pillar and the arch, making two of the most important of the further steps in advance to which they respectively lay claim. Keeping these facts in view, it would seem, moreover, that something more is required to prove an historical connection between Doric and Egyptian A. than the circumstance that the columns which they respectively employ possess a base, a shaft, and a capital, or that both are used to support an entablature. Even the long unbroken horizontal lines which seem to indicate an affinity between the architectural styles of Egypt and of Greece, and which distinguish them both so sharply from the Christian A. of medieval Europe, may be the result rather of a similarity of circumstances than an identity of origin. Though these styles agree in having columns, and though the columns support horizontal entablatures in each, they disagree in the forms of the columns, in the character of the entablature, and indeed, in almost every other particular. Whilst Greek pillars taper towards the top, and the walls are vertical, in Egyptian buildings the very reverse is the case, the pillars being vertical, and the walls sloped. When the effect of a whole Greek building, surrounded by a colonnade, and of an Egyptian building is considered, a certain similarity appears—the base in each case being wider than the upper part; but the result is produced in the one case by sloping the pillars, and in the other, by sloping the walls, the external edges of which form a slightly acute angle with the base of the building. The great distinction, however, between the A. of Egypt and Greece consists in the stages which they respectively reached. The A. of Egypt retained throughout a character of gloomy strength, and never attained to the lightness, freedom, or variety of that of Greece. In the one case, the traditionary forms continued throughout to dominate and subdue the free spirit of art; in the latter, art triumphed over tradition, and owned no laws but its own. It is in this circumstance that the distinction consists between the stage of A. of which Egyptian may be considered the type, and of which Assyrian, Babylonian, and Persian A. are also examples, and that ultimate stage which was reached by the Greeks in one direction, and by the various Germanic nations in another. See ARABIAN A., BYZANTINE A., and GOTHIC A. See also ARCHITECTURE in AM. SUPP.

A'RCHITRAVE (Gr. *archi-*, chief; Lat. *trabs*, beam), the lowest part of the entablature (q. v.), or that which rests immediately upon the columns.

A'RCHIVES. See RECORDS.

A'RCHIVOLT, the ornamental band or moulding which runs round the lower part of the voussoirs of an arch.

A'RCHON, the highest magistrate in Athens. The government was originally monarchical; but on the death of Codrus (q. v.), the Athenians, according to the traditionary account, resolved that no one should succeed him with the title of king (*basileus*), and therefore appointed his son Medon with the title A. (ruler). The office was at first for life, and confined to the family of Medon; but in 752 B.C., the time of office was limited to ten years; and in 714, the exclusive claims of Medon's family to the office of A. were abrogated, and it was thrown open to all persons of noble birth; afterwards to all citizens, without distinction of rank (477 B.C.). In 683, the office had been made annual, and the number of archons had been extended to nine. The year was named from the first A.; to the second, styled Basileus, belonged the care of religious affairs; the third was Polemarchos, or commander-in-chief; and the remaining six, having to conduct all criminal trials, were styled Thesmothetæ, or lawgivers.—Among the Jews, during the time of their subjection to the Romans, the title of A. had various meanings; but was generally given to the members of the Sanhedrim or supreme council.—In the mystical jargon of the Gnostics, the term A. was frequently employed, and hence one of

their sects, especially opposed to Judaism, received the name ARCHONTICS. See GNOSTICS.

ARCHY'TAS of Tarentum, one of the most illustrious men of antiquity, flourished about the year 400 B.C. His father's name was Mnesagoras. A. is said to have been a contemporary of Plato, and on one occasion to have saved the life of the latter when the tyrant Dionysius wished to put him to death. His public career was glorious. He was seven times elected general of his city, though it was customary for the office to be held only for one year; and in every campaign which he undertook, he was victorious. His civil administration was equally fortunate. Affairs of the highest moment were repeatedly intrusted to him; and yet, though deeply skilled in philosophy and politics, he was possessed of a childlike simplicity of character. He was drowned on the Apulian coast. A.'s virtues were as conspicuous as his talents. He paid the most humane attention to the comfort and education of his slaves, and although one of the greatest geometricians, he did not disdain to make a rattle for the amusement of his children. He solved the problem of the doubling of the cube, and secured almost the reputation of a magician by his numerous mechanical contrivances, the most wonderful of which was the flying pigeon. A Pythagorean in philosophy, he is generally supposed to have exerted a considerable influence on Plato, and some affirm that even the gigantic understanding of Aristotle was indebted to him for the idea of his categories. Only fragments of his writings remain. They relate to metaphysics, ethics, logic, and physics. See also ARCHITECTURE in AM. SUPP.

ARCIDO'SSO, a town of Central Italy, in the province of Grosseto, 23 miles north-east from Grosseto, on a feeder of the Umbrone, among the Appennines. Pop. of commune, 5859.

ARCIS-SUR-AUBE, a small town in the French department of Aube, situated in lat. 48° 32′ N. long. 4° 8′ E., with (1876) 2817 inhabitants, is remarkable on account of the battle fought here, March 20, 21, 1814, between Napoleon and the allied forces under Prince Schwartzenberg. The battle, beginning with several skirmishes on the first, and ending in a general engagement on the second day, when the French retreated over the Aube, was not in itself very important. But Napoleon now formed the plan of operating in the rear of the Allies, and left the road to Paris open; assuming that they would not venture to proceed without attempting first to secure their rear. The Allies marched, nevertheless, on the capital, and thus decided the campaign.

A'RCOLA, or A'RCOLE, a village on the left bank of the Adige, in Northern Italy, 15 miles E.S.E. of Verona, famous for the victory gained by Bonaparte over the Austrians, 17th November 1796. The Austrians, relieved by the retreat of Moreau from the Rhine, had begun to take the offensive in Italy, and General Alvinzy appeared at the head of 50,000 men, with the main body of which he advanced to Caldiero, and threatened Verona. Bonaparte, recognizing the danger, descended by night the course of the Adige, crossed that river at Ronco, and was thus in a position to threaten the left flank of Alvinzy's army, which was posted at A. A causeway leads from Ronco across the morasses to A., before reaching which the road crosses the small stream of the Alpon by a narrow bridge. This bridge was defended by the Austrian general, Mittrowsky, with fourteen battalions of infantry, and two squadrons of cavalry. On the 14th of November, Augereau attacked the bridge with two battalions of grenadiers, but being exposed in flank to the Austrian fire, was obliged to withdraw. Bonaparte now seized the standard himself, and rushed on the bridge, followed by the grenadiers; but again the fire of the Austrians, who were in much greater force than the French, made it necessary to draw back. The struggle was renewed on the 16th with a similar result; and it was only on the 17th that the French succeeded in getting possession of A., not, however, by forcing the bridge, but by sending a column across the Alpon, lower down, and getting in rear of the Austrians. On this Alvinzy was obliged to retreat to Vicenza. It fared no better with the other column of the Austrians under Davidovich. In this series of battles the Austrians lost 18,000 men killed, and 6000 prisoners. The French loss was 15,000.

ARÇON, JEAN CLAUDE D', a distinguished French engineer, born at Pontarlier 1733, was originally intended for the church, but on manifesting a decided preference for the study of Vauban, his father, an eminent jurisconsult, consented to his choice of a military profession. In 1754, he entered the Military School at Mézières, and, in the following year, he passed as an engineer. During the Seven Years' War, he acquired considerable reputation, especially in the defence of Cassel. His fertility of invention was surprising, and of the greatest benefit to that branch of the service with which he was connected. In all his writings—which, in spite of a very faulty style can be read with pleasure—there are indications of a lively, rich, and vigorous genius. He was even bold enough to question the wisdom of certain strategical propositions of the Great Frederick. But his most famous scheme was that by which he hoped to reduce Gibraltar, then in the hands of the English, and defended by Governor Elliot. He contrived floating batteries, incombustible, and not liable to sink, which, however, were not successful, though this is mainly to be attributed to the fact of his efforts being indifferently supported. When the French, under Dumouriez, overran Holland, A. took several strongly fortified places, amongst others, Breda. After this, he retired from public life, and confined himself to the literature of his profession. His most important work is, *Considérations Militaires et Politiques sur les Fortifications* (Paris, 1795). In 1799, Bonaparte called him to the senate, but he died the year after.

ARCOS DE LA FRONTE'RA, a town on the right bank of the Guadalete, in Andalusia, Spain. Its principal manufacture is that of tanned leather, which was the first established in Andalusia; thread and ropes are also manufactured. Pop. 11,270. A. de la F. has a wild and romantic situation, which harmonizes well with the picturesque garb of the inhabitants, who still wear the national costume. It was called Arcos, from being built in the form of a 'bow;' and after Alfonso-el-Sabio had rescued it from the Moors, it received the additional name of *de la Frontera*, from its frontier position, being in the vicinity of the Moorish kingdom of Granada. Almost impregnable by nature, it was furthermore embattled with walls and towers, part of which still remain, and afford a magnificent view of the Ronda mountains. The rich plains that lie below the rocky town are famed in the Spanish ballads for their breed of war-steeds, 'Arcos barbs.'

ARCOT, a city of Hindustan, in the presidency of Madras, the capital of the district of north Arcot. It is situated on the right bank of the Palar, a river which, rising in Mysore, is, in the rainy season, about half a mile wide before the town. It stands in N. lat. 12° 54′, and in E. long. 79° 24′, and is distant from Madras 65 miles. Besides the military cantonment, which can accommodate three regiments of cavalry, A. contains some mosques in a tolerable state of repair, and the ruins of the Nawaab's palace. At the census of 1871, the town of A. (more properly spelled *Arkát*) had a pop. of 10,988. A. is chiefly noticeable for its history. It was the spot where Clive first firmly established his military reputation. With a force of 300 Sepoys, 200 Europeans, and three field-pieces, he marched against A., which was garrisoned by 1100 men, and after having taken it, he stood a siege of fifty days against thousands of assailants, and hardships and privations of every description.

ARCOT, a portion of the presidency of Madras. It consists of two districts, the northern and the southern, of which the respective areas are 7139 square miles, and 4873, and the respective populations, according to the census of 1871, 2,015,278 and 1,755,817.

As most of the rivers are destitute of water in the dry season, there are thousands of tanks in A. Some of them are of an enormous size: that of Cavery-pak, in particular, measures eight miles by three. These tanks are indispensable, as well for irrigation as for domestic use. The hot and parching winds from the west, sweeping down the valleys of the Eastern Ghaats, are often fatal to birds on the wing, and also to human beings when exposed for any length of time. Glass cracks and flies in pieces; and wood shrinks, splits, and shivers; and from the mutual friction of the sapless trees, spontaneous combustion sometimes takes place in the jungles.

A'RCTIC means, properly, lying near the constellation of the Bear (Gr. *arctos*), and hence, northern. The Arctic Circle is a circle drawn round the north pole, at a distance from it equal to the obliquity of the ecliptic, or 23½°. The corresponding circle round the south pole is the *Antarctic* Circle. Within each of these circles there is a period of the year when the sun does not set, and another when he is never seen, this period being longer the nearer to the pole.

ARCTIC HIGHLANDS, a name sometimes applied, though not very appropriately, to that portion of the American continent which lies between Hudson's Bay and the mouth of the Mackenzie. It has been the scene of all, or nearly all, the overland efforts in connection with the exploration of a North-West Passage, from Hearne's discovery of the Coppermine, down to the recent voyage of Anderson—the most prominent among the intermediate laborers having been Franklin, Richardson, Back, Dease, Simpson, and Rae.

A'RCTIC OCEAN, that part of the universal sea which surrounds the north pole. Its single boundary, that towards the south, naturally divides itself into four sections—the northern shores respectively of the two continents, and the northern limits respectively of the two intercontinental oceans.

The A. O. meets the Pacific at Behring Strait, in about 66° of N. lat., so that here the A. O. overlaps the Arctic Circle by about 30′. On the side of the Atlantic, again the common border seems to be equally independent of arbitrary definition, for Scoresby Sound almost as definitely terminates the south-east coast of Greenland as North Cape terminates the north-west coast of

Europe; so that, as both extremes are intersected by about the same parallel of 71°, the A. O. here falls short of the Arctic Circle by about 4½°.

In the Old World, the A. O., if we include its gulfs, stretches south of the Arctic Circle, in the White Sea, fully 2°; while at Cape Severo, the most northerly point of Asia, in lat. 78° 25′ N., it falls short of the same by 11° 55′. Lastly, within the range of the New World, the A. O., in its strict acceptation, is everywhere forced back within the Arctic Circle, about 5° at Point Barrow, about 7½° on Barrow's Strait, and about 3° at the Strait of the Fury and Heela.

The waters of the A. O., however, may conveniently be extended beyond these their strict limits. So far as the mere aspect of the map is concerned, Davis's Strait, Baffin's Bay, and Hudson's Bay may be regarded as gulfs rather of the Atlantic than of the A. O. But if essential characteristics are permitted to outweigh mere position, they must be assigned rather to the A. O. than to the Atlantic. Besides being all fed by currents from the A. O., they are all hyperborean in temperature. Even the most southerly of the three illustrates this. While Hudson's Straits present, in general, more ice than Davis's Strait or Baffin's Bay, Hudson's Bay itself has been the scene of perhaps the two most abortive, if not most disastrous, of all modern attempts at northern discovery. On opposite sides of Southampton Island, Lyons and Back were arrested by impenetrable packs, the one near the Bay of God's Mercy, and the other off Cape Comfort—the latter point being 1½°, and the former being twice as much, south of the Arctic Circle. Reckoning, therefore, to the bottom of James's Bay, as an arm of Hudson's, the arctic seas, thus appended to the A. O. Proper, reach as far south as the parallel of London.

Little as is yet known, at least accurately, of the A. O., its discovery and exploration have developed and tasked more skill and heroism than perhaps the exploration and discovery of all the rest of the world since the age of Columbus. Without anticipating what is to be said on this subject under the heads of NORTH-EAST PASSAGE, NORTH-WEST PASSAGE, and POLAR EXPEDITIONS, it may not be out of place here to state summarily the comparatively easy labors of the Russians while issuing, as it were, from their domestic rivers to survey their domestic shores. About a century and a quarter ago, the Muscovites simultaneously sent forth five expeditions to complete, if possible, the North-East Passage. From the White Sea to the Obi, four seasons were consumed; from the Obi to the Yenesei, four seasons; from the Yenesei to the Lena, season after season was spent in both directions without success; from the Lena to the Kolyma, six seasons were occupied; from the Kolyma to the Pacific every effort was fruitless, though the Cossack Deshneff was known to have accomplished this part of the enterprise about a century before.

Arctic navigation, in fact, is beset by almost every imaginable difficulty and danger. In addition to the peculiar perils of ice in all possible states, the adventurer, often blinded by fogs and snows, has to face, generally without guide or sea-room, the storms, tides, and currents of comparatively unknown waters. If such be his three months of summer, what must be his nine months of winter! Take a general illustration from the personal experience of the most successful of all the arctic navigators. On the parallel of 73°, and under a temperature of 15° degrees below zero of Fah., Captain M'Clure spent the night of 30th October 1851 on the ice, amid prowling bears, and that without food or ammunition—his only guide being a pocket-compass, which, however, the darkness, thickened by mist and drift, rendered useless. The gallant officer whiled away the time by sleeping three hours on 'a famous bed of soft dry snow,' and by wandering 10 miles, by the crow's flight, over a surface so rugged as to endanger his limbs. It was at the close of a pedestrian expedition of nine days, on very short allowance of food and water, that the adventure took place; and it had been immediately occasioned by a generous desire of reaching the the winter-quarters by a nearer cut, so as to have 'a warm meal ready for his men on their arrival.'

Notwithstanding the labors and researches of two centuries and a half, very little of this vast ocean has been even seen by man. To the north of 83° 30′, in fact, the A. O., so far as authentic evidence goes, is a mere blank to geographers, for Parry, in 1827, barely reached lat. 82° 45′; Kane, in 1854, touched only 81° 22′; the *Polaris*, in 1871, reached only 82° 16′; in 1874, the Austro-Hungarian Polar Expedition just reached 82° 5′; and the British Expedition of 1875–6 could advance no further than 83° 20′, the highest latitude ever attained. At all the intermediate points of longitude, the northern limit of geographical knowledge falls short, more or less at every point, of the parallel of 83°. Perhaps the actual average of such northern limit, even on the full tale of 360° of long., may not exceed lat. 75′, so as to leave absolutely unknown a circle of 30° of lat., or nearly 2100 miles in diameter—an area little inferior to that of Europe. This untrodden world, however, is not to be regarded as a continuous wilderness of ice. Parry, at his furthest point, found not an unbroken field, but separate floes, with more or less of open water between them—the mildness of the temperature being indicated by falls of rain: and Kane, again, at his furthest point, saw a free sea to the north, as far as the eye could reach, from a promontory 240 feet high; while, to use his own words, 'a gale from the north-east, of fifty-four hours in duration, brought a heavy swell from that quarter without disclosing any drift or other ice.' This is quite in keeping with the fact already noticed, that Hudson's Straits and Bay are often more encumbered with pack than the waters of far higher latitudes. With regard to currents, Parry, during nearly the whole of his boat-sleigh expedition of 1827, found that his place by reckoning was considerably ahead of his place by observation, or, in other words, that his northward progress on the floes was neutralized more or less by the southward progress of the floes themselves, the existence of a current towards the south being thus shown.

M'Clure derived advantage from the current, whether advaneing through open water, or drifting along at the mercy of the pack. The experience of Weyprecht and Payer was different from that of any preceding navigators, since they found that they steadily drifted *north*. While M'Clure had the fortune to return with the news of the discovery of the North-West Passage, M'Clintock has shown that the discovery must have been anticipated by Sir John Franklin. Succeeding expeditions of which a great number have been equipped by England, Germany France, Sweden, America, Austria, and Denmark, have been mainly directed towards the North Pole. The reports of the expedition of 1875–6 lead to the conclusion that the pole is surrounded by an inaccessible region of ice, to which has been given the name of the Palæocrystic Sea, or Sea of Ancient Ice. The North-East Passage was accomplished for the first time by Professor Nordenskiöld in 1878–79. And repeated successful voyages have been made with cargoes between Western Europe and the mouths of the Obi and Yenisei, by way of the Kara Sea.

The only section of the Southern A. O. that is tolerably well known to a distance from the continent is that which washes the north-east of America. It contains, under the collective name of Polar Archipelago, many large islands. Off the coast of the Old World, again, are Spitzbergen, Nova Zembla, New Siberia, Wrangel Land, King Charles Land, &c. The latest discovery, made by Weyprecht and Payer in 1873, is that of Franz-Joseph Land, an extensive and mountainous tract, lying about 200 miles due north of Nova Zembla. Its south coast is in about 80° N. lat., and it was seen to extend as far north as 83°, occupying at least 15 degrees of longitude. The chief straits are Lancaster Sound, Barrow's Strait, Smith's Sound, Strait of the Fury and Hecla, Wellington Channel, Banks Strait, &c. The chief rivers, all of them on the mainland, are the Obi, the Yenesei, and the Lena, of the first class; the Mackenzie, the Yana, the Indigirka, and the Kolyma, of the second; and many others of the third.

The principal production of the A. O. has been the whale. The whale-fisheries on the west of Spitzbergen, and on both sides of Greenland, scarcely need to be mentioned. But it may not be generally known, that according to official returns as quoted by Admiral Beechey, the Americans had, in two years, drawn more than 8,000,000 of dollars, or upwards of £1,600,000 sterling, from the whale-fishery of Behring Strait alone.

On the side of East Siberia, however, the A. O. produces a more remarkable article of traffic. Here are found, in the greatest abundance, the bones of the mammoth. Spring after spring, the alluvial banks of the lakes and rivers, crumbling under the thaw, give up, as it were, their dead; while the islands lying off the Yana teem with these memorials of antiquity. (See Nordenskiöld's *Voyage of the Vega*, 1882.)

The American half of the A. O., if it cannot boast of fossil ivory presents something still more difficult perhaps to be explained. In lat. 74° 25′, and lat. 76° 15′ respectively, Captain M'Clure and Lieutenant Mecham discovered large deposits of trees, apparently indigenous, of considerable size. Writing of Banks' Island, M'Clure has the following passages: 'From the summit of these hills, which are 300 feet high, to their base, abundance of wood is to be found, and in many places layers of trees are visible, some protruding 12 or 14 feet, and so firm that several people may jump on them without their breaking: the largest trunk yet found measured 1 foot 7 inches in diameter'—equivalent in girth to about 5 feet. Again, 'I entered a ravine some miles inland, and found the north side of it, for a depth of 40 feet, composed of one mass of wood. Some of it was petrified, the remainder very rotten, and worthless even for burning.' Writing of Prince Patrick Island, Mecham has the following passage: 'Discovered buried in the east bank of the ravine, and protruding about 8 feet, a tree of considerable size. During the afternoon I found several others of a similar kind: circumference of first and second tree seen, 3 feet; of another, 2 feet 10 inches. From the perfect state of the bark, and the distance of the trees from the sea, there can be but little doubt that they grew originally in this country.'

A'RCTIUM. See BURDOCK.

A'RCTOMYS. See MARMOT.

A'RCUS SENI'LIS, a not very well chosen term for a change occurring in the corner of the eye, in consequence of fatty degeneration of its marginal part. The term is objectionable, because the change usually commences before the advent of old age, and further, because the *arcus*, or arch, is usually converted into a complete circle by the time that the patient has reached the age of sixty or seventy years. The *arcus senilis* usually commences at or even before the age of forty years, as an opaque whitish crescent, skirting either the upper or lower margin of the cornea; and from this commencement it extends along the edge, till it finally becomes a complete circle, which sometimes assumes a chalky whiteness, and gives to the eye a very peculiar appearance. On careful examination, it may be seen that a narrow interval of partially clear cornea always intervenes between the arcus and the opaque sclerotic. As far as the eye is concerned, the formation of this circle is of little importance, but it is of great diagnostic value to the physician if, as Mr. Canton and several late observers maintain, its presence indicates the coexistence of fatty degeneration of the heart.

ARD, or AIRD, a Celtic root, meaning 'height' (cf. Lat. *arduus*, high), which appears in many geographical names, especially in Ireland and Scotland.

A'RDAHAN, a village of about 300 houses in the portion of Turkish Armenia ceded in 1878 to Russia, 35 miles N.W. of Kars. Its position gives it strategic importance. Its fortress was dismantled by the Russians in the war of 1854–56; in 1878, the Berlin Congress sanctioned the cession to Russia of A., which had been captured early in the war. On account of the severity of the climate, the houses of A. are mainly constructed underground.

A'RDEA. See HERON.

ARDECHE, a department in the south of France, taking its name from the river A., a tributary of the Rhone, includes the most northern part of ancient Languedoc. Greatest length from north to south, 74 miles; greatest breadth, 44. Area, 2130 square miles; pop. (1881) 373,140. A. is almost wholly mountainous. In the north-west of the department, the Cevennes culminate in the volcanic Mont-Mezène, 5972 feet in height. The variety of the numerous extinct volcanic peaks, deep craters, rugged valleys, masses of tufa, grottos, rock-labyrinths, ranges of basaltic columns, gigantic dams, &c., give a most extraordinarily picturesque appearance to the scenery. The upland, which has winter for six or eight months, is devoted to pasturage; but the terraces and valleys near the Rhone enjoy a warm climate, and produce good wine (white and red), olives, figs, almonds, chestnuts, &c. There are manufactures of silk, paper, leather, iron, &c.; and good roads, with water-carriage, facilitate commerce. Lead, iron, copper, manganese, &c., are wrought. The chief towns are Privas, Aubenas, Bourg, St. Andéol.

ARDEE', a town in the west of Louth County, Ireland, on the river Dee, twelve miles inland. It contains two ancient castles—one built about the year 1200, and now used as the town-house; the other, a square building, and now used as a prison. The chief trade is in corn and other agricultural products. The population in 1881 amounted to 2622.

ARDE'NNES, the western division of the slate-plateau of the Lower Rhine. It extends over portions of Belgium, France, and Rhenish Prussia, and consists of a broken mass of hills, for the most part of no great elevation, which gradually slope towards the plains of Flanders. In early times, the name was given to the whole of the region lying between the Rhine and the Sambre, a length of about 160 miles. The average height of the hills is less than 2000 feet; but in the east, Mont St. Hubert attains an elevation of 2300 feet. Large tracts of this region consist not of hills, but of gently undulating plateaus, which are densely covered with oak and beech forests, while other portions are marshy, heathy, and barren. The districts through which the Meuse and other rivers flow, present some extraordinary appearances. The channel of the river is sometimes bound in by rugged and precipitous cliffs more than 600 feet high. The principal rocks of the A. are clay-slate, grauwacke, quartz, &c., interspersed with extensive strata of primitive limestone. Coal and iron mines are wrought in the north-west; lead, antimony, and manganese are also found. There is little cultivation of grain, but multitudes of cattle and sheep are reared.

ARDENNES, a frontier department in the north-east of France, bordering upon the provinces of Namur and Luxembourg in Belgium. It formed a part of the old province of Champagne. Length, from north to south, 63 miles; breadth, from east to west, 60; area, 2020 sq. miles; pop. (1881) 331,832. The north-east of A. belongs to the basin of the Meuse; the south-west is watered by the Aisne; both of these rivers are enriched with affluents, and united by the *Canal of A.* About one-eighth of the whole surface is hilly, and covered with forests and wide tracts of pasturage. In the north extremity of the department, near Givet, marble is obtained; but the prevailing rock is limestone, veined with lead and iron. South of this, and stretching across the department from east to west, are great layers of slate, with hereand there flint, quartz, &c. In the south-east, muschelkalk, rich in iron-ore, abounds; and in the south-west, the soil is composed of arid chalk, a naked, treeless, elevated plain. Only the valleys are fertile, and produce corn. The vine is only cultivated at Mézières, in the south-west. Slate, marble, and iron, porcelain-clay, and sand for making glass are obtained. Excellent work-horses and sheep are reared. There are manufactures of earthenware, glass, marble, woollen cloths, metallic wares, &c. The principal towns are Mézières, Rethel, Rocroy, Vouziers, and Sedan, where Napoleon III. surrendered to the Prussians, September 2, 1870.

ARDNAMU'RCHAN POINT, the N.W. promontory of Argyleshire, and the extreme western point of the mainland of Britain. A light-house was erected here in 1849, which is visible at a distance of 20 miles. For 10 miles around, the country consists of trap, resting on sandstone often hardened, and blue slates. The trap veins form many striking reticulations in the strata. South of the point are found numerous oolitic and lias fossils.

A'RDOCH, a small village in Scotland, county of Perth, 8 miles south-south-west of Crieff, celebrated for a Roman camp, the most entire now in Britain. The camp is 2¼ miles north of the Greenloaning Station of the Caledonian Railway, in the grounds of A. House. The intrenched works form a rectangle 500 by 430 feet, the four sides facing the cardinal points. The north and east sides are protected by five ditches and six ramparts, these works being 270 feet broad on the north side, and 180 feet on the east. A deep morass exists on the south-east, and the perpendicular banks of Knaig Water, rising 50 feet high, protect the camp on the west. The prætorium, or general's quarter, now called Chapel Hill, rises above the level of the camp, but is not exactly in the center, and is nearly a square of 60 feet each side. Three of the four gates usual in Roman camps are still seen. A subterranean passage is said to have formerly extended from the prætorium under the bed of the Knaig. Not far north of this station, on the way to Crieff, may be traced three temporary Roman camps of different sizes. Portions of the ramparts of these camps still exist. A mile west of A., an immense cairn of stones lately existed, 182 feet long, 45 feet broad at the base, and 30 feet in sloping height. A human skeleton, 7 feet long, in a stone coffin, was found in it.

ARDOYE, a town of Belgium, in the province of West Flanders, 17 m. S. from Bruges. Linen-bleaching is the principal branch of industry. Brewing and candle-making are also carried on. Pop. (including the commune, which is not large), 6500.

ARDRO'SSAN, a small seaport town and summer bathing-place in Ayrshire. It owes its rise to the public spirit of the Eglintoun family. Its harbor, which is sheltered by an island off the coast, is one of the safest and most accessible on the west coast of Scotland, and has been greatly improved, at vast expense, by the Earls of Eglintoun. There is a large export of coal from this place, and ship-building is carried on to a considerable extent. On a hill above the town stands the ruins of A. castle, said to have been surprised by Wallace when held by the forces of Edward I. Wallace destroyed the garrison, and threw the dead bodies into a dungeon called 'Wallace's Larder.' Pop. in 1881, 4036.

ARE, the unit of the French land-measure, is a square, the side of which is 10 metres (or 32·809 feet) long (see METRE), and which, therefore, contains 100 square metres = 1076 English square feet. The next denomination in the ascending scale is the *decare*, containing 10 ares; but the denomination commonly used in describing a quantity of land is the *hectare* of 100 ares, = 2.47 English statute or imperial acres.

A'REA (Lat.), is a term in mathematics meaning *quantity of surface*. The calculation of areas, or mensuration of surfaces, is one of the ultimate objects of geometry. The measuring unit is a square inch, a square foot, &c., according to the unit of length. As a figure is thus measured by finding an equivalent for its surface in *squares*, the process is sometimes called the *quadrature* of the figure.

ARE'CA, a genus of Palms, containing several species, having pinnate leaves and double spathes. The fruit is a fibrous one-seeded drupe, a nut with an outer fibrous husk. *A. Catechu*, the PINANG PALM, or Betel-nut Palm, is a native of the East Indies, whose nut yields a sort of catechu. See CATECHU. This Areca-nut, or Betel-nut, is very much used in all parts of the East, the chewing of it with quicklime and the leaf of the betel-pepper being one of the most prevalent habits of the people. See BETEL. The nut is about the size of a hen's egg; the fibrous husk about half an inch thick. It is austere and astringent. It is doubtful if it possesses a narcotic power, or if this is to be ascribed entirely to the leaf which is used along with it. Areca-nuts form a considerable article of trade in the East. The timber of the palm which produces them, and its leaf-stalks and spathes, are also used for domestic purposes. The tree is often 40 or 50 feet high, and in general less than a foot in diameter. The leaves are few, but very

large, their leaflets more than a yard long. In Malabar, an inebriating lozenge is prepared from the sap—*A. oleracea*, the CABBAGE PALM of the West Indies, is a very tall tree, 100—200 feet, whose huge terminal leaf-bud is sweet and nutritious, and is sometimes used for the table as cabbage, but when it is cut off, the tree is destroyed. The stem of this tree, notwithstanding its great height, is remarkably slender. The nuts are produced in great numbers; they are about the size of a filbert, and have a sweet kernel.—*A. sapida*, the New Zealand Palm, is remarkable as extending southward beyond the geographical limits, of any other of its order, as far indeed as lat. 38° 22′ S. It is a small palm, only from 6 to 10 feet high, with leaves 4—6 feet long. The young inflorescence is eaten.—*A. vestiaria*, a native of the East, is so called because clothing is made from its fibres.

ARECI'BO, a town of Puerto Rico, Spanish West Indies, on the north coast of the island. It is the chief town of a province of the same name. It has a considerable trade. Pop. 11,187.

AREIO'PAGUS (Gr. for 'Mars' Hill'), a mount lying to the west of the Acropolis, at Athens, and celebrated as the spot where the most venerable court of justice in ancient times held its sittings. It is not easy to determine satisfactorily why the hill obtained its name; most probably it was on account of sacrifices having been offered there at an early period to the God of War; but all its historic importance is derived from the Areiopagitic Council, the origin of which reaches far back into antiquity, and is ascribed by some to the semi-mythological Cecrops. Orestes, according to tradition, was tried before this court, and it is certain that it must have existed long before the first Messenian War (740 B.C.), for the Messenians, in offering to submit to its decisions certain points of dispute, speak of it, even then, as 'old.' Solon, however, made many changes in its constitution, enlarging its sphere of jurisdiction to such an extent that it ceased to be any longer a mere criminal court, and acquired henceforth social and political powers in addition to the former. Before Solon's time, it was strictly oligarchical. It now became a *tertium quid* between aristocracy and democracy, the new qualification for office introduced by Solon being *property* instead of *birth*. It thus naturally allied itself with aristocracy, so that we can perfectly understand why it should have been considered a check upon the impetuous democracy, though it would, perhaps, be fairer to regard it as a check upon both extremes. It is not known how many members were included in its council. The nine archons—if they had recommended themselves by a faithful discharge of their duties—were elected life-members of it. Solon made the council 'overseers of everything,' and we find instances of their manifold authority in the subsequent history of Greece. They granted money, at the time of the Persian invasion, from a reserve treasury of their own, the ordinary public treasury being empty. After the battle of Chæroneia, they executed all who had deserted their country. In social matters, their powers appear to have been curiously minute. They had officers whom they sent or accompanied into private houses, on an occasion of a festivity, to see that the rooms were not overcrowded; they called to account persons who lived in such riotous extravagance that their example might be considered hurtful to the community, and conferred marks of honor on those of an opposite character. Their sphere of influence seems to have extended itself to religion also. Innovations in the worship of the gods, neglect of the sacred ceremonies, impiety in any form, brought the offenders under the rebuke and punishment of the A. It is likewise asserted that they possessed and exercised great authority in the education of the young, although this statement, and that regarding some charitable functions attributed to them, are of dubious value.

Until the time of Pericles, the brilliant and powerful ruler of the democracy, the A. continued to maintain its ancient dignity. He soon discovered, however, that it would prove an insurmountable obstacle to the realization of his designs if not shorn of its privileges. After much and vigorous opposition, he succeeded in carrying a decree (458 B.C.), by which, as Aristotle says, the A. was 'mutilated,' and democratic tribunals acquired supreme authority. It is, however, far from being clear what were the precise changes which Pericles effected, whether he abridged its powers as a criminal, or as a social and political court. From the high estimation in which it was held for centuries after, in the first of these capacities, we are inclined to think that it was its social and political supremacy that was destroyed. Probably the A. was made responsible to the demus, or body of citizens. It lingered in life for a very long period. We hear of it as late as 380 A.D., and it would seem, from the case of St. Paul, that it possessed in his day a certain authority in religious matters.

ARE'NA, a part of an amphitheater (so called because it was usually strewed with sand, though when a fit of extravagance seized the Roman emperors, they used borax and cinnabar instead), where the combats of gladiators and wild beasts took place. It had four main entrances, and was surrounded by a wall about 15 feet high, so that the spectators were perfectly safe. The name was afterwards applied by the Romans to any building for exhibitions of baiting animals, horsemanship, &c. On the continent, the name has been given to the large summer theaters for dramatic performances in the open air. It is applied also, in a general sense, to any scene of contest or display of power.

ARENA'CEOUS ROCKS. All rocks, composed entirely, or to a large extent, of grains of silex, are included under this title. Beds of loose sand occur extensively in the more recent deposits. The grains, either of quartz or flint, are generally water-worn and rounded. In older deposits, the grains of sand are bound together by silicious, calcareous, argillaceous, or ferruginous cements. It is seldom that a rock is composed of quartzy materials alone; grains or particles of other mineral substances are frequently mingled with the grains of quartz. Silvery flakes of mica are seldom absent; and they often occur in layers parallel to the planes of stratification, causing the rock to split into thin slabs, and exposing a glittering surface. These are called *micaceous sandstones*. When grains of feldspar occur, it is a *feldspathic sandstone*. Often large quantities of calcareous matter, either as cement or as distinct grains, occur; and these are called *calcareous sandstones*. The presence of lime can always be detected by the effervescence which takes place on the application of muriatic or other acid. When the sandstone is coarse-grained, it is usually called *grit*. If the grains are large enough to be called pebbles, it becomes *conglomerate* or *puddingstone;* if the fragments are sharp and angular, it is called *breccia*.

ARENA'RIA or SANDWORT, a genus of plants of the natural order *Caryophylleæ*, differing from Stellaria (Stitchwort, q. v.) chiefly in the undivided petals. The species are numerous, annual and perennial herbaceous plants of humble growth, rarely somewhat shrubby, natives of the temperate and colder parts of the world. Some of them are arctic and alpine plants. Many of them are chiefly found in sandy soils. The flowers are generally small and inconspicuous, but if closely examined, are seen to possess no little beauty. A number of species are natives of Britain.

A'RENDAL, a town on the south-east coast of Norway, situated near the mouth of the Nid-elf in the bay of Christiania, with a population of 5800. It is built partly on poles, partly on rock, and this circumstance, as well as its situation, gives it a very romantic aspect. The bay, which is protected by the island of Tromöe, forms an excellent harbor, and favors the commerce of the town, which is considerable in proportion to its size. A. is intersected by canals; its exports are iron from the neighboring mines, and wooden articles. Ship-building is also carried on; and on a smaller scale, distilleries and tobacco-factories. King Louis Philippe, after the French Revolution, when wandering in the north as Duke of Orleans, made some stay here.

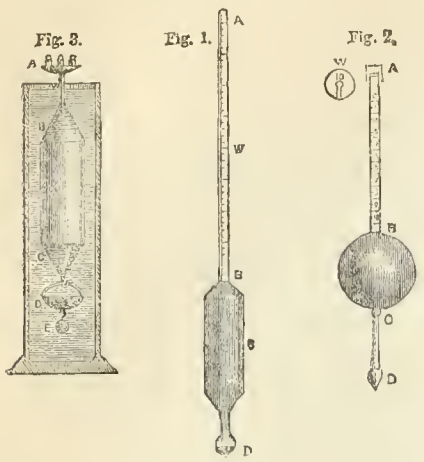
ARE'NG or ARENGA. See GOMUTO PALM.

ARENI'COLA. See ANNELIDA.

AREO'METER (*araios*, thin, and *metreo*, I measure; Fr. *aréomètre* or *pèse-liqueur;* Ger. *Aräometer* or *Senkwage*), called also Hydrometer, an instrument which is allowed to float freely in liquids, to determine their specific gravity or that of solid bodies. By specific gravity (q. v.) is meant the ratio that the weight of any volume of a substance bears to the weight of the same volume of water. Thus, a cubic foot of alcohol weighs 793 ounces, while the same quantity of water weighs 1000 ounces; the specific gravity of alcohol is set down, therefore, as $\frac{793}{1000}$ or ·793. A cubic foot of sulphuric acid weighs 1841 ounces, and has, consequently, a specific gravity of 1·841. These relations are not confined to the particular volume, one cubic foot, of these bodies, but hold for any equal volumes of them. Equal volumes of alcohol, water and sulphuric acid, have always to each other the ratio respectively of 793, 1000, and 1841; and this is only an instance of the general principle, that equal volumes of different substances have weights bearing to each other the direct ratio of the specific gravities of these substances. This is the principle on which areometers with weights, or weight-areometers, are constructed. If, however, equal weights of any two of these liquids were taken, it would be found that ·793 of a cubic foot of water would weigh as much as 1·000 cubic foot of alcohol; 1·000 cubic foot of sulphuric acid as much as 1·841 cubic feet of water; or ·793 of a cubic foot of sulphuric acid as much as 1·841 cubic feet of alcohol: more generally thus—when equal weights of two different fluids are taken, the volumes of each are inversely as their specific gravities.

On this latter principle depends the use of areometers with scales, or scale-areometers. The scale-A. is much more commonly employed than the weight-A., and is, in consequence, a much more important instrument. Of the various forms of scale-areometers, that contrived by Gay-Lussac deserves particular notice, from the simplicity of the mode of graduation; and an account of

it will give the best idea of the general nature of such instruments. Fig. 1 gives a representation of it. It consists of a uniform glass tube, AB, blown into two bulbs, C and D, at the bottom. The lower bulb, D, is loaded with mercury, so that when the instrument floats in any liquid, the stem, AB, is maintained in a vertical position. We shall suppose that the quantity of mercury is so adjusted that when placed in water, the A. sinks to the point W, which may, in consequence, be called the water-point. According to the principle of Archimedes, the weight of the volume of water displaced by the instrument up to this point is equal to the weight of the instrument. Let us suppose, for the sake of simplicity, that the water so displaced is a cubic inch, the weight of the A. will be that of a cubic inch of water, or 250 grains (more correctly 252·5 grains at 60° F.). If the A. be now placed in a fluid heavier than water, such as a mixture of sulphuric acid and water, having a specific gravity $\frac{5}{4}$ or 1·25, it is manifest that if it is sunk again to the water-point, the displaced fluid would weigh $\frac{5}{4}$ of 250 = 312½ grains, or 62½ grains more than the weight of the instrument. As much, therefore, of the stem of the A. must rise above the liquid as will reduce the weight of the displaced liquid to 250 grains, or reduce the volume to $\frac{4}{5}$ of what it was before. If the stem in this case rises to B, the volume displaced by the part WB is $\frac{1}{5}$ of the volume displaced by the instrument at the water-point. If we consider the whole divided into 100 parts, and mark 100 at W, B must be marked 80, as the A. displaces up to that point $\frac{4}{5}$ of 100; and if the intervening space on the stem be divided into 20 equal parts, each of them will correspond with $\frac{1}{100}$ of the water-volume—viz., ·01 of a cubic inch, or with $\frac{1}{100}$ of the weight of the instrument—viz., 2·5 grains. If the same scale be carried above the point W, and the divisions marked as ascending from 100, the A. will be serviceable likewise for fluids less dense than water, and will mark the volumes which it displaces in each of them.



Areometers.

The A. thus graduated gives immediately the volumes which it displaces in different liquids; and from these, seeing that it displaces in every case a weight of liquid equal to its own, the specific gravities may be calculated according to the principle already stated—viz., that equal weights of two different fluids have volumes inversely as their specific gravities. If, in a mixture of sulphuric acid and water, the A. stands at 90, according to the above principle, 90 volumes of the mixture weigh as much as 100 of water; therefore, its specific gravity is $\frac{100}{90}$ or 1⅑. If, again, in a mixture of spirits and water it should stand at 110, 110 volumes of the mixture weigh as much as 100 of water, so that its specific gravity is $\frac{100}{110}$ or $\frac{10}{11}$. In all cases, then, 100 is to be divided by the number read on the A., to determine the specific gravity of the liquid in which it floats.

The delicacy of the A. depends on the distance of the divisions on the scale, or on the thinness of the stem compared with the bulbs. An instrument possessing this advantage cannot be made to serve both for liquids heavier and lighter than water, for the stem would be of an inconvenient length; and it is usual to construct two areometers—one marked with the water-point at the top, and the scale descending to 50, for fluids heavier than water; and the other, with the water-point at the bottom, and the scale ascending to 150, for fluids lighter than water. The scale is generally marked on a slip of paper, which is fixed inside the stem. Gay-Lussac's A. is also known under the name of 'volumometer.' Although it cannot be surpassed either for accuracy or simplicity, it is much less used than other instruments of a similar nature furnished with arbitrary scales, requiring the aid of tables to interpret the readings. The best known of these is Twaddle's A., used in England; and Beaumé's A., extensively adopted on the continent. The A. with an equally divided scale is a very ancient instrument; it was known among the Greeks under the name of 'baryllion.' On some areometers the divisions are not at equal distances, but are so drawn as to give at once, without table or calculation, the specific gravity of the fluid in which they are placed. Although very desirable, in practice they do not possess the accuracy of the A. with equally divided scales, because the graduation of them is attended with considerable difficulty.

No form of A. can be made to determine specific gravities with perfect accuracy, and such instruments are only useful where a ready and good approximation is all that is needed. They are, in consequence, employed chiefly to ascertain the specific gravity of the various liquors and solutions which occur in the arts and manufactures, and very frequently they are graduated with reference to special liquids, as spirits, wine, milk, brine, &c. The Alcoholometer or Hydrometer of Sykes is an instrument of this latter description, and is in general use in the Excise for estimating the strength of spirits. It is represented in fig. 2. BC is a hollow brass ball, surmounted by a flat stem AB, and loaded below by a short conical stem CD, terminated by the pear-shaped bulb D. It is accompanied by eight weights, by which the weight of the instrument may be increased, and the range of the scale extended to fluids heavier as well as lighter than water. One of these weights, W, is shown in the figure; it is furnished with a slit, so as to allow of being slipped on to the narrowest part, C, of the lower stem. The stem, AB, is graduated into 11 equal parts, and these again into halves; and the instrument is so adjusted that its indications give the volumes of water that must be added to or taken from 100 volumes of the mixture under examination to reduce it to proof-spirit (see ALCOHOL), which is a mixture of nearly equal parts of water and alcohol. Thus, if the A. indicates 11 over-proof, 11 volumes of water must be added in order to bring the liquor down to proof-strength; and 100 gallons of such strength would be reckoned as 111; 100 gallons, at 11 under-proof, would in the same way be charged as 89. Very carefully-constructed tables accompany the instrument, in which the specific gravity and percentage of alcohol of different mixtures, at different temperatures, are marked, corresponding to each degree of the A. Since the specific gravity of alcohol is known, it might be thought, that if that of a mixture of it with water were known, the relative proportions of each would also be known. Such, however, is not the case, for alcohol and water possess a chemical affinity for each other, which causes the combined volumes of the two to measure less than the two volumes separately. Thus, 50 volumes of alcohol mixed with 50 volumes of water, does not make 100 volumes of the mixture, but only 96, and thereby the specific gravity of the mixture is higher than it would have been if no contraction had taken place. As the law of this contraction is very complicated, the relative proportions of the two in a combination of given specific gravity, are only to be estimated from tables founded upon experimental data.

The peculiar feature of areometers with weights is, that instead of a scale, they have only one mark on the stem, to which the A. is in all cases sunk. One of the best-known instruments of this kind is the A. of Nicholson. It consists of a brass tube, BC (fig. 3), about 1 inch in diameter, closed above and below by conical ends, to the upper of which a wire is fixed, carrying on the top of it a cup A, capable of containing the weights; and to the lower, a hook is attached, from which hangs the cup D. The lower part of the cup, D, is also provided with a hook, and the whole instrument is kept vertical, partly by the weight of the cup, and partly by the weight of the ball, E, suspended from it. On the wire, a notch, W, is made, to serve as the mark or fixed point to which the A. is sunk. The specific gravities of liquids are determined by Nicholson's A. in the following way: The weight of the A. itself is first ascertained—let it be in a given case 2000 grains—it is then put into water at the temperature 60° F., and weights (say 500 grains) put in, till it is sunk to W. It is now removed to the liquid under examination; and if the weight required to sink the instrument now to the standard-point be only 100 grains, we have the specific gravity of the liquid equal to $\frac{2100}{2500}$, or $\frac{21}{25}$. In both fluids, the same volume has been displaced, and that is in each case equal to the weight of the A.; but the weight of the A. in the second case was 2000 + 100, and in the former, 2000 + 500; hence the above result. Nicholson's A. is seldom used for finding the specific gravity of fluids; its use is almost entirely restricted to ascertaining that of small solid substances, as gems and small pieces of minerals. The following example will show how this is done: If in the cup of the A. already mentioned, when placed in water, the gem be put, and only 440 grains be then necessary to bring the instrument to W, 60 grains is manifestly the weight of the gem, because 500 grains were needed without it to do the same thing. The gem is next placed in the lower cup, D, and if 460 grains are now needed to sink to the standard-point, the gem has thus lost 20 grains of its weight by being immersed in the water. According to the principle of Archimedes (q. v.), these 20 grains are also the weight of a volume of water equal to that of the gem; so the specific gravity of the gem is $\frac{60}{20}$, or 3. By reversing the cup D, which is furnished with perforations, to allow free passage to the air, and attaching the weight, E, to the handle of it, the specific gravity of substances lighter than water may also be determined by this instrument. The other forms of weight-areometers are those of Fahrenheit, Tralles, and Charles. For the more accurate determination of the specific gravities of liquids and solids, see SPECIFIC GRAVITY.

AREQUI'PA, a term primarily applied to a mountain in the west Cordillera of the Peruvian Andes, and secondarily to a city at its foot, being from this, again, extended to a district, a province, a department, and a diocese. 1. The city, which is in lat. 16° 13′ S., and in long. 72° 18′ W., is the third largest in Peru, being inferior only to Lima and Cuzco, and is said to contain 35,000 inhabitants. It carries on a considerable trade both with the interior and by sea. Its port is Islay, one of the largest harbors of the republic. 2. The department is bounded N. by Lima; E. by Ayacucho, Cuzco, and Puno; S. by Moquega, which, along with it, forms the diocese; and W. by the Pacific. It contains 200,000 inhabitants, and is subdivided into seven provinces. Like nearly the whole of the maritime region of Peru, it is generally arid and sterile. 3. The mountain is volcanic, of the form of a truncated cone, and of the height of 20,320 feet. Its neighborhood is subject to earthquakes.

ARÉS. See MARS.

ARETÆ'US, a famous physician of Cappadocia, who flourished in the latter half of the 1st, and in the beginning of the 2d century after Christ. He is considered to rank next to Hippocrates in the skill with which he treated diseases; but he did not, in every instance, follow the practice of the 'Father of Medicine.' He was less attentive to 'the natural actions' of the system, which he frequently counteracted, if he thought it desirable; administered active purgatives copiously, employed narcotics, and did not object to bleeding. He was, in fact, noted for his total want of professional bigotry; and hence, not committing himself to any particular set of opinions, in his accuracy in the detail of symptoms and the diagnosis of disease, he is superior to most of the ancient physicians. His great work, written in singularly elegant and concise Ionic Greek, is divided into two parts. The first four books treat of the causes and symptoms of acute and chronic diseases; the second, the cure of the same. They are almost in a state of complete preservation, and have been translated into various European languages, besides having been frequently edited in the original. The finest edition is the Oxford one of 1723, by J. Wigan; a German translation appeared at Vienna (1790—1802), and an English by T. F. Reynolds, Lond. 1837.

ARETHU'SA. See ALPHEIUS.

ARETI'NIAN SYLLABLES are the syllables *ut, re, mi, fa, sol, la*, used by Guido d'Arezzo for his system of hexachords.

ARETI'NO, PIE'TRO, an Italian author of the 16th c., was the natural son of a gentleman named Luigi Bacci, and was born at Arezzo, in Tuscany, on the 20th of March, 1492. Banished from his native town, he went to Perugia, where he wrought as a bookbinder, and gathered up a few scraps of learning, until, seized with a desire of becoming famous, he abandoned his occupation, and wandered through Italy in the service of various noblemen. At Rome, he distinguished himself by his wit, impudence, and talents, and secured even the papal patronage, which, however, he subsequently lost by writing licentious sonnets. A. now went to the Medicean court, where John de' Medici grew so fond of him that he shared his bed with the adventurer, and even procured him an opportunity of ingratiating himself with Francis I. at Milan in 1524. A few years later, he settled at Venice, where he also acquired powerful friends. The Bishop of Vicenza not only soothed the irritation of the pope against A., but also recommended him to the Emperor Charles V. The latter, as well as his chivalrous rival, Francis, and other great persons, pensioned the fortunate wit, besides enriching him with splendid presents. He likewise obtained considerable sums for his literary efforts.

Nature had undoubtedly gifted A. with some fine qualities, but these were vitiated by his love of sensual gratifications. His death in 1556 accorded with the character of his life. It is said that while laughing heartily at some trifling adventure of one of his abandoned sisters, he fell from a stool, and was killed on the spot. His poetical works include five comedies and a tragedy. The former are full of wit and genuine comic humor; the latter is not without merit. His *Sonetti Lussuriosi* have been translated into French under the title of *Académie des Dames*. Besides these, he wrote a number of other pieces, some of which have not been published. His satire procured for him the name of 'the Scourge of Princes;' but it seems clear that he was equally well fitted to be their sycophant. Although the very impersonation of licentiousness, he had nevertheless the impudence to publish some books of a devotional kind, with the view of obtaining the favor of the pope.

ARETI'NO, SPINELLO, an early Italian painter of great genius, was born at Arezzo in 1316; or, according to others, in 1328. He studied under Jacopo del Casentino; but before he had attained his majority, he had surpassed his master in the vigor and liveliness both of his conceptions and coloring. His reputation attained its full bloom after he went to Florence, where he painted in fresco, in the chapel St. Maria Maggiore, several incidents in the life of the Virgin and of St. Antonio Abate. The monastery of San Miniato, near Florence, contains to the present day a few of his frescoes. He also adorned the monasteries of San Bernardo at Arezzo, and Monte Oliveto near Florence. Vasari thought that the finest works of A. were those which he executed for the Campo Santo at Pisa, illustrating the life of San Ranieri. Of these, however, we have only prints, and cannot therefore judge satisfactorily. His principal works, still remaining, are those from the life of Pope Alexander III. in the town-hall of Siena. He died in 1408.

Throughout all Italy, A. was greatly admired for his invention, the grace and simplicity with which he arranged his figures, and the finish of his style. His Madonnas possessed a remarkable sweetness of expression; and his coloring was in most cases bold and beautiful. Vasari prefers him to Giotto.

ARE'ZZO (ARETIUM), the chief city of the Italian province of A., is situated in a fertile valley near the confluence of the Chiana with the Arno, lat. 43° 27′ N., long. 11° 52′ E. It is 38 miles E.S.E. from Florence. A. is perhaps the oldest town in Tuscany, and formed one of the twelve cities of the ancient Etruscans. It was devastated by Sylla during the Social War; and, like many other Italian cities, was sacked by the Goths when they burst into the peninsula. During the contest of the Guelphs and Ghibellines, in a later age, it became subject to Florence, whose troops defeated those of A. at the battle of Camaldino, in which the poet Dante took part. Arezzo contained (1881) 11,816 inhabitants; but its extensive walls and numerous churches bear record of its more flourishing and more populous period. The *Piazza Grande*, the *Pieve*, an old church founded on the site of a heathen temple, and the cathedral, which, like almost all the other churches, has an unfinished façade, are its principal public buildings. The cathedral has a splendid high altar in marble by Giovanni Pisano; and the several churches contain fine specimens of the old Tuscan school of painting. These ecclesiastical decorations are contrasted with the general aspect of the city, which has dark and dirty streets. Its industry is at present at a very low ebb, there being few or no manufactures, and its people are not generally favorites in Italy; but perhaps no city of its size ever produced a greater number of celebrated men, among whom may be mentioned—Mæcenas, the famous patron of letters in the time of the Emperor Augustus; Petrarch; Pietro Aretino; Guido de A., inventor of the gamut; Leonardo de A., the historian; Cesalpino, the botanist; Redi, the physician; Pope Julius III.; the notorious Marshal d'Ancre; and Vasari, author of *Lives of the Painters*. Michael Angelo was also born in the vicinity of A. The province of A. contains 1276 square miles, with a population of (1881) 238,707. The soil is fertile in corn, wine, and oil.

A'RGALA. See ADJUTANT.

A'RGALI (*Ovis Ammon*), the great wild sheep of Siberia and Central Asia. It is found from Kamtchatka to the Himalaya Mountains, where, however, it is only seen in the more elevated regions. 'We came suddenly,' says Dr. Hooker in his *Himalayan Journal*, 'upon a flock of gigantic wild sheep, feeding on scanty tufts of dried sedge and grass; there were twenty-five of these enormous animals, of whose dimensions the term sheep gives no idea; they are very long-legged, stand as high as a calf, and have immense horns, so large that the fox is said to take up his abode in their hollows when detached and bleaching on the barren mountains of Tibet.' The horns of the male are nearly 4 feet long, and 14 inches in circumference at the base, where they are triangular. The general color is fulvous gray, white beneath, with a whitish disk around the tail. The wool is concealed by hair. The name A. is Mongolian, and was adopted by Pallas. A similar but smaller species is also found on the Himalaya Mountains. The Rocky Mountain Sheep or Big-horn, is sometimes called the American A. See SHEEP.

Head of the Argali Sheep.

ARGAN (*Argania sideroxylon, Sideroxylon spinosum* of Linnæus), a low spiny evergreen tree of the natural order *Sapotaceæ*, a native of the southern parts of the kingdom of Morocco, bearing an ovate drupe about the size of a plum, dotted with white, and full of white milky juice. The Moors extract an oil from the fruit, which they use with their food.

ARGAND, AIMÉ, physician and chemist, was born at Geneva about the middle of the 18th c. He was the inventor of the well-known *Argand lamp*. The chief difficulties that attended the use of lamps as a source of light were—first, in procuring the complete combustion of the oil, so as to keep the flame from smoking; and second, in preventing the level of the oil in the reservoir from sinking as the combustion goes on. The round cotton-wick, used in the old simple form of lamp, was always attended with smoke and smell. The oils and fats are exceedingly rich in car-

bon, containing 70 to 80 per cent. of that element, and only 10 to 12 of hydrogen. The round thick column, then, of oil-vapor rising from the wick of an old-fashioned lamp, presented too little extent of surface to the air; the oxygen of all the air that could get access was chiefly taken up in burning the hydrogen, and a large proportion of the carbon ascended in the burnt air as smoke. A.'s improvement was that he made the wick in the form of a ring, The flame thus became a hollow cylinder with a current of air ascending through the inside, so that the burning surface was doubled. It would appear, however, that the lamp did not satisfy the expectations of A., till his younger brother accidently discovered the effect of a glass cylinder, as a chimney over the flame, by which the flame was steadied, a draught created, and the greatest possible amount of light yielded.

Argand Burner.

A. was soon involved in a dispute with one Langé of Paris regarding the originality of his invention. He went thither to vindicate his claim, but rather than risk the chances of a lawsuit, he consented to share the honor, and a patent was obtained by which Langé and A. alone were authorized to make and sell the new lamps in France for 15 years. The French Revolution, however, destroyed their privilege, and A. retired to England. After some time, he returned to his native country, a victim to melancholy and fantastic humors and died on the 24th October 1803.

ARGAU'M, a village in the territory of the Nizam. It is in lat. 21° 2′ N., and in long. 77° 2′ E., on the route between Ellichpore and Aurungabad. Its single claim to notice is that, on 28th November 1803, about two months after the battle of Assaye, Major-general Wellesley here gained another victory over the Mahrattas. To commemorate this action, a medal was struck in 1851, about a year before the death of the illustrious conqueror.

A'RGEL, or A'RGHEL (*Solenostemma A.*, or *Cynanchum A.*), a plant of the natural order *Asclepiadaceæ*, a native of Arabia and of the north of Africa, deserving of notice only because of the frequent use of its leaves for the adulteration of senna. They are lanceolate, and leathery, and may readily be distinguished from genuine senna-leaves by their texture, their being downy, their greater heaviness, the comparative absence of veins, and the symmetry of their sides, the sides of the true senna-leaves being unequal. They are acrid, and cause sickness and griping, but a difference of opinion subsists as to their possessing purgative properties.

ARGELANDER, Friedrich Wilhelm August, one of the most eminent astronomers of our time, was born, March 22, 1799, at Memel. He studied at Königsberg, where the science of finance first attracted him, but he was subsequently drawn away to that of astronomy by the lectures of Bessel, by whom he was employed to make calculations and observations. In 1820, he was appointed assistant to Bessel in the Königsberg Observatory, and in 1823 succeeded Walbeck as astronomer at the observatory of Abo, in Finland. Here he commenced a series of observations on the fixed stars which have a perceptible 'proper motion.' His studies were unfortunately interrupted by a fire which destroyed the observatory; but after, a time, he resumed them in a new observatory at Helsingfors, and published a catalogue of not less than 560 stars having 'proper motions.' This contained the results of his observations at Abo, and received from the Academy of St. Petersburg the great Demidov prize. After removing to the university of Bonn in 1837, A. published his *Uranometria Nova* (Berlin 1843), containing celestial charts of the fixed stars seen in our hemisphere with the naked eye; also (in 1846) his *Astronomical Observations*, containing the results of an examination of the northern heavens from 45° to 80° declination. His *Atlas of the Heavens* will combine with these works to perpetuate his memory. A. was long engaged in a series of observations on the changes of light in variable stars, and he also demonstrated the theory that there is a progressive motion of the solar system in space. He died in 1875.

ARGE'MONÉ, a genus of plants of the natural order *Papaveraceæ*, distinguished by 4—6 petals, 4—7 radiating concave stigmas, and an obovate capsule, opening by valves at the point. *A. Mexicana*, sometimes called Mexican Poppy, is an annual herbaceous plant with large yellow flowers, and sessile, waved and sinuated, spiny leaves, variegated with white. It is a native of Mexico and of the southern parts of the United States, and is now also common in many tropical and sub-tropical countries, in which it has been naturalized. Its seeds are narcotic, purgative, and diuretic, exhibiting in a strong degree those qualities of the order of which the seeds of the poppy are devoid. They are used in the West Indies as a substitute for ipecacuanha, also instead of opium; and the juice of the plant is employed as a remedy for ophthalmia. —This plant is not unfrequently to be seen in flower-borders in Britain; but in the northern parts, at least, the seed is generally sown in a hot-bed.

ARGENS, Jean Baptiste de Boyer, Marquis d', born at Aix, in Provence, June 24, 1704. He was originally intended for a learned career; but, from a love of adventure, he entered the army at fifteen. Fascinated by a certain actress, he eloped with her to Spain, but was captured, and brought back to Provence. In spite of his glaring breach of discipline, he had the good-fortune to be employed in the French embassy to Constantinople, and on his return, re-entered the army. Being disabled by accidents in military service, and disinherited by his father, he tried his fortune in authorship, and by his *Lettres Juives*, *Lettres Chinoises*, *Lettres Cabalistiques*, and *La Philosophie du Bon Sens* (London, 1737), attracted the notice of Frederick II., then Crown-prince of Prussia, and became a favorite at the court of Prussia when Frederick came to the throne. The king appointed him chamberlain, and a director of the Art Academy at Berlin, with a salary of 6000 livres. He was a constant associate of Frederick, who liked exceedingly his frank and vivacious character, but used to tease him on account of his hypochondriacal fits. When almost a sexagenarian, he renewed the adventures of his youth by again falling a victim to the charms of an actress, Mademoiselle Cochois, whom he married without Frederick's permission. This and other circumstances irritated the despotic monarch, who deprived A. of his pension. The latter now returned to Provence, and died at Toulon, January 11, 1771. His numerous writings, but especially his *Histoire de l'Esprit Humain*, *Lettres et Mémoires*, and those above mentioned, once enjoyed a considerable reputation.

ARGE'NSOLA, Lupercio and Bartolomé Leonardo de, two of the first among the Spanish poets in the 'golden age,' were born at Barbastro, in Aragon; the former in 1565, the latter in 1566. They studied at the university of Huesca. Lupercio afterwards went to Madrid, while Bartolomé entered the church. In character and fortune, however, they were closely united throughout the whole of their career. Both were patronized by Maria of Austria, who appointed the one her chaplain, and the other her private secretary. The latter was subsequently made chamberlain to the Archduke Albert of Austria, and Philip III. appointed him historiographer of Aragon. Bartolomé was employed by the Count de Lemos to edit the *Conquista de las Molucas* (Madrid, 1609); and when this nobleman was appointed as viceroy of Naples, both the brothers A., who had acquired fame as poets, attended his court at Naples, where Lupercio, who then filled the office of Secretary of State, died in 1613. Bartolomé returned to Spain with the viceroy in 1616, and occupied the position formerly held by his brother, as historiographer of the kingdom of Aragon, where he proceeded with the work left unfinished by Lupercio—a continuation of Zurita's *Annals of Aragon*. While engaged in this work, he died, February 26, 1631. The collected poems of the two brothers were first published in 1634, by the son of Lupercio, and passed through several editions. These poems (*Rimas*) consist of epistles, odes, sonnets, and satires, and are singularly alike in character. They are imitative of the style of the Latin poets (especially Horace, for which reason the brothers have been styled 'the Spanish Horaces'), and display more care and polish than originality of invention or richness of fancy. Bartolomé A., as a prose-writer, is reckoned among the Spanish classics. The style of his continuation of Zurita is a great advance on the original, especially in correctness.

ARGENSON, Marc Pierre, Comte d', a celebrated French statesman, was born in 1696. After holding a number of inferior offices, he succeeded M. de Breteuil as Secretary of State to the war minister in 1742. On the death of Cardinal Fleury, in the following year, the whole care of the war then raging devolved upon him. He found matters in the most deplorable condition. The French troops, decimated by sword and disease, were in full retreat across the Rhine; the Austrians already swarmed in Alsace and Lorraine, and the very political existence of France was imperilled; but A., by his vigor and lucky choice of generals, changed the fortunes of the war in the course of one year. After the victories of Fontenoy and Lawfeldt, and the capture of Bergen-op-Zoom, peace was secured by the famous treaty of Aix-la-Chapelle, signed in 1748. A., however, did not remain inactive; he established the *Ecole Militaire* in 1751, and, by various measures, kept alive the military spirit of the nation. He was an illustrious patron of literature. Diderot and D'Alembert dedicated to him their great *Encyclopédie;* and to Voltaire, whose fellow-student he had been, he furnished materials for his *Siècle de Louis XIV.* In 1756, he was exiled to his estate, it is supposed by the machinations of Madame Pompadour. On her death he returned to Paris, where he died in 1764.

A'RGENT, the French word for silver, is always used in English heraldry to signify that metal. In engraving shields, it is left white.

ARGE'NTA, a town of Central Italy, in the province of Ferrara, and 18 miles south-east from Ferrara, on the Reno, in

the plain near the Marshes of Comacchio. Pop. of commune, 15,926.

ARGENTAN, a town of France, department of Orne, and chief town of the arrondissement of the same name. It has an ancient castle, manufactures of linen and lace, and bleach-fields. Pop. (1876) 5254.

ARGENTEUIL, a town of France, in the department of the Seine-et-Oise. Its priory, now in ruins, was founded in the 7th c., and was by Charlemagne turned into a nunnery, of which the famous Heloïse became abbess. Pop. of A. (1876) 7934.

ARGE'NTEUS CODEX. See ULFILAS.

A'RGENTINE (*Argentina*), a genus of small fishes of the family *Salmonidæ*, of which one is rarely found on the British shores and two or three are found in the Mediterranean. They are chiefly remarkable for the resplendent silvery lustre of their sides, and the abundance of *nacre*, the substance used in making artificial pearls, with which their air-bladder is externally loaded. It consists of a coat of silvery fibres. Upon account of it, they are sought after. They are commonly taken in nets along with anchovies or sardines.

A'RGENTINE REPUBLIC, the confederation of the Rio de La Plata, or River of Silver, South America—the Latinized epithet and the Spanish term being merely copy and original of one and the same misnomer. Lat. 22° 30′—41° S., long. 54°—70° 31′ W. This confederation, as constituted by its reunion with Buenos Ayres in 1859, consists of what may be roughly termed a rectangle comprising 19° of lat. and 18° of long. On the west it is bounded by the Andes, which separate it from Chili and the desert of Atacama; on the north by Bolivia; by Paraguay, Brazil, Uruguay, and the Atlantic on the east; and on the south by Patagonia. The republic embraces 14 provinces. In 1880, the population was estimated at 2,400,000; at the census of 1869, it was as follows:

Provinces.	*Department.*	*Area in sq. miles.*	*Population*	*Chief Towns.*	*Population.*
1. Buenos Ayres,	51	83,615	495,107	Buenos Ayres,	177,787
2. Santa Fé,	4	25,087	89,117	Santa Fé,	10,670
3. Entre Rios,	10	29,955	134,271	Concepcion,	6,531
4. Corrientes,	17	45,454	129,023	Corrientes,	11,218
5. Cordova,	14	58,997	210,508	Cordova,	28,523
6. San-Luis,	8	24 151	53,394	San-Luis,	3,748
7. Santiago,	8	38,799	132,898	Santiago,	7,775
8. Mendoza,	8	30,699	65,413	Mendoza,	8,124
9. San-Juan,	4	18,772	60,319	San-Juan,	8,353
10. Rioja,	7	31,103	48,746	Rioja,	4,489
11. Catamarca,	8	35,780	79,962	Catamarca,	5,718
12. Tucuman,	9	23,386	108,953	Tucuman,	17,438
13. Salta,	16	63,461	88 933	Salta,	11,716
14. Jujuy,	9	3 ,527	40,379	Jujuy,	3,071
Total,	173	542,786	1,736 923		

Foreigners—of whom there were reckoned to be about 200,000 in the republic, consisting of Americans, Italians, Spaniards, French, English, Swiss, Germans, and others—are included in these numbers. The A. R. claims, besides the provinces enumerated, the desert of Gran Chaco in the north; and that which, in the south, lies between the Rio Colorado and the Rio Negro; Chili used to claim the south of Patagonia, but has now made a treaty in favor of the A. R. These wide and wild domains, however, have been hitherto sources rather of disquiet than desirable acquisitions, as the Indians occasionally commit inroads.

Except the most purely Indian districts to the west of Buenos Ayres, the provinces of the A. R. lie chiefly in the basin of the Rio de la Plata, embracing much the larger half of the same. Mountains abound in the north-west; and elevated ranges are found also in Entre Rios, which is situated, as its name implies, between the Parana and the Uruguay. But, with these exceptions, nearly the whole country presents boundless plains, covered alternately with rich pasturage and gigantic thistles. The climate and productions vary considerably—being tropical and temperate respectively to the north and south of Corrientes (in 27° 27′ N. lat.). Agriculture, however, of every description is very backward—less perhaps than $\frac{1}{1000}$ of the surface being under cultivation. The rearing, in fact, of live-stock is the grand business of the country. Millions of cattle wander at will across the plains, or are kept on breeding-estates of vast extent; and likewise of mules and horses there are immense bands. Besides the Rio de la Plata, which is rather an estuary than a river, and its far-reaching affluents, the hydrography of the A. R. comprises the head-waters of some southern streams, which fall into the open Atlantic, such as the Rio Colorado, the Rio Negro, &c.; and along the west border, under the shadow, as it were, of the Andes, salt-lakes are common. In connection, doubtless, with this feature in the hydrography, mines of rock-salt exist, and salt here and there abundantly encrusts the plains, both to the satisfaction and benefit of the roaming herds. The names of the country and its estuary are, as already characterized, to a great extent, misnomers, yet silver ore, gold, copper, sulphur, coal, and alum, have been found near the Andes. Little mining has yet been done. The export trade, chiefly in hides and wool, is increasing, and there are several lines of railway.

In 1515, Juan Diaz da Solis, while searching for a passage into the Great South Sea newly seen by Balboa, entered the Rio de La Plata. In 1526, Sebastian Cabot, son of the discoverer of Newfoundland, penetrated nearly to the confluence of the Parana and the Paraguay, being arrested by the rapids, which afterwards gave name to Corrientes. In 1535, Buenos Ayres was founded, to command, though indirectly, the most practicable channel of the only outlet of the country, a city which, in conjunction with its own colony of Monte Video, on the opposite bank, has virtually monopolized the history of a region equal in extent to Western Europe. Gradually other cities were planted, partly by colonists from Spain, and partly by adventurers from Peru, each city generally giving its own name to its own province. The chief staples of the country—horses and cattle—had been largely introduced before 1552. Down to 1775, the basin of the Rio de La Plata was a dependency of the viceroyalty of Lima. In that year, however, was erected the viceroyalty of Buenos Ayres, which, to the basin in question, added Bolivia, under the name of Upper Peru, thus embracing the head-waters of the Amazon, and also most of the plateau of Titicaca. The year 1806 ushered in a new order of things. Spain, as an ally of France, being then at war with England, both Buenos Ayres and Monte Video were occupied by the English—a change which, brief as was its duration, virtually sowed the seeds of revolution. The colonists had felt the inconvenience of belonging to a state which had left them, in a great measure, to defend themselves; they had successfully tried their strength against a foe more powerful than their own masters; and they had been encouraged not less by the sayings, than by the doings, of their invaders to assert their independence. These influences were, in fact, instantaneously exemplified. The triumphant militia, after deposing and expelling the legitimate viceroy for cowardice, elected in his stead the French officer who had led them to victory. Thus had the viceroyalty of Buenos Ayres become peculiarly ripe for taking its share in the outbreak, which Napoleon's dethronement of the Bourbons, in the spring of 1808, almost immediately occasioned throughout Spanish America. The constituents of the A. R. did not, however, submit to the sovereignty of Joseph Bonaparte when he was shuffled on to the Spanish throne to replace Ferdinand VII. In 1810, they organized a government in the name of the latter monarch. This arrangement, which lasted only for a short and inglorious period, ended, like a great many others, in utter confusion. In 1816, a General Congress declared the independence of the 'United Provinces of Rio de La Plata;' but those provinces, in 1827, returned once more to a state of isolation. In 1831, Buenos Ayres, Entre Rios, Corrientes, and Santa Fé, sometimes classed as the coast or riverine states, entered into a federal compact, and invited the others to form a voluntary alliance with them.

This Argentine Confederation led to little but anarchy till 1835, when General Rosas was elected captain-general or governor of it, with all but absolute power. He secured quiet and order for a time; but the great aim of his policy, both warlike and commercial, being to achieve the supremacy of Buenos Ayres, the struggles with this end in view, to which he was goaded on also by personal ambition and reckless daring, led to his ultimate overthrow in 1851. Buenos Ayres, refusing to submit to Urquiza, the next governor of the A. R., declared itself independent in 1854; but was compelled by a signal defeat at Cepeda, in 1859, to re-enter the confederation. Continuing restless, however, another war, in which its army was ably led by General Mitré, placed that province in the position of supremacy which it still holds. In 1865, the A. R. became involved, along with Brazil and Uruguay, in a war against Paraguay, which ended only with the death of Lopez, President of Paraguay, in 1870, and which accomplished little in the interest or to the credit of the A. R. The boundless interior of this country has a standing feud with the narrow sea-board which shuts it out from the ocean. The Banda Oriental has been a bone of contention between the Brazilians and the Argentines; and the jealousies also of Buenos Ayres and Monte Video are constant sources of irritation. Till of late, the relations with Chili were unfriendly, owing to disputed territory in Patagonia. See White, *Cameos from Silver Land* (1881); Mulhall, *Handbook of the River Plate Republics* (1875); Lopez, *Historia de la Republica Argentina* (1883).

A'RGES, a genus of small fishes of the family *Siluridæ*, of extreme interest on account of their being frequently thrown out in vast numbers by some of the South American volcanoes, with torrents of muddy water. Humboldt was the first accurately to inquire into this wonderful fact, and to describe one of these fishes, which he referred to the genus *Pimelodes*, and called *P. cyclopum*. It is now called *A. cyclopum*. The quantities of these fishes ejected from the volcanoes in the neighborhood of Quito is sometimes so great, that the stench of their putrefaction is felt at a

great distance, and putrid fevers are caused by it. They are expelled from craters or from lateral openings at an elevation of 16,000 or 17,000 feet above the sea. It is supposed that they exist in lakes within the cavernous recesses of the mountains, but nothing is positively known on this subject. Their capacity of enduring the high temperature of the water with which they are ejected has excited much interest. Several species are known, to which the common name of *preñadillas* is given in the country, and which are placed by ichthyologists in the genus *A.*, and the closely allied genera *Brontes* and *Astroblepus*.

A'RGIL, clay or white clay, a term now little used, but of which the derivative *argillaceous* is still in frequent use as descriptive of soils, geological deposits, &c., and in the name of *Argillaceous Slate* or *Argillaceous Schist*, instead of which, however, the name *Clay-slate* (q. v.) is more generally employed. The term *argillaceous* is rather vague, and sometimes *clayey*, sometimes *aluminous*, would seem to be its equivalent. See ARGILLACEOUS ROCKS.

ARGILE PLASTIQUE, a series of beds at the base of the Tertiary system in France, resting on a conglomerate or breccia of rolled and angular chalk-flints. They consist of extensive deposits of sand, with occasional beds of plastic clays, used for pottery. Marls occur, enclosing, in some places, the fluviatile shells that are met with in the same position in the London basin, and in others, large numbers of a species of oyster. Beds of impure lignite also occur.—The A. P. is the equivalent in the Paris basin of the Woolwich and Reading series, or Lower Eocene of the English geologists. See EOCENE.

ARGILLA'CEOUS ROCKS. All rocks composed entirely or to some extent of clay are included under this title. Pure clay is known as *kaolin* or *porcelain clay*. It is a hydrated silicate of alumina. Decomposed feldspar, from which the silicates of potash, soda, &c., have been washed out, supplies the material which forms kaolin. *Common clay*, however, contains many impurities; the chief are sand, in variable proportions, and oxide of iron, which gives its color to the mass. Any matter that contains sufficient alumina (more than 10 per cent.) to enable it to retain its shape when moulded and pressed, is called clay. Plastic clays occur abundantly in the superficial deposits and in the Tertiary strata. The older clays become more or less indurated. When they are regularly laminated, and split into thin layers in the direction of the laminæ, they are called *shale*. In *clay-slate*, the clay has become highly indurated and metamorphosed, so as to split into plates that are altogether independent of the original lamination, and frequently cross it at right angles. Clay-slate forms extensive deposits in the Azoic rocks, but it is not confined to these, for the Palæozoic shales are often converted into clay-slate, when, from their proximity to crystalline rocks, or other cause, they have been subjected to the action of heat.

A. R. can generally be distinguished by the peculiar 'argillaceous' odor which they give out when breathed upon.

A'RGOL is a crude variety of cream of tartar which forms a crust in the interior of wine-vats and wine-bottles. Originally, it exists in the juice of the grape, and is soluble therein; but during the fermentation of the juice, and as it passes into wine, much alcohol is developed, which remaining in the fermenting liquor, causes the precipitation of the A.; the latter being very sparingly soluble in an alcoholic liquid. Some wines, when they are bottled, are not fully ripe, and more alcohol being thereafter developed, a further precipitation of A. takes place as a crust in the bottles, and hence the meaning of the term *crusted port*. A. is generally of a reddish tinge, obtained from the color of the grapes, but sometimes is of a grayish-white color, when it has been deposited during the fermentation of the juice of colorless grapes. The *red* or *white A.* is denominated in commerce *crude tartar*, and its principal uses are in the preparation of cream of tartar (q. v.) and tartaric acid (q. v.) The constituents of A. are bitartrate of potash (cream of tartar), (KO,HO,T), tartrate of lime, with coloring and extractive matters.

A'RGOLA. See ADJUTANT.

A'RGOLIS, the north-east peninsula of the Morea (Greece), lying between the Bays of Nauplia and Ægina, forms a nome, or department, in the modern kingdom of Greece. The plain of Argos, famous in ancient times for its breed of horses, is naturally fertile, but is now made pestilential by morasses. It is surrounded by an eastern continuation of the range of mountains on the north of the Peloponnesus, which also girds the riven and shattered-looking coast. The highest summits attain an elevation of between 5000 and 6000 feet. The plain of A. is the most extensive in the whole peninsula, being 12 miles in length, and 5 in breadth. The eastern part is higher and more rocky than the western. Near where the plain opens on the sea, the ground is marshy. This was the Lernean marsh of antiquity. The nome of A. and Corinthia has now Nauplia as its capital, and contains 127,820 inhabitants.

It was from the importance of the ancient kingdom of A. that the Greeks were collectively often styled Argivi by ancient writers. A. was colonized in very early times. According to the old traditions, Inachus, the Pelasgic chief, settled here in 1800, and Danaus in 1500 B.C., with colonists from Egypt. Here Pelops ruled, and was succeeded by Atreus, Agamemnon, &c. Here also Hercules was born, and achieved his victories over the Lernean hydra and the Nemean lion.

The ancient capital, Argos, was situated about 3 miles from the sea, and was considered the oldest city in Greece. It was supposed to have been built by that Inachus of whom we have spoken, or by his grandson Argus; but as the whole period in which his deeds are said to have been accomplished belongs to the unhistorical age, we cannot possibly determine the truth of such a statement. It is certain, however, that at one period A. was the head of a league composed of several Doric states or cities—Cleonæ, Phlius, Sicyon, Trœzen, Hermione, Ægina, and Epidaurus. Latterly, Sparta robbed it of its supremacy and influence. The population of A., during its most prosperous condition in ancient times, was—inclusive of the town-territory—upwards of 100,000. It was noted for the attention it paid to the worship of the gods. Juno was the principal divinity, but many of the other gods had temples and statues also. This gave a stimulus to the fine arts, and we know that A. possessed one of the most famous of the ancient schools of statuary. The natives were, moreover, renowned for their love of music. Herodotus considered them the finest musicians in Greece. They do not, however, seem to have cultivated literature. Few poets, and no orators or philosophers, were born amongst them. The modern Argos, built on the site of the ancient, is 7 miles from Nauplia, and is a large and thriving town. It still exhibits some remains of antiquity, though these were nearly wholly destroyed in 1825, during the Greek war of independence. Cotton, vines, and rice are grown. Pop. 11,000.

A'RGONAUT (*Argonauta*), a genus of cephalapodous mollusca, pretty generally known by the name of *Paper Nautilus*, and in consequence of similarity in the form of the shell, often confounded with the genus *Nautilus* (q. v.), but in fact much more nearly allied to the Poulpe (*Octopus*). The shell is not chambered like that of the true nautilus, but has one spiral cavity, into which the animal can entirely withdraw itself. The animal has no muscular attachment to the shell, and some naturalists therefore suspected that it might be merely, like the Hermit Crab, the inhabitant of a shell originally belonging to some other animal; but this question has been set at rest by the observations of Madame Power, proving the beautiful but fragile shell to be the production of the A. itself. It has, however, also been discovered that the shell is peculiar to the female A., and does not answer the ordinary purposes of the shells of mollusca, but rather that of an 'incubating and protective nest.' The eggs, which are very numerous, are attached to filamentary stalks, and by these the whole compacted mass is united to the involuted spire of the shell, where it is usually concealed by the body of the parent. The descriptions, until recently admitted into the works of the most respectable naturalists, of argonauts sailing about in pretty little fleets upon the surface of the water, employing six of their tentacula as oars, and spreading out two, which are broadly expanded for the purpose, as sails to catch the breeze, are now regarded as entirely fabulous, and indeed are founded upon an entire misapprehension of the position of the animal in its shell, and of the use of the two expanded arms or *vela* (sails). The membranes of these arms are extended at the pleasure of the animal, so as to envelop the shell, and appear to be the secreting organs employed in its fabrication. Two species of A. are common in the Mediterranean. Fig. 1 represents one of them as it used to be commonly represented with oars and sails. Fig. 2 represents it as it really exists, with the membranes of the dorsal arms covering the shell. The other arms are cut off. At *a* in fig. 2, is seen the mass of eggs.

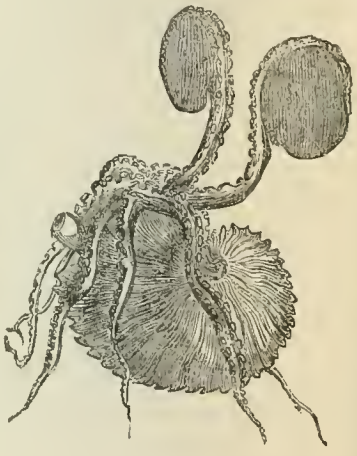


Fig. 1.

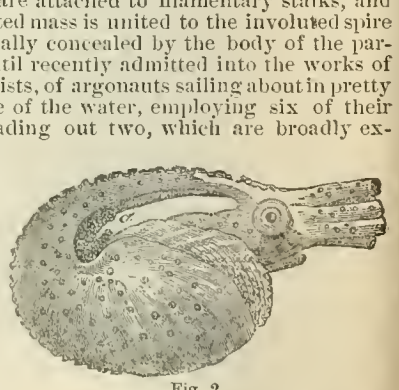


Fig. 2.

A'RGONAUTS, heroes of Greek antiquity (so named from their ship *Argo*), who, according to tradition, about a generation before the Trojan war, undertook a long voyage into unknown seas, under the command of Jason. Homer alludes to the story; Hesiod, Mimnermus, Pindar, the Pseudo-Orpheus, and many others relate it, all in different ways, the accounts in some instances being utterly irreconcilable. The plainest and most complete narrative is that of Apollodorus, which is as follows: Jason was commissioned by his uncle, Pelias—who ruled over Iolcus, in Thessaly—to fetch from the country of Æetas (Colchis) the golden fleece of the ram, which was suspended on an oak, and guarded by a sleepless dragon. He therefore caused Argus, the son of Phrixus, to build a ship of fifty oars; and in pursuit of this adventure, gathered together the choicest heroes from all parts of Greece, fifty in number, with whom he sailed. Their first landing-place was Lemnos, where the A. stayed two years, because the women, in consequence of the wrath of Aphrodite, had slain all the men, excepting Thoas. Next they sailed to the Doliones, and were hospitably received by King Cizycus, who was afterwards accidentally killed by Jason. After landing at Mysia, where they left Hercules and Polyphemus—who had wandered too far inland in pursuit of the lost Hylas—they came to the country of the Bebryces, where King Amycus was killed by Pollux, or Polydeuces, in a pugilistic fight. They next sailed along the coast of Thrace to Salmydessus, where two of their number, Zetes and Calais, having delivered the blind seer, Phineus, from certain winged monsters called Harpies, he in return gave them good counsel respecting their future adventures, and especially warned them against the dangerous passage between the opening and closing Symplegades, from which they escaped with but little injury to their vessel. The story goes that Phineus advised the A. to let loose a dove when they approached the dreaded rocks, and to judge from its fortune what they themselves might expect. The bird escaped with the loss of its tail. The A. resolved to risk the passage, and after heroic efforts, got safely through, their ship only losing some of the ornaments of its stern. After visiting several other lands, they arrived at the month of the river Phasis, in Colchis. Here the king, Æetes, promised to give up the golden fleece to Jason, on condition that the latter should yoke to a plough the two fire-breathing bulls with brazen hoofs, and should sow the dragon's teeth left by Cadmus in Thebes. Jason, by the help of the famous sorceress Medea, daughter of Æetes, who had fallen passionately in love with the bold navigator, fulfilled these conditions; and was assisted by Medea in still more wonderful exploits. He obtained from her, under promise of marriage, a charm against fire and steel, and was enabled to destroy all the warriors who sprung up from the land sown with the dragon's teeth. While this was taking place, Æetes had resolved to burn the ship *Argo*, and put to death the crew; but Jason, informed of the scheme by Medea, anticipated it, hastened into the grove, stupefied the dragon-sentinel by an opiate-charm prepared by Medea, seized the golden fleece, and, embarking in the *Argo* with his mistress and her brother Absyrtus, sailed away from Colchis by night. Æetes followed, but was hindered in his pursuit by an atrocity committed by his fierce daughter.

It is said that she slew her brother Absyrtus, and cut him into several pieces, which she threw overboard, one at a time. While King Æetes stayed to gather up the fragments of his son, Jason escaped from the pursuit. The A. now reached the mouth of the river Eridanus; but were driven on the Absyrtian Islands by a storm sent from Jove, who was angry on account of the murder of Absyrtus. Meanwhile the mast of the *Argo*—which had been cut from the sacred grove of Dodona—delivered an oracle to the effect that Jove could not be appeased unless they sailed towards Ausonia, and were purified by the expiatory agency of Circe. This was accomplished; and next, the A. passed by the Sirens, from whose charms they were preserved by Orpheus, who sang to them, but could not hinder one of their number, Butes, from swimming off to the sea-maidens; then through Scylla and Charybdis, by the help of Thetis, and at length landed on the island of Corcyra, where Alcinous ruled. On leaving this place, they encountered a storm at night, but were saved by Apollo, who, in flashes of lightning, revealed to them the haven of Anaphe, where they raised an altar to their preserver. At Crete, their landing was opposed by the giant Talus, who was slain by Medea. They subsequently touched at Ægina, and sailing between Eubœa and Locris, arrived safely at Iolcus, after a four months' voyage. Jason dedicated the good ship *Argo* to Neptune, at the Isthmus of Corinth.

It is perhaps useless to speculate on the real character of the Argonautic expedition, even if it be more than a mere myth. The accounts given by other writers differ so widely, especially in the geographical parts, from these of Apollodorus, that it becomes impossible to determine satisfactorily whether the expedition sailed north, east, or west. The common historical interpretation of the legend is that Jason sailed on a voyage of discovery, which had for its aim and stimulus the hope of new commercial relations; others would modify this hypothesis, and suggest that the enterprise was partly commercial, partly piratical, and partly adventurous, and that Jason's crew was in all probability composed of young, restless, and ambitious spirits, who were ready for anything that might turn up.

ARGO'STOLI, a seaport on the south-west of Cephalonia, and capital of the island. Its lat. is 38° 10′ N., and long. 19° 59′ E. Its pop. is 8000; and its quay is a mile long.

ARGUELLES, Augustin, a prominent Spanish politician of the modern liberal school. On the breaking out of the War of Independence in 1808, he went to Cadiz, where he agitated for the organization of a regency along with a free constitution, as the best method of strengthening and consolidating the powers and resources of the nation. In 1812 he was sent as representative of his native province to the Cortes, where he was appointed one of the members of the committee to whom were intrusted the drawing up of the plan of a new constitution. His splendid talents as a public speaker soon won him the admiration of the liberal party, who used to term him the Spanish Cicero. But on the return of Ferdinand VII., A. fell a victim to the reactionary spirit which ensued. On the 10th of May 1814, he was arrested and imprisoned; but at his trial he displayed such dexterity that it was found impossible to convict him. Different judges were nominated five successive times, but they could not agree in their decision. At last the monarch himself passed sentence, which was, that A. should be confined for ten years in the prison at Ceuta. He was not, however, alone in his misfortunes. Fourteen persons were condemned along with him, amongst whom was his friend Juan Alvarez Guerra. In their confinement they experienced such barbarous treatment, that in four years three died, two became mad, and the rest received grievous injuries. The revolution of 1820 restored them to freedom. A. became Minister of the Interior, but soon resigned, in consequence of the king complaining of the weakness of the executive. Although provoked beyond measure by the narrow bigotry of the court, he did not rush into extremes, but continued a constitutional liberal to the end of his life. In the Cortes held at Seville in 1823, he voted for the suspension of the royal power; but after the violation of the constitution, he fled to England, where he remained till the amnesty of 1832. On his return to Spain, being nominated to the Cortes, he was repeatedly made president and vice-president of the Chamber of Deputies, and always showed himself a moderate but unwavering reformer. In July 1841, on the discussion of the law regarding the sale of church property, he delivered himself strongly against all concordats with the pope. Next to Espartero, he was the most popular man in the kingdom with the enlightened party. During the regency, he was appointed guardian to the young queen, Isabella, but died soon after, on the 23d of March 1844, at Madrid. In his old age, he still exhibited the fiery eloquence that marked his youth.

A'RGUMENT (Lat. *argumentum*), in Logic, means properly the ground or premiss on which a conclusion is rested; popularly, it is applied to a series of arguments, or to a controversy. *Argumentation* is reasoning put into regular shape, with a view to convince or silence an objector. Logicians have given distinctive names to various kinds of arguments. Thus, we have the *Argumentum ad hominem*, which is no real proof, but only an appeal to the known prepossessions or admissions of the persons addressed. In this style, when a man upholds one method of fraud, he may, by an appeal to his consistency, be driven to uphold another. The A. *ad veritatem*, again, has no regard to anything save objective truth. Next we have the A. *e consensu gentium*, or an appeal to the common belief of mankind, which, of course, may be used to prove or disprove anything. The A. *a tuto* rests upon the supposed safety or prudence of adopting a certain conclusion. It is sometimes used by Roman Catholics against Protestants in the following form: Protestants teach that salvation is possible in any church; this is denied by Catholics; therefore, it is safer to belong to the Catholic Church, as even the Protestant admits that a man may be saved in that church. Lastly, the *Argumentum a baculo* (or use of the cudgel) though objectionable, is concise in its style, and has settled many controversies.

ARGUME'NTUM AD HO'MINEM. See Argument.

A'RGUS, the son of Zeus and Niobe, succeeded Phoroneus in the government of the Peloponnesus, which took from him its name of Argos, as did also the territory of Argolis.—A., surnamed Panoptes (all-seeing), had one hundred eyes, some of which were always awake. He was enormously strong, and on account of the wonderful exploits he performed, Juno appointed him to watch over Io, transformed into a cow. Mercury, being commissioned by Zeus to carry off the cow, slew A. by stoning him; or, as Ovid says, first charmed him to sleep by playing on the flute, and then beheaded him. Juno used the eyes of A. to decorate the peacock's tail.—A. the builder of the ship *Argo* (see Argonauts).

A'RGUS, a genus of gallinaceous birds, remarkable for magnificence of plumage. The only known species is *A. giganteus*, formerly called *Phasianus A.*, and still very generally the A. pheasant. The sides of the head and of the neck are destitute of feathers; the tail consists of twelve feathers, of which the two middle ones in the male are very much elongated; the secondary feathers of the wings are much longer than the primary. The name A. has allusion to the many beautiful eye-like markings which adorn the plumage of the male, and particularly the secondaries of the wings. The long secondaries are said to impede the flight of the bird; but its wings are much employed to aid it in running. The female is of comparatively tame plumage, not only wanting the eye-like markings, but even the length of the secondaries and of the middle tail-feathers. The size of the bird, when divested of its plumage, is not much greater than that of a common barn-door fowl, but the tail-feathers of the male are nearly four feet long. The A. is a native of Sumatra and other eastern islands, of the peninsula of Malacca, Siam, &c. It is said to be found even in the northern parts of China. It is impatient of confinement, and has very seldom been brought alive to Europe.

Argus Pheasant (*A giganteus*).

ARGY'LE, Archibald Campbell, Marquis of, an eminent political character of the 17th c., was born in 1598, and succeeded to the earldom of A. in 1638. Already he had given proofs of that strength of religious principle which marked his whole life, and of a perilous union of attachment to the king and of faith in the principles against which the king made war.

In the General Assembly at Glasgow, in November 1638, he openly took the side of the Covenanters, and thenceforth became recognized as their political head. In 1640, he commanded a military expedition through Badenoch, Athole, Mar, and Angus, for the purpose of enforcing subjection to the Scottish Parliament. On the king's visit to Scotland, in 1641, he found it convenient to show peculiar favor to A., and created him a marquis. On the breaking out of hostilities, H. was still desirous for negotiation, but was finally compelled to take the field. In April 1644, he dispersed the royalist forces under the Marquis of Huntly, in Aberdeenshire. He was less successful in withstanding the genius of Montrose, who, on the 2d February 1645, almost annihilated his army at Inverlochy. His estates had suffered so much in the preceding year from the ravages of the brilliant Cavalier, that a sum of public money was voted for his support. In August (1646), he went to London, with Loudon and Dunfermline, to treat with the parliament for a mitigation of the articles presented to the king. He was at the same time the bearer of a secret commission from the king to treat with the Duke of Richmond and the Marquis of Hertford, on the propriety of a Scottish demonstration in favor of Charles. On the defeat of the 'Engagement' plan, to which he had been decidedly opposed, the government of Scotland devolved on A. and the other Presbyterian leaders. In the parliament of February 1649, Charles II. was proclaimed king, and at Scone, on the 1st of January 1651, A. put the crown on his head. At this time, it was even said that the complaisant monarch intended to marry one of his daughters. As head of the Committee of Estates, A. took vigorous measures to oppose Cromwell's invasion of Scotland, and still adhered to the king, after the subjugation of the country. After the battle of Worcester, he retired to Inverary, where he held out for a year against Cromwell's troops. Falling sick, he was taken prisoner by General Dean. He refused submission to the Protector, but took an engagement to live peaceably, which he strictly kept. On the restoration, he repaired to Whitehall, encouraged by a flattering letter from the king to his son. Impeached with the crime of having submitted to the usurper (to whom he had refused allegiance), he was committed to the Tower, and on the 13th February 1661, was brought before the Scottish Parliament on the charge of treason. He defended himself with spirit, but in vain. On the 27th May he was executed at Edinburgh—having displayed throughout his whole trial, and on the scaffold, the dignity of a true nobleman, and the meekness of a Christian.

His son, Archibald, 9th Earl of A., was early distinguished by personal accomplishments, and exhibited great bravery on the disastrous day of Dunbar, where he commanded a regiment on the royal side. After Worcester, he continued, like his father, in arms, and made himself so obnoxious to the parliamentary leaders, that he was specially excepted by Cromwell from the act of grace in 1654. After much harassing persecution, he submitted to the parliament, but continued to be closely watched. On the restoration of Charles II., he was received into high favor (as a balance to the execution of his father), and unfortunately for his own fame, participated in some of the iniquitous acts of the Scottish legislature. He had, however, numerous and active enemies; and, on the ground of an intercepted letter, in which he had complained of neglect, he was tried and condemned to death by the Scottish Parliament for the imaginary crime of *læsa majestas*. The influence of Clarendon restored him to liberty and favor; even the king himself was prejudiced in his favor; but his explanation in subscribing the infamous test framed by the Scottish Parliament in 1681 was declared treasonable, and he was again condemned to death. The devotion of his wife enabled him to escape from Edinburgh Castle in the disguise of a page; and after remaining concealed some time, he fled to Holland. Landing in the north of Scotland, in May 1685, with an armed force, to co-operate in the revolt of Monmouth, he was, after a series of misfortunes, taken prisoner, hastily condemned, and beheaded, June 30, 1685. His son Archibald, one of the deputation sent by the Scottish Convention to present the crown to the Prince of Orange, was in 1701 created Duke of Argyle.

ARGYLE, John Campbell, 2d Duke of, son of the first duke, was born in 1678, and took an important part in the political and military affairs of his time. As royal commissioner in 1705, he had a principal share in bringing about the Act of Union. As a soldier, he distinguished himself under Marlborough at Ramilies, Oudenarde, Lille, Ghent, and Malplaquet. Previous to the change of ministry in 1710, A. had been a keen Whig. He now veered with the wind of the court, and became a declaimer against the Duke of Marlborough. As the reward of his apostasy, he was appointed by the Tories generalissimo of the British army in Spain; but considering himself to have been unhandsomely treated by the ministry, he shortly after returned, and finding his influence greatly diminished, he again became a Whig. His career up to the rebellion of 1715, was most tortuous and unprincipled, and seriously detracts from his meritorious services during that critical period. He was, however, completely successful in quelling disturbances, and his services were rewarded in 1718, among other dignities, with an English peerage, and the title of Duke of Greenwich. His restless vanity and ambition, however, constantly prompted him to political intrigues. In 1721 he again played into the hands of the Tories, for the purpose of securing the entire patronage of Scotland. In 1737 he rose into immense popularity in his own country, by his spirited defence before parliament of the city of Edinburgh in regard to the Porteous mob. He died on the 3d September 1743. He was a man of lax principles and selfish character, but possessed of considerable shrewdness and talent, and noted for his kindness and courtesy in private life. The benevolence of his disposition procured him the title of "the Good Duke of Argyle.'

ARGY'LE, Duke of. George John Douglas Campbell, 8th Duke of A., was born in 1823, and succeeded his father in 1847. At the age of 19, his Grace, then Marquis of Lorne, wrote a pamphlet entitled *A Letter to the Peers from a Peer's Son*, on the subject of the struggle which ended in the disruption of the Scottish Church. Seven years later he published an essay on Presbytery, which contains a historical vindication of the Presbyterian system. On taking his seat in the House of Peers, he soon commanded the respect of that dignified assembly. On the formation of the coalition ministry by Lord Aberdeen, his Grace was invested with the office of Lord Privy Seal, which he continued to hold in Lord Palmerston's administration. In 1855, he became Postmaster-general. In Palmerston's next ministry, formed in 1859, he again successively held the same office. Mr. Gladstone appointed him Secretary of State for India in 1868, and again in 1880. He resigned office in 1881, disapproving the Irish Land Bill. In 1874 he had supported the abolition of patronage in the Church of Scotland. In 1854 he was chosen lord rector of the University of Glasgow; in 1855 presided at a meeting of the British Association in that city; and in 1861 was elected president of the Royal Society of Edinburgh. His Grace is hereditary master of the Queen's household in Scotland, chancellor of the University of St. Andrews, a trustee of the British Museum, also hereditary sheriff and Lord Lieutenant of Argyleshire. Besides numerous papers on zoology, geology, &c., he has written *The Reign of Law*, 1866; *Primeval Man*, 1869; and, in 1870, *A History of the Antiquities of Iona*. In 1844 he married the eldest daughter of the Duke of Sutherland (died 1878). His eldest son, the Marquis of Lorne, married the Princess Louise in 1871; and in 1878 was appointed Governor-general of Canada. In the ducal title, A. is now generally spelt Argyll. See Lorne in Am. Supp.

ARGY'LESHIRE (*Airer-Gaedhil*, territory of the Gael), a county in the west of Scotland, cut up into many peninsulas, by arms of the sea, and including numerous islands. It is bounded N. by Invernessshire; W. and S. by the sea; E. by Perthshire,

Dumbarton, Loch Long, and Firth of Clyde. Its greatest length is about 115 miles; greatest breadth about 60 miles; its extent of coast-line is very great, amounting to 663 miles, owing to the indentation of the coast by numerous lochs running inland. Next to Inverness, it is the largest county in Scotland—area, 3210 square miles, of which 1063 are occupied by the numerous islands. No part is above 12 miles from the sea or from large inland lochs. The county is divided into the districts of Cantire, North and South Argyle, Lorn, Appin, Cowal, Morven, and Sunart.

The chief islands are Mull, Islay, Jura, Tiree, Coll, Lismore, and Colonsay, with Iona and Staffa. There are upwards of thirty other islands of smaller size. The general aspect of A. is wild and picturesque, marked by rugged and lofty mountains and deep inland bays. Some fertile valleys exist. The north part is entirely mountainous, and presents some of the grandest scenery in Scotland, as Glencoe. The highest peaks are (Ord. Trig. Survey) Bidean nam Bian, 3766 feet; Ben Cruachan, 3693; Buachael Etive, 3341—all in Lorn; Ben Ina (end of Loch Long), 3319; Ben More (Mull), 3185; Ben Creach (Morven), 2790; North Pap of Jura, 2565. The chief bays are (going south)—Loch Moidart, Loch Sunart, Linnhe Loch, branching off into Loch Eil and Loch Leven, Loch Fyne, and Loch Long. There are no rivers of any size. The streams are short and rapid, the principal being the Urchay, running through Glenorchy into Loch Awe, and the Awe connecting that lake with Loch Etive. The inland or fresh-water lochs are Loch Awe and Loch Lydoch. The rocks of A. are mica-slate, which predominates on the mainland; trap in Mull and Lorn; quartz rock in Islay and Jura; granite around Loch Etive and in Knapdale; patches of lias and oolite in many of the isles; and a little old red sandstone west of Loch Fyne and in South Cantire. Lead-mines occur at Strontian (where the mineral Strontianite was discovered, and from which the names of the earth called *Strontia* and the metal *Strontium* are derived), at Tyndrum, and in Islay and Coll. A copper-mine exists in Islay. The Easdale and Ballachulish quarries supply the best roofing-slates in Scotland. Coal occurs near Campbelton; fine marble in Tiree, &c.; excellent granite near Inverary; and limestone in most parts of the county. The fertile parts of A. lie along the arms of the sea and the mountain streams. The soil is mostly a light, sandy, and gravelly loam, along the coast and the sides of the rivers, and gravelly, with a till bottom, on the hillsides. Sheep and cattle rearing are the chief occupations of the farmer. More sheep are reared in A. than in any other Scotch county, and nearly a million acres are in permanent pasture. In number of cattle, A. yields only to the counties of Aberdeen, Ayr, Lanark, and Perth. In 1881, A. had 24,481 acres under corn, and 12,990 under green crops, as well as 60,151 acres under permanent pasture, exclusive of heath or mountain-land. A. abounds in deer and game. Loch Fyne is famed for its herrings. Loch Awe abounds in salmon and trout.

In many parts of A. the peasantry are still very poor, notwithstanding that steamers now connect every portion of the coast with the commercial center of Scotland. The manufactures are unimportant, the chief being whisky, in Campbelton and Islay, and coarse woollens for home use. The chief towns and villages are Inveraray, Campbelton, Oban, Dunoon, Lochgilphead, Tarbert, and Tobermory. The three former unite with Ayr and Irvine in returning one member to parliament; the county returns another. Pop. (1871) 75,679; (1881) 76,440, mostly using the Gaelic language. This exhibits a considerable decrease since 1831, which has chiefly resulted from emigration. This extensive county is divided ecclesiastically into not more than fifty parishes, which contain only two royal burghs, Inverary and Campbeltown, the former of which is a station of the Circuit Court of Justiciary. The principal proprietors are the Duke of Argyle, the head, and the Earl of Breadalbane, a branch of the Campbell family. Among the antiquities of A. are the ruins of Iona and Oronsay, and many *duns*, or circular forts, along the coast. In Cantire formerly lived the Macdonalds, or Lords of the Isles, whose power was weakened by James III.

ARIA (Air), in Music, a rhythmical song, as distinct from recitative. The term was formerly applied to a measured lyrical piece either for one or several voices; but is now commonly applied to a song introduced in a cantata, oratorio, or opera, and intended for one voice supported by instruments. Arietta, a short melody. Arioso, a passage in the style of the A., often introduced into recitative. A. Buffo, a comic song, &c.

ARIA'DNE, daughter of Minos, king of Crete, by Pasiphaë. When Theseus, with the offerings of the Athenians for the Minotaur, landed in Crete, A. conceived a passion for the beautiful stranger, and gave him a clew by means of which he threaded the mazes of the labyrinth, and was enabled to slay the monster. For this service, Theseus promised to marry her, and she escaped with him, but was slain by Diana on the island of Naxos.—According to another tradition, A. was left by Theseus at Naxos, where she was found by Bacchus returning from his triumph in India, who was captivated by her beauty, and married her. At her death, he gave her a place among the gods, and suspended her wedding-crown as a constellation in the sky. A., as left forsaken by Theseus, and as married to Bacchus, has been a favorite subject with artists.

ARIA'LDUS, a deacon of the church of Milan, who flourished during the 11th c. He took a prominent part in the ecclesiastical contentions of his times. The Catholic Church in the north of Italy was then very corrupt, a wide-spread licentiousness, originating from the unnatural institution of priestly celibacy, prevailed. Great numbers of the clergy kept concubines openly. Such as looked earnestly in those days at this flagrant evil, were disposed to consider the strict enforcement of celibacy the only effectual cure. Chief among these reformers stood A., whose life was one continued scene of violent controversy. Although successively sanctioned by Popes Stephen X., Nicholas II., and Alexander II., he found little sympathy among his brethren, and used to complain that he could only get laymen to assist him in his agitation. Having at length succeeded in obtaining a papal bull of excommunication against the Archbishop of Milan, a fierce tumult ensued in the city, whose inhabitants declared against A. and his coadjutors. A. now fled to the country; but his hiding-place being betrayed, he was conveyed captive to a desert isle in Lake Maggiore, where he was murdered by the emissaries of the archbishop, and his remains thrown into the lake, June 28, 1066. He was afterward canonized by Pope Alexander II.

ARIA'NA. See Aryan Race.

A'RIANS. See Arius.

A'RIAS MONTA'NUS, Benedictus, a Catholic divine noted for his great linguistic attainments, was born, 1527, in the village of Frexenal de la Sierra, situated among the mountains separating Estremadura from Andalucia. He studied first at Seville, and afterwards at Alcalá de Henares, where he distinguished himself by the ardor he manifested in the acquisition of the oriental languages, Arabic, Syriac, and Chaldee. He next proceeded on a tour through Italy, France, Germany, England, and the Netherlands, in the course of which he obtained a knowledge of various modern tongues. He was present at the celebrated Council of Trent; but on his return to his own country, he resolved to retire into seclusion, and dedicate his whole time to literature. In 1568, however, Philip II. persuaded him to repair to Antwerp and superintend the publication of the famous edition of the 'Polyglot Bible,' executed in that city at the suggestion of the printer, Christopher Plantin. After four years' labor, the work was issued under the title *Biblia Sacra, Hebraice, Chaldaice, Græce, et Latine. Philippi II. Regis Catholici Pietate et Studio ad Sacrosanctæ Ecclesiæ Usum Chph. Plantinus excudebat.* It was received with universal applause. The Jesuits, to whom A. was sincerely and strenuously opposed, alone attempted to fasten the charge of heresy on the author, who made several journeys to Rome to clear himself of the accusation. Philip II. rewarded him with a pension of 2000 ducats, besides bestowing on him various emoluments. He died at Seville in 1598. His literary works are very numerous. They relate principally to the Bible and to Jewish antiquities; but he also wrote a poem on Rhetoric, and a History of Nature.

ARI'CA, a seaport of Moquega, the most southerly department of Peru, in lat. 18° 28′ S., and long. 70° 24′ W. Though it has merely a roadstead, it affords safe anchorage to shipping, and is one of the chief outlets of the trade of Bolivia, being connected with La Paz in that republic by a mule-path which leads across the west Cordillera of the Andes. Its exports mostly consist of copper, silver, alpaca, wool, and guano. A. has frequently suffered from earthquakes; a most destructive one occurred in 1868. It was stormed and taken by the Chilians in 1880, and afterwards set on fire. About 230 vessels, of some 260,000 tons, enter this port annually, and about the same number clear it with cargoes. The climate is salubrious. Pop. about 4000.

ARICHAT, a seaport of Cape Breton Island, in the province of Novia Scotia, with a harbor for the largest vessels. It is near the Gut of Canso, the most southerly of three channels of communication between the Gulf of St. Lawrence and the Atlantic. The town has about 1000 inhabitants, is largely engaged in fishing, and at the head of its harbor a lead mine has recently been opened.

ARIA'NO (*Arianum*), a city of South Italy, in the province of Avellino, beautifully situated 2800 feet above the sea, in one of the most frequented passes of the Apennines, 50 m. N.-E. from Naples. It is a bishop's seat, and has a fine cathedral. The chief manufacture is earthenware. There is a considerable export trade in wine and in butter. A. is said to have been founded by Diomed. Roger II. held a parliament here to settle the affairs of the province, after his defeat of the allied armies of Pope Innocent II. and the Prince of Capua. In the face of the hill on which the city is built, hundreds of caves have been dug, in which many of the poorer inhabitants dwell. Pop. 12,588.

ARIEGE, or ARRIEGE, a river in the south of France, rises in the department of the East Pyrenees, flows through a beautiful

vale. and falls into the Garonne near Toulouse.—The department of ARIEGE, which lies along the northern slopes of the Pyrenees, formed a part of the old county of Foix, the territory of Couserans, and the province of Languedoc, is bounded N. and W. by Haute Garonne, E. by Aude, S. by the republic of Andorra and the Pyrenees. It contains some of the highest mountain-summits in France, such as Fontargente, 9164 feet; Serrère, 9592 feet; Montcalm, 10,513 feet; Estats, 10,611 feet; Montvalier, 9120 feet. The department, nevertheless, has a mild climate. Area, 1880 square miles. Pop. (1881) 240,601, engaged chiefly in agriculture, pasturage, iron mines, and the manufacture of woollens, linen, pottery, &c. The three arrondissements are Foix, Pamiers, and St. Girons. Chief towns—Foix, Pamiers, St. Girons.

A'RIES, the Ram, one of the signs of the zodiac, including the first 30 degrees of the ecliptic measured from the vernal equinox, or that point where the vernal passage of the sun across the equator takes place. The vernal equinox, or, as it is also called, the first point of A., is constantly changing its position among the fixed stars, in consequence of the precession of the equinoxes, moving westward at the rate of 50″·2 annually. It is from this circumstance that the sign A. no longer corresponds with the constellation A., which was the case about 2000 years ago, when the ecliptic was divided into 12 equal parts called signs, each named after the group of stars through which it passed. The present sign A. is in the constellation Pisces, about 30° west of the original sign; and although the sun at the vernal equinox will always be at the first point of A., yet nearly 24,000 years will elapse before that point will again coincide with the beginning of the constellation A.

A'RIL (*arillus*), a peculiar covering of the seed in some plants, formed by an expansion of the *funiculus* (the cord which attaches the ovule to the *placenta*), or of the placenta itself. This expansion takes place after fertilization, and sometimes invests the seed entirely, sometimes only partially. In the nutmeg, the A. forms what is called *mace*. In the spindle-tree (*Euonymus Europæus*), it forms the remarkable orange-colored covering of the seed.

ARI'NOS, a river of Brazil, which after a north-west course of 700 miles, enters the Tapajos, itself an affluent of the Amazon, in lat. 9° 30′ S., and long. 58° 20′ W.

ARI'ON, a celebrated lute-player, a native of Methymna, in Lesbos, about 700 B.C., was regarded by the ancients as the inventor of the dithyrambic metre. According to a tradition first given by Herodotus, and afterwards decorated by the poets, A. was sent by Periander, ruler of Corinth, to Sicily and Italy, and at Tarantum won the prize in a poetical contest. As he returned laden with gifts in a Corinthian ship, the avaricious mariners determined to slay him and seize his wealth; of this the poet, musician was forewarned by Apollo in a dream. He asked for permission to try his skill in music; and after playing on his lute threw himself from the deck into the sea. Here several dolphins, charmed by his music, had assembled round the vessel. On the back of one of them the musician rode safely to the promontory of Tænarus, where he landed, and journeyed on to Corinth. The sailors who, arriving afterwards, assured Periander that A. was dead, were confronted with him, when they confessed their guilt, and were crucified. The lute and dolphin were raised among the constellations; and the story became a favorite theme with artists. A. W. Schlegel, in one of his best poems, gives this story of A.

ARIO'STO, LUDOVICO, one of the greatest of Italian poets, was born at Reggio, September 8, 1474, being the eldest son of the military governor of that city. He was bred to the law, but abandoned it for poetry. However, at an early period of life, he was compelled to exert himself for the support of a large family, left as a burden on him at the death of his father. His imaginative powers were developed in early life. In 1503, after he had written two comedies, with several lyrical poems in Latin and Italian, he was introduced to the court of the Cardinal Hippolytus d'Este, who employed him in many negotiations. Here, in Ferrara, in the space of about ten years, he produced his great poem *Orlando Furioso*, which was published in that city, in one volume 4to, in 1516, in forty cantos. After the death of the cardinal, the duke, his brother, invited the poet to his service, and acted to him with great kindness and liberality. In the early part of 1521, a second edition of his poems was published, the *Orlando Furioso* being still in forty cantos. Shortly after, he was commissioned by the duke to suppress an insurrection which had broken out in the wild mountain-district of Garfagnana; a task which seems more like a punishment than a mark of honor. A., however, succeeded in this arduous undertaking; and after remaining three years governor of the quarter, he returned to Ferrara, where he lived comfortably, nominally in the service of his patron, but in reality enjoying what he highly prized—an abundant leisure for prosecuting his studies.

It was at this time that he composed his comedies, and gave the finishing touch to his *Orlando*. At length, in the latter part of 1532, that poem made its appearance in a third edition, enlarged to its present dimensions of forty-six cantos. He now became seriously ill of a painful internal distemper, of which, after a few months of suffering, he died on the 6th of June 1533, in his fifty-ninth year, and was buried in the church of San Benedetto, at Ferrara, where a magnificent monument indicates the resting-place of his remains. A. is described as a man of noble personal appearance and amiable character. His *Orlando Furioso* is a romantic, imaginative epic, marked by great vivacity, playfulness of fancy, and ingenuity in the linking together of the several episodes. It takes its name and its theme from a chivalrous romantic poem by Boiardo, the *Orlando Innamorato*. That poem treats of the wars between Charlemagne and the Saracens, confounded as they were by tradition with those of Charles Martel, wherein Orlando, or Roland, stood forward as the champion of Christendom. Orlando is the hero of Boiardo's piece, and falls in love with Angelica, a clever and beautiful oriental princess, sent by the Paynim to sow discord among the knights of the Christian armies. The story of this lady being left unfinished in the *Orlando Innamorato* is taken up by A., who makes her fall in love herself with an obscure juvenile squire, on which Orlando gets furious, and long continues in a state of insanity. Besides his great work, A. wrote comedies, satires, sonnets, and a number of Latin poems, all more or less marked with the impress of his genius. In 1845, Giamperi, a librarian of Florence, announced that he had discovered at Argenta, near Ferrara, an autograph manuscript by A., containing a second epic, *Rinaldo Ardito*, describing, like the *Orlando*, the battles of Charlemagne and his paladins against the Saracens. The manuscript had been mutilated, and contained in a complete form only the cantos 3, 4, 5, while 2 and 6 were imperfect; and it was stated that the entire poem had consisted of twelve cantos. The work was published under the title *Rinaldo Ardito di L. Ariosto, Frammenti Inediti Pubblicati sul Manuscritto Originale* (Florence, 1846). In genius and style, it has been found by critics by no means to accord with the *Orlando*. Of the *Orlando* there are three several translations into the English language: the first, by Sir John Harrington, appeared in the year 1634; the second, by John Hoole, in 1783; and the third by W. Stewart Rose, in 1823 and following years. In the last only is there to be found a fair representation of the feeling and spirit of the original.

ARIOVI'STUS (probably the Latinized form of the German *Heer-fürst*, army-prince), a German chief, leader of the Marcomanni and other German tribes, was requested by the Sequani, a Gallic people, to assist them in a contest against the Ædui. Having gained a victory for the Sequani, A. was so well pleased with their fine country (now Burgundy), that he and his followers determined to abide there. Many other Germans followed him into Gaul, where he soon collected an army of 120,000 men. The Gallic people turned now for help towards the Romans, and Cæsar demanded an interview with A., who proudly replied, that 'he did not see what Cæsar had to do with Gaul.' After another message from Cæser had been treated in the same scornful manner, the Roman forces under Cæsar advanced and occupied Vesontium (now Besançon), the chief city of the Sequani. A furious engagement took place (58 B.C.) in which Roman discipline prevailed over the German forces, which were utterly routed. A., with only a few followers, escaped over the Rhine into his own country. His subsequent history is unknown.

ARI'SPE, a town in Sonora, the extreme north-west department of the Mexican Confederation. It is situated in the Sierra Madre, the western range of the Rocky Mountains, on the banks of the Sonora, which is said to lose itself in an inland lake. Its population has been estimated as high as 7600. The surrounding district abounds in the precious metals, as also in cotton, wine, grain and live-stock.

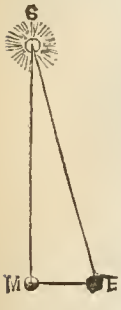
ARI'STA and ARI'STATE. See AWN.

ARISTAE'US (from a Greek word signifying *the best*), an ancient divinity whose worship in the earliest times was widely diffused throughout Greece, but whose myth is remarkably obscure. According to the common tradition, he was the son of Apollo and Cyrene, the latter the grand-daughter of Peneius, a river-god of Thessaly. She is said to have given birth to A. on the coasts of Libya, in Africa, whence the region is alleged to have derived its name of Cyrenaica. Hermes placed the child under the protection of the Horæ, the fosterers of cities, culture and education. According to another tradition, A. was the son of the nymph Melissa, who fed the infant with nectar and ambrosia, and afterwards intrusted his education to Chiron. The great diversities in the legend were probably caused by the fusion into one of separate local divinities, whose functions were similar, and whose histories were, in consequence, carelessly commingled. After A. left Libya, he went to Thebes, in Bœotia, where he was taught by the Muses the arts of healing and prophecy, and where he married Autonoë, the daughter of Cadmus, by whom he had several children. After the unfortunate death of his son Actæon (q. v.), he

went to Ceos, where he liberated the inhabitants from the miseries of a destructive drought by erecting an altar to Zeus *Icmæus*—i. e., the rain-maker. He now returned to his native land; but shortly after, set out a second time on a voyage of beneficence. He visited the islands of the Ægean Sea, Sicily, Sardinia, and Magna Græcia, leaving everywhere traces of his divine benignity. At last he went to Thrace, where he was initiated in the mysteries of Dionysus; and after a brief residence in the vicinity of Mount Hæmus, he disappeared from the earth.

This myth is one of an extremely pleasing character, from the invariable beneficence which is attributed to A. It is less disfigured by anthropopathic errors than most of the myths of Greek divinities. A. was especially worshiped as the protector of vine and olive plantations, and of hunters and herdsmen. He also trained men to keep bee-hives, and averted the burning heats of the sun from the open fields. Later mythology often identified A. with the higher gods Zeus, Apollo, Dionysus.

ARISTA'RCHUS, OF SAMOS, a celebrated ancient astronomer, of the Alexandrian school, who flourished 281—264 B. C. All his writings have perished, excepting a short essay on the sizes and distances of the sun and the moon. In this he shows the method of estimating the relative distances of the sun and the moon from the earth, by the angle formed by the two bodies at the observer's eye at that moment when the moon is exactly half-luminous. It will be obvious from a glance at the annexed figure that the three bodies must then form a right-angled triangle, of which the moon is at the right angle. The angle MES, then, being observed, it is easy to find the ratio between EM and ES. This is quite correct in theory; but the impossibility of determining when the moon is exactly half-illuminated, renders the method useless in practice. Besides, in the days of A., there were no instruments for measuring angles with anything like accuracy. A. estimated the angle at E at 83°, and determined EM to be $\frac{1}{20}$ of ES; the truth being that the angle at E differs only by a fraction of a minute from a right angle, and that EM, the distance of the moon from the earth, is about $\frac{1}{400}$ of ES, the distance of the sun. According to some accounts, A. held, with the Pythagorean school, that the earth moves round the sun; but this seems to be a mistake. Vitruvius speaks of A. as the inventor of a kind of concave sun-dial.



ARISTA'RCHUS, OF SAMOTHRACE, a grammarian, who lived, about 150 B.C., in Alexandria, where he founded a school of grammar and criticism, and educated the children of Ptolemy Philopator. His life was chiefly devoted to the elucidation and restoration of the text of the Greek poets, especially of Homer. The form in which we now have the Homeric poems preserved is in a great measure owing to his judgment and industry. The strictness of his critical principles has made his name a general term for a severely just and judicious critic. Being afflicted with an incurable dropsy, he ended his life by voluntary starvation at the age of 72. The fragments of his writings that have been preserved are to be found scattered through the Scholia on Homer, first published by Villoison (Venice, 1788.)

ARI'STEAS, an entirely fabulous character, who may be styled 'the Wandering Jew' of popular tradition in ancient Greece. First we find A. teaching Homer; then, some ages afterwards, born at Proconnesus, an island in the Sea of Marmora. It is stated that having visited the Arimaspæ, the gold-watching Griffin, and the Hyperboreans, he died on his return home; but soon afterwards, a traveler asserted that he had been met and accosted by A. Consequently, neighbors searched the house where the body of A. was supposed to be lying, but it could not be found. Seven years afterwards, he appeared as an author, and wrote a poem entitled *Arimaspeia*, in three books, giving accounts of Northern and Central Asia, which were copied by Herodotus and others. After thus establishing himself as a poet, he vanished again; and after 340 years of mystery, reappeared at Metapontum, in the south of Italy, where he advised the people to erect an altar to Apollo, and an altar to the 'everlasting A.,' assuring them that, when Apollo founded their city, he (A.), in the form of a raven had accompanied the god, and had assisted in the ceremony. In the early controversy of the Christian Church, heathens sometimes quoted this tale of A. as a counterpart to the miracles recorded in the New Testament.

ARISTI'DES, surnamed 'THE JUST,' was the son of Lysimachus, and descended from one of the best families in Athens. He was one of the ten leaders of the Athenians against the Persians at the battle of Marathon (490 B.C.). It had been arranged that each leader (or *strategos*) should hold the supreme command for one day; but A., who saw the folly of this want of unity, induced his companions to give up their claims, and make Miltiades commander-in-chief, which proved the means of winning the battle. In the following year, A. was chief archon, and in this position, as in every other, secured the general respect of the citizens. Some years later, probably because he had opposed the plans of Themistocles, that unscrupulous leader brought about the banishment of A. It is said when an illiterate citizen, who did not know him personally, requested him to write his own name on the voting shell, he asked the man whether A. had injured him. 'No,' said the voter; 'but I am weary of hearing him always styled "the Just."' A. submitted to the sentence with dignity, praying to the gods, as he left the city, that the Athenians might not have cause to repent of their decision. Only three years later, Xerxes, with an overwhelming force, had invaded Greece. A., hearing that the Greek fleet was surrounded by that of the Persians, hastened from Ægina to apprise Themistocles of the danger and offer his aid. After taking a prominent part in the battle of Salamis, A. was restored to popular favor, and soon afterwards aided greatly in achieving the victory at Platæa, in which he commanded the Athenians. In 477 B.C. he introduced a change of the constitution, by which all citizens, without distinction of rank, were admitted to political offices. As showing the confidence reposed in A., it is related that Themistocles having announced that he had a scheme very advantageous for Athens, but which he could not disclose in a public assembly, A. was deputed to consult with Themistocles on the subject. The plan was to secure the naval supremacy of Athens by burning all the vessels of the other Greek states, her allies, then lying in a neighboring harbor. A. reported to the people that nothing could be more advantageous than the plan of Themistocles, but nothing could be more unjust; and the matter was immediately rejected by the people. After a variety of other public services, A. died in old age, and universally respected, 468 B.C., so poor that it is said his funeral had to be provided for by the public. He left a son and two daughters, for whom provision was made by state bounty.

ARISTI'PPUS, the founder of the Cyrenaic school of philosophy among the Greeks, was the son of Aritades, a wealthy gentleman of Cyrene, in Africa, and was born in that city about the year 424 B.C. Having come over to Greece to attend the Olympic games, he heard so much of Socrates, that he was filled with an eager desire to see the sage, and hurried to Athens, where he became one of his pupils. He remained with Socrates up nearly to the last moments of the great teacher, though he does not at any period seem to have followed his doctrine or practice. We know that subsequently he was the object of strong dislike, both to Plato and to Antisthenes the Stoic. He passed a considerable part of his life in Syracuse, at the court of Dionysius, the tyrant, where he acquired the reputation of a philosophic voluptuary. That his manners must have been at once extremely graceful and accommodating, is clear from the saying of his opponent, Plato, who declared that 'A. was the only man he knew who could wear with equal grace both fine clothes and rags.' Diogenes Laertius records a number of his *dicta*, some of which take the form of *bons-mots*, and indicate a sharp, cutting, lively, and self-complacent nature. A. also lived at Corinth, in intimacy with the famous courtesan Laïs, but towards the close of his life he is supposed to have retired to Cyrene. His daughter Arete seems to have been a person of superior abilities, inasmuch as her father imparted his leading doctrines to her, and she to her son, A. the Younger (hence called *Metrodidaktos*, 'taught by the mother'), by whom they are supposed to have been systematized. A., in all probability, published nothing during his life. He prided himself more upon spending his days in what he conceived to be a philosophical manner, than in elaborating a philosophical system for the benefit of the race.

The Cyrenaic school, all the teachers of which were probably imbued with the spirit of A., and merely carried out his doctrines to their legitimate results, professed a great contempt for speculative philosophy, and for physical and mathematical knowledge. They confined their investigations to morals, and formed an ethical system completely in harmony with the gay, self-possessed, worldly, and sceptical character of their master. The chief points of the Cyrenaic systems were: 1. That all human sensations are either pleasurable or painful, and that pleasure and pain are the only criterions of good and bad. 2. That pleasure consists in a gentle, and pain in a violent motion of the soul. 3. That happiness is simply the result of a continuous series of pleasurable sensations. 4. That actions are in themselves morally indifferent, and that men are concerned only with their results. Wieland in his historico-philosophical romance, *Aristipp und einige seiner Zeitgenossen* (A. and Some of his Contemporaries), presents us with a charming picture of the life and opinions of the great philosophic sensualist, who stood out in strong relief against the gloom and austerity of Antisthenes and the Cynical school. See Wendt's *De Philosophiâ Cyrenaicâ* (Gött. 1842).

ARISTOBU'LUS, an Alexandrian Jew who lived under Ptolemæus Philometer about 175 B.C., and was considered by the early Fathers as the founder of the Jewish philosophy in Alexandria. He was long considered the author of the *Exegetical Commentaries*

on the Books of Moses which went under his name, but it is now admitted that the work in question was the composition of a later period. Only fragments of it remain. It was intended to show that the oldest Greek writers borrowed from the Hebrew Scriptures; and to support this theory, numerous quotations were professedly taken from Linus, Musæus, Orpheus, &c., of which the Christian apologists made abundant use. These, however have long been considered forgeries, inasmuch as they do not exhibit a trace of the antique Greek spirit, but make the writers speak in the tone and style of the Old Testament. See Valckenær's treatise, *De Aristobulo Judæo* (Leyden, 1806).

ARISTO'CRACY (Gr. *aristocratia*, from *aristos*, best, and *kratos*, power) means etymologically the power of government of the best, noblest, or most worthy; and in the sense which it originally bore, A. had reference not to a social class, but to a form of government in which the sovereignty was placed in the hands of a minority of the citizens of the state, exclusive altogether of the slave population, which generally existed in antiquity. It is in this sense also that we use it when we speak of the Italian states of the middle ages as aristocracies. In order to constitute an A., it was further necessary that the minority which composed it should consist of the highest class, in point not of wealth alone, but of birth and culture; the government of a minority in numbers simply, being known by the more odious name of an *oligarchy*. Were the whole government of England intrusted to the House of Lords, even though that body were to become vastly more numerous than it is, so long as it did not include half of the whole adult males, and were not elective, but hereditary, we should be ruled by an A., and our rulers would be aristocrats in the antique sense of the term. In this, its political sense, the term A. has never been acclimatized in England, because the thing which it signifies has always been unknown. Our territorial nobility, though possessing great influence in the government of the country, has, at every stage of its career, been controlled either by the Crown from above or the Commons from below; and thus it is that, though more important as a social influence than in any other country, the English A. has never assumed the form of a ruling-class.

When used with reference to English society, the term A. has two significations—a narrower and a wider one. According to the first, it is nearly synonymous with *nobility*. In this sense, it will be treated of under that head, and its relative subdivisions. According to the second, it is synonymous with *gentry*, and includes the whole body of the people, titled and untitled, above a certain very indefinite social line. Perhaps the nearest approximation which we shall make to a definition of A. in this, its proper English sense, will be by adopting that which Aristotle has given not of *aristocratia*, but of *eugeneia*, or good birth. 'Good birth,' he says, 'is ancient (long inherited) wealth and virtue.' (*Politic.* lib. iv. c. 7.) The question as to the extent to which either of these qualities is requisite to constitute a claim to admission into the ranks of the A., is one to which probably not two persons, either within or without the pale, would return the same answer; but that the absence of either would be a ground of exclusion, is a point on which there will be little difference of opinion. No amount of mere wealth will, in general, confer it either on a tradesman or his immediate descendants (see GENTLEMAN); and scarcely any deeds, however noble, will give it to him who is not the possessor of inherited fortune. Neither Burns the gauger, nor Shaw the lifeguardsman, has ever been regarded as an aristocrat, though nobody denies that the one was a poet, and the other a hero. But when the claim to recognition as an aristocrat has been inherited, it will scarcely be lost by the individual himself, however adverse may be his worldly circumstances, or however ignoble his conduct; and it is not difficult to imagine an elevation of moral tone which would confer it even on a beggar.

ARISTOGEI'TON, See HARMODIUS AND ARISTOGEITON.

ARISTOLO'CHIA, a genus of plants of the natural order *Aristolochiaceæ* or *Asarineæ*. This order, which is dicotyledonous or exogenous, consists of herbaceous plants or shrubs, often climbing shrubs, and contains upwards of 130 known species, chiefly natives of warm climates, and particularly abundant in the tropical regions of South America. The leaves are alternate, simple, stalked, often with a stipule; the flowers axillary, solitary, hermaphrodite, of a dull color; the perianth at its base adhering to the ovary, tubular, sometimes regular, but generally irregular; the stamens 6—12 epigynous (or inserted upon the ovary), distinct, or adhering to the style; the ovary is generally six-celled, with numerous ovulus; the style simple, the stigmas radiating, as numerous as the cells of the ovary; the fruit dry or succulent; the seeds with a very minute embryo at the base of fleshy albumen.

The genus *A.* is distinguished by a tubular oblique perianth, generally inflated at the base, the mouth dilated on one side, and by stamens adherent to the style, so that it is included in the Linnæan class *Gynandria*. The species are mostly shrubby, and natives of tropical countries, some of them climbing to the summits of the loftiest trees. Several are found in the south of Europe; one only, the common BIRTHWORT (*A. Clematitis*), occurs upon the continent as far north as about lat. 50°, and is a doubtful native of England. It is a perennial plant, with erect, naked, striated stem—heart-shaped dark-green leaves on long stalks—the flowers stalked, and growing to the number of sometimes seven together from the axils of the leaves, the tube of the perianth about an inch long, and of a dirty yellow color. It grows chiefly in vineyards, hedges, about the borders of fields, among rubbish, and in waste places. It has a long branching root, with an unpleasant taste and smell, which, with the root of *A. rotunda* and *A. longa*, two herbaceous species, natives of the south of Europe, was formerly much used in medicine, being regarded as of great service in cases of difficult parturition, whence the English name. These roots possess powerful stimulating properties, and those of the southern species are still used as emmenagogues. The root of *A. Indica* is used in the same way by the Hindoos.—*A. serpentaria*, VIRGINIAN SNAKEROOT, is a native of most parts of the United States, growing in woods. It has a flexuous stem, 8—10 inches high, bearing heart-shaped very acute leaves. The flowers are on stalks, which rise from the root; the orifice of the perianth is triangular. The root has a penetrating resinous smell, and a pungent, bitter taste. It has long been a fancied remedy for the bite of the rattlesnake. It possesses stimulant and tonic properties. It forms an article of export from the United States to Europe, and bears a high price, being highly esteemed as a medicine in certain kinds of fever.—Its reputation as a cure for serpent-bites is shared by other species, particularly *A. anguicida* and *A. guaeo* (the Guaco of Colombia), natives of the warmer parts of America.

Aristolochia Clematitis.

The juice has certainly the power of stupifying, and even of killing serpents; and it is said that a number of species are used by Egyptian jugglers, in order to their handling serpents with impunity.—Several South American species seem also to possess medicinal properties analogous to those of the Virginian snakeroot.—*A. Sipho*, a climbing shrub, of 15—20 feet in height, a native of the southern parts of the Alleghany Mountains, is frequently planted in the United States, in Britain, and on the continent of Europe, to form shady bowers. It has very large heart-shaped leaves (a foot in breadth), of a beautiful green. The flowers hang singly, or in pairs, on long stalks; the tube of the perianth is crooked in its upper part, inflated at the base, and veined with reddish-brown veins having a sort of resemblance to the bowl of a tobacco-pipe, for which reason the shrub is sometimes called Pipe-shrub, Pipe-vine, or Dutchman's Pipe.—The tropical species are distinguished for their beauty and the peculiar forms of their flowers. Some of them are much prized ornaments of our hot-houses.

Aristolochia serpentaria; *a*, a flower; *b*, a flower not open, showing the parts of fructification, *c*; *d*, the stamens; *e*, the stigmas.

To the natural order *Aristolochiaceæ* belongs also the genus ASARUM.

ARISTO'PHANES, the only writer of the old Greek comedy of whom we possess any entire works, was the son of one Philippus, and was born at Athens about the year 444 B.C. We know very little of his history. Plato, in his *Symposium*, relates that he was fond of pleasure—a statement which it is easy to credit when we consider the tendencies of his profession in all ages. It seems equally clear, however, from the vigorous and consistent expression of his convictions in his various works, and from the fearless manner in which he assails the political vices of his day, that he was possessed of an honest and independent spirit. He appeared as a comic writer in the fourth year of the Peloponnesian war (427 B.C.).

The piece which he produced was entitled *Daitaleis* (the Banqueters), and received the second prize. It ridiculed the follies of extravagance, and, like all his subsequent works, was pervaded by a contempt of modern life, and an admiration of the sentiments

and manners of the earlier generations. Next year, he wrote the *Babylonians*, in which he satirized Cleon, the so-called demagogue, so sharply, that the latter endeavored to deprive him of the rights of citizenship, by insinuating that he was not a real Athenian. This, in all probality, gave rise to the various traditions of A. having been born in Rhodes, Egypt, &c. Fragments of these plays remain. In 425, his *Acharnians* obtained the first prize. It was written to expose the madness of the war then raging between Athens and Sparta, and exhibits the feelings of the 'peace-party' in the former city. It is still extant. In 424 appeared *Hippeis*, the *Knights* or *Horsemen*. It was the first which the poet produced in his own name, and evinces the singular boldness of the author. It is levelled against Cleon, and presents us with a striking picture both of a vulgar and insolent charlatan, and of the fickle, cunning, credulous, and rather stupid mob over whom he precariously despotises. It is related of this piece that, when no actor would undertake to play the part of the influential Cleon, A. himself impersonated the demagogue. Unfortunately for the character of Cleon, as well as that of the Athenian democracy, these caricatures and misrepresentations of A. have been received as historical pictures. How far they are from the truth, has been clearly shown by Grote in his *History of Greece*. See CLEON. In 423, A. produced the *Clouds*, which, along with the *Knights*, are the two most famous of his comedies. They exhibit in overflowing richness that fancy, wit, humor, satire, and shrewd insight which characterize this greatest of all Greek comic writers. The *Clouds*, however, displays at the same time the weaknesses and imitations of A.'s mind. Its aim was to deride the pretensions of the new sophistical school, and to point out its pernicious tendencies. So far well. But A., who was no philosopher, demonstrates his own incapacity to appreciate the highest range of thought and character, by selecting no less a person than Socrates as the most perfect representative of a sophist. A., who was both religiously and politically conservative, had apparently no clearer conception of abstract truth than is involved in reverence for the sanctities of the past, the old gods, old traditions, old manners, and old sentiments. He had an instinctive hatred of innovations, and considered all equally pernicious. As he had represented Cleon the reformer as a vulgar innovator and demagogue, ruled by the lowest considerations, he makes the innovating views of Socrates also proceed from corrupt motives, veiled perhaps with more craft. Alcibiades is caricatured in this brilliant comedy as a wildly extravagant youth, whose career of ruin is accelerated by the insidious instructions of Socrates; and a hint is thrown out towards the end of the piece, which unfortunately proved to be the 'shadow' of a 'coming event.'

A. represents the father of Alcibiades as about to burn the philosopher and his whole *phrontisterion* (subtlety-shop); and there can be little doubt that this dramatic vilification of the purest of heathen moralists led to that persecution which, twenty years later, culminated in his condemnation and death. In 422 appeared the *Wasps*, still extant, in which the popular courts of justice are attacked; and three years later, in his *Peace*, he returns to the subject of the Peloponnesian war, which is ridiculed with great cleverness. In 414 he produced two comedies, *Amphiaraus* and the *Birds*, both of which caricature, in the liveliest manner, the Sicilian expedition, then being meditated, but which proved so utter a failure. The *Lysistrata* belongs to the year 411, and exhibits a civil war of the sexes, as the monstrous issue of that in the Peloponnesus. In his *Platus* and *Ecclesiazusæ*, which respectively appeared in 408 and 392, true to his mission as the enemy of innvoation, he assailed the new passion for Doric manners and institutions, and ventured to ridicule Plato, in that, however, in which the philosopher is weakest—namely, his political theory. Euripides, also, as the sophist among poets, is severely handled in the *Frogs*, which belongs to the year 405.

A. wrote fifty-four comedies, of which only eleven are extant. He is acknowledged to stand far above all his contemporaries or successors of the middle and new comedy in wealth of fancy and beauty of language. His choruses sometimes exhibit the purest spirit of poetry; and Plato himself says that the soul of A. was a temple for the Graces. The ingenuity which he displays in the mechanical artifices of verse is not less wonderful. Frogs are made to croak choruses, pigs to grunt through a series of iambics, and words are coined of amazing length—the *Ecclesiazusæ* closes with one composed of 170 letters. It only remains to be added, what might naturally be expected, that the personalities in which A. indulged descend at times into coarseness and indecency, and that even the gods whom he undertook to defend are treated with levity, and placed in the most ludicrous lights.

The comedies of A. have been edited by Brunck (1781—1783), Dindorf (1794—1826), Bekker (1829). They have all been translated into German by Voss (Brunswick, 1821), and there are several translations of single plays into English.

ARISTOTE'LIA. See MAQUI.

A'RISTOTLE was born at the Grecian colonial town of Stageira, on the west side of the Strymonic Gulf (now the Gulf of Contessa, in Turkey in Europe), in the year 384 B.C. He belonged to a family in which the practice of physic was hereditary. His father, Nikomachus, was the friend and physician of Amyntas II., king of Macedonia, father of Philip, and grandfather of Alexander the Great. A. lost both parents while he was quite young, and was brought up under the care of Proxenus, a citizen of Atarneus, in Asia Minor, who was then settled at Stageira. It is to be conjectured that his education, such as it was, would take the direction of preparing him for the family profession, and that whatever knowledge and power of manipulation attached to the practice of physic at that time, would rank among his early acquisitions. In after-life, he occupied himself largely in the dissecting of animals, and was acquainted with all the facts that had been derived from this source by others before him. It seems probable, however, that he early abandoned the intention of following physic as a profession, and aspired to that cultivation of universal knowledge for its own sake, in which he attained a distinction without parallel in the history of the human race.

In his 18th year (367 B.C.) he left Stageira for Athens, then the intellectual center of Greece and of the civilized world. Plato, on whom he doubtless had his eye as his chief instructor, was then absent at Syracuse in that extraordinary episode of his life, connecting him as political adviser with the two successive Syracusan despots—Dionysius the Elder, and Dionysius the Younger—and with Dion. A., therefore, pursued his studies by books, and by the help of any other masters he could find, during the first three years of his stay. On the return of Plato, he became his pupil, and soon made his master aware of the remarkable penetration and reach of his intellect. The expressions said to have been used by Plato imply as much; for we are told that he spoke of A. as the 'Intellect of the School.' Unfortunately, there is a total absence of particulars or precise information as to the early studies of the rising philosopher. He remained at Athens twenty years, during which the only facts recorded, in addition to his studying with Plato, are, that he set up a class of rhetoric, and that in so doing, he became the rival of the celebrated orator and rhetorical teacher, Isocrates, whom he appears to have attacked with great severity. It was in the schools of rhetoric that the young men of Athens got the principal part of their education for public life. They learned the art of speaking before the Dikasteries, or courts of law, and the public assembly, with efficiency and elegance; and incidentally acquired the notions of law and public policy that regulated the management of affairs at the time. We can easily suppose that A. would look with contempt upon the shallowness—in all that regarded thought or subject matter—of the common rhetorical teaching, of which, doubtless, the prevailing excellence would lie in the form of the address, being artistic rather than profound or erudite. One of the disciples of Isocrates, defending his master against A., wrote a treatise wherein allusion is made to a work (now lost) on proverbs, the first recorded publication of the philosopher.

The death of Plato (347 B.C.) was the occasion of A.'s departure from Athens. It was not extraordinary or unreasonable that A. should hope to succeed his master as the chief of his school, named the Academy. We now know that no other man then existing had an equal title to that pre-eminence. Plato, however, left his nephew Spensippus as his successor. We may suppose the disappointment thus arising to have been the principal circumstance that determined A. to stay no longer in Athens; but there are also other reasons that may be assigned, arising out of his relations with the Macedonian royal family at a time when the Athenians and Philip had come into open enmity.

Whatever may be the explanation, he went in his thirty-seventh year, after a stay of nearly twenty years in Athens, to the Mysian town of Atarneus, in Asia Minor, opposite to the island of Lesbos. Here he lived with Hermeias, the chief of the town, a man of singular energy and ability, who had conquered his dominion for himself from the Persians, at that time masters of nearly all Asia Minor. A. had taught him rhetoric at Athens, and he became in return the attached friend and admirer of his teacher. For three years the two lived together in the stronghold of Atarneus; but by treachery and false promises, the Rhodian Mentor, an officer in the Persian service, got possession of the person of Hermeias, put him to death, and became master of all the places held by him. A. accordingly fled, and took refuge in Mitylene, the chief city of the neighboring island of Lesbos. He also took with him Pythias, the sister of Hermeias, and made her his wife. In a noble ode, he has commemorated the merits of his friend thus lost to him through the treachery of a Greek renegade. His wife, Pythias, died a few years afterwards in Macedonia, leaving him a daughter of the same name. His son Nikomachus, to whom he dedicated his chief work on ethics—called, in consequence, the *Nikomachean Ethics*—was born to him at a later period of his life by a concubine.

After two years' stay at Mitylene, he was invited (in the year

342 B.C., age 42) by Philip to Macedonia, to educate his son Alexander, then in his fourteenth year. What course of study Alexander was made to go through, we cannot state. He enjoyed the teaching of A. for at least three years, and contracted a strong attachment to his preceptor, which events afterwards converted into bitter enmity. The two parted finally when Alexander commenced his expedition into Asia (334 B.C.), and A. came from Macedonia to Athens, having recommended to the future conqueror, as a companion in his campaigns, the philosopher Callisthenes, whom he educated along with Alexander. Now at the age of fifty, he entered on the final epoch of his life; he opened a school called the 'Lyceum,' from its proximity to the temple of Apollo Lyceius. From his practice of walking up and down in the garden during his lectures, arose the other name of his school and sect, the *Peripatetic*. It would appear to have been his habit to give a morning lecture to select pupils on the more abstruse subjects, and one in the evening of a more popular kind to a general audience. He may now be supposed to have composed his principal writings; but, unfortunately, there is nothing known of the dates of any of them. This crowning period of his life lasted twelve years. After the death of Alexander, the anti-Macedonian party at Athens obtained an ascendency, and among other consequences, an accusation was prepared against A., the pretext being impiety. With the fate of Socrates before his eyes, he chose a timely escape, and in the beginning of 322 B.C., took refuge at Chalcis in Eubœa, where, in the autumn of the same year, he died, aged 62. He had long been afflicted with indigestion, and ultimately sank under this malady.

The *philosophy* of A. differed from that of Plato on many points, especially in the fundamental doctrine termed the Theory of Ideas. The Platonic 'ideas' or 'forms' were conceived as real existences, imparting all that is common to the particular facts or realities, instead of being derived from them by an operation of the mind. Thus, the actual circles of nature derive their mathematical properties from the pre-existing 'idea,' or circle in the abstract; the actual men owe their sameness to the ideal man. A. was opposed to this doctrine throughout, although he always speaks of its author with respect, and sometimes with affection. The whole method of A. was in marked contrast to the Platonic handling of philosophical subjects: he was a most assiduous observer and collector of facts, from which he drew inductions with more or less accuracy. Plato, on the other hand, valued facts merely in criticising the views that he was bent upon demolishing, and not as a means of establishing sound theories.

The writings of A. may be said to have embraced the whole circle of the knowledge of his time. Many of them are lost; those that remain refer principally to the following departments.

Astronomy, Mechanics, Physics, were treated of by him at some length; but here his failure was complete, if we look at his writings from the point of view now acquired. He was the victim of capricious fancies, based upon doctrines common among his contemporaries, accepted by him as principles of reasoning, and conducting him to the most unsound conclusions. His theory of the rotation of the sphere, the necessary perfection of circular motion, of the impossibility of a vacuum, and the like, did more to confuse than to explain the phenomena of nature. Nor can it be said that the time was not ripe for putting these subjects on a rational basis; for he was very shortly followed by a series of men, who both observed and reasoned soundly respecting them, and laid the foundation of their great subsequent progress—namely, Euclid, Appollonius, Archimedes, Eratosthenes, and Hipparchus.

The thirteen books called Metaphysics contain much profound thought, but are obscure and defectively arranged; indeed, neither the actual arrangement of the books, nor the title which they bear, can be ascribed to A. himself. The subject to which they are devoted is Ontology—the science of *Ens, quatenus Ens*—which he terms *Philosophia Prima*, and sometimes Theology. He distinguishes three branches of theoretical philosophy. 1. Physics—the study of sensible material particular things, each of which differs from every other, and all of which have in themselves the principle of change or motion. 2. Mathematics—that of geometrical and numerical entities, known by general definitions, susceptible neither of change nor of movement, capable of being considered and reasoned upon apart from matter, but not capable of existing apart from matter. 3. The First or Highest Philosophy—which studies the essences of things eternal, unchangeable, and apart from all that change, movement, and differentiation which material embodiment involves.

The Metaphysics, or First Philosophy, does in fact deal with the extreme abstractions or generalities of all sciences. It is a collection, partly of doubts and difficulties, partly of attempted solutions, upon these last refinements of the human mind. It includes many valuable comments on the philosophy of Plato and others anterior to or contemporary with A. The general terms and subtle distinctions which this treatise first brought to view, were highly prized throughout all the philosophy of the middle ages.

He appears in a very different light in his great work on Animals. He has here amassed a stock of genuine observations, and also introduced a method of classification which continues to this day as the most approved groundwork of zoological classification. In this work we see perhaps, in the most advantageous light, the two great qualities of his mind, rarely coupled in the same individual—the aptitude for observation, and logical method. The excellence shown in his various writings generally depends upon one or other of these qualities.

His Organon or Logic is his complete development of formal reasoning, and is the basis and nearly the whole substance of syllogistic or scholastic logic. This science he almost entirely created. Mr. Grote observes (*History of Greece*, part ii. chap. lxviii.) that 'what was begun by Socrates, and improved by Plato, was embodied as a part of a comprehensive system of formal logic by the genius of A.; a system which was not only of extraordinary value in reference to the processes and controversies of its time, but which also having become insensibly worked into the minds of instructed men, has contributed much to form what is correct in the habits of modern thinking. Though it has now been enlarged and recast by some modern authors (especially by Mr. John Stuart Mill in his admirable System of Logic) into a structure commensurate with the vast increase of knowledge and extension of positive method belonging to the present day—we must recollect that the distance between the best modern logic and that of A. is hardly so great as that between A. and those who preceded him by a century—Empedocles, Anaxagoras, and the Pythagoreans; and that the movement in advance of these latter commences with Socrates.'

A considerable portion of his writings relate to the Human Mind and Body. In one of these, a short treatise on Memory and Recollection, he gave the first statement of the laws of Association of Ideas.

His treatises on Rhetoric and Poetics were the earliest development of a Philosophy of Criticism, and still continue to be studied. The same remark is applicable to his elaborate disquisitions on Ethics.

Perhaps one of his greatest works is his Politics, based upon a collection made by himself of 158 different Constitutions of States; the collection itself being unhappily lost. Here we see the spirit of the inductive observer, which indeed is no less apparent in the works mentioned in the last paragraph. It is, however, a singular fact, that he gives no evidence of having read the historian Thucydides; and his only reference to Herodotus is on a point of natural history. Yet the narratives and descriptions contained in the works of both these writers are probably of as much value, and as much in point, in a Political Philosophy, as the very best observations made by himself.

The great current distinctions of Matter and Form, Substance and Quality, Actuality and Potentiality, are due to A. See Grote's *Aristotle*, 1872.

ARISTO'XENUS, of Tarentum, a pupil of Aristotle's, and one of the oldest writers upon music, flourished about 330 years B.C. He was extraordinarily active and versatile in his literary studies, and is said to have composed upwards of 450 treatises on music, history, and philosophy. On the death of Aristotle, he fully expected to be appointed his successor, and is said to have been deeply mortified when Theophrastus was preferred; but this statement is discredited by many. He founded a school of musicians, who were called after him, Aristoxeneans, and whose distinguishing characteristic was that they judged of the notes in the diatonic scale exclusively by the ear, while the Pythagoreans determined these mathematically. Except his *Elements of Harmony*, in three books, which we still possess, only a few fragments of his writings survive in later authors.

ARI'THMETIC is the science that treats of numbers (Gr. *arithmos*). It is sometimes divided into theoretical and practical; the former investigating the properties of numbers and their combinations, the latter applying the principles so established, in the form of rules, to actual calculations. Some restrict the term A. to this art of reckoning, assigning the investigation of the principles to analysis.

Among the ancient Greeks and Romans, A. made little progress, owing to their clumsy modes of notation. Few of their writings on the subject have come down to us; the most important are those of Euclid (7—10 B. of the *Elements*), Archimedes,, Diophantus, and Nicomachus. After the introduction of the decimal system and the Arabic or Hindu numerals (see NUMERALS), about the 11th c., A. began to assume a new form; but it was not till the 16th c. that the Double Rule of Three, or Compound Proportion, was discovered, and decimal fractions were introduced. The invention of Logarithms in the 17th c. is the last great step in advance that the art has made. Passing over the elementary operations of Addition, &c., the chief heads, such as FRACTIONS, DECIMALS, PROPORTION, LOGARITHMS, &c., will be noticed in their proper places.

ARITHME'TICAL MEAN is that number that lies equally distant between two others: thus, the A. M. between 11 and 17 is 14, which is found by taking half their sum.

ARITHME'TICAL PROGRESSION is a series of numbers that increase or diminish by a common difference, 7, 10, 13, 16, 19, 22; or 12, 10½, 9, 7½, 6. To find the sum of such a series, multiply the sum of the first and last terms by half the number of terms. The series of natural numbers, 1, 2, 3, 4, &c., form an A. P., of which the difference is 1.

ARITHME'TICAL SIGNS are arbitrary marks or symbols used to denote the operations to be performed on numbers, or the relations existing between them. *Ex. gr.*, $7 + 5$ indicates that 7 and 5 are to be *added* together; $7 - 5$, that 5 is to be *subtracted* from 7; 7^5 that 7 is to be raised to the fifth *power*; $7 + 5 = 15 - 3$, that when 7 and 5 are added together, the result is *equal* to the difference between 15 and 3. The same signs are also used in Algebra; and an enumeration and explanation of them may be found in almost any treatise on Arithmetic or Algebra.

A'RIUS, the celebrated founder of Arianism, was a native of Libya, and is generally supposed to have been born shortly after the middle of the 3d c. About the year 306 A. D., Alexandria was thrown into confusion by the violence of its religious disputes, and in these A. was largely mixed up. At first, he took part with Meletius, Bishop of Lycopolis, in Upper Egypt, a man who was strenuously opposed to certain notions of discipline entertained by Peter, Bishop of Alexandria; but afterwards he became reconciled to the latter, who made A. a deacon. The reconciliation however, was brief. A. once more took the part of Meletius, and was excommunicated by Peter in consequence; but the latter dying soon after, Achillas, his successor, restored A. to his office, and even advanced him to the dignity of a presbyter, 313 A. D. His new function required that he should interpret the Scriptures, and, as he possessed an abundance of natural gifts, united with great learning, it is not wonderful that his preaching should have become popular, and his peculiarities of opinion been vehemently embraced. The first time, however, that A. was brought into collision on a point of doctrine with his ecclesiastical superiors, was in 318 A.D. Alexander, Bishop of Alexandria, and successor of Achillas, having in a public assembly of clergy, while speaking of the Trinity, said that it contained one single essence, or indivisible unity of substance, A. alleged that such a conception was impossible to the human mind, and accused Alexander of Sabellianism—i. e., of destroying the distinction of persons. The dispute grew hot, and a conference which was held to settle it only embittered the disputants. In maintaining his ground, A. went beyond his first statement of the absolute distinctness of person between the Father and the Son; he maintained that the Son was not co-equal or co-eternal with the Father, but only the first and highest of all finite beings, created out of nothing by an act of God's free will, and that he ought not to be ranked with the Father.

A. was successful in securing the adherence of large numbers both of the clergy and laity in Egypt, Syria, and Asia Minor. In 321 a synod of bishops was held at Alexandria.

These deposed and excommunicated A., and active measures were taken to let this decision be known over all the Christian churches. Alexander himself wrote numerous letters (two of which are still extant), exhorting the bishops not to receive the 'heretic.' In consequence of these violent steps, the breach was widened between both parties. To escape persecution, A. retired to Palestine, where he wrote a letter to his friend Eusebius, who was Bishop of Nicomedeia, a city of Bithynia, and not far from Constantinople. Eusebius, one of the most influential Christians of his time, warmly sympathized with him; wrote in his behalf to Paulinus, Bishop of Tyre, and others; absolved him from the Alexandrian synod's excommunication; and in 323 convened another synod in Bithynia, which pronounced favorably on A. He even enlisted Constantine on the side of the latter, to this extent at least, that the half-pagan emperor addressed admonitions to both Alexander and A., assuring them that the point in dispute was a trifling one, and ought not to provoke a serious quarrel. While A. was residing at Nicomedeia, he wrote a theological work in verse and prose, called *Thaleia*, some fragments of which remain, and indicate an earnest and philosophic mind, but at the same time contain expressions which could not but pain a believer in the divinity of Christ. The *Thaleia* is said to have been sung by the Arian neophytes, who thus kindled the passions of their adversaries, and increased the virulence of the contest. The comedians, who were pagans, took advantage of the occasion to ridicule the Christian religion in the theaters. The officers of the emperor in several cities wished to repress this profane temerity, but the interferenee only created greater confusion.

It now became impossible for the emperor to remain neutral or indifferent, with safety to himself, or to the tranquillity of the empire. Hosius, Bishop of Corduba, whom he had appointed mediator betwixt Alexander and A., took part with the former, and reported unfavorably of A. The result was, that Constantine, in order, as he thought, to effect a final settlement of the question, convoked the memorable Council of Nicæa (Nice, q. v.), in Bithynia, 325 A.D. Three hundred and eighteen bishops from all parts of the Christian world, but especially from the east, were present, besides numbers of priests, deacons, and acolytes. A. boldly expounded and defended his opinions. He declared in the most unambiguous manner that the Son of God was created out of nothing; that he had not always existed; that he was not immutable or impeccable; that it was through his free will he remained good and holy; that if he had chosen, he could as easily have sinned as not; in a word, that he was a mere creature and work of the Deity. He further affirmed that the Son of God was not of the same substance with the Father; that he was not the 'Word' or 'Wisdom,' properly speaking; and that the Scriptures only attribute these names to him as they do to other created intelligences.

These propositions were listened to with great calmness by the bishops, but the inferior clergy, or at least a majority of them, manifested the most violent opposition. The document containing his confession of faith was torn to pieces before his face. Arguments, however, of a more rational kind were also employed. Alexander was ably seconded by the young deacon, Athanasius, the equal of A. in eloquence, and in the power of his logic. It was principally by the reasonings of Athanasius that the council was persuaded to define, in the most precise manner, the doctrine of the Godhead—viz., the absolute unity of the divine essence, and the absolute equality of the three persons. All the bishops subscribed it except two, Theonas of Marmarica, and Secundus of Ptolemais, who had the heroism (for it must be considered such) to follow the banished A. into Illyricum.

The emperor was even prevailed on to remove the latter to Gaul, though he alleges as his reason that he wished to deliver him from the machinations of his enemies. In the same year, another synod met at Jerusalem, which revoked the sentence of excommunication uttered against A. and his friends. Still the majority of the Christians of Alexandria clung to the doctrines of Athanasius, and resolutely resisted every effort to establish the new opinions among them. Disappointed in his expectations, A., in 336 A.D., proceeded to Constantinople, where he presented the emperor with another apparently orthodox confession of faith; whereupon orders were issued to Alexander, Bishop of Constantinople, to administer to Arius the holy communion on the Sunday following. This was considered a grand triumph by Eusebius and his friends, and when the day arrived, they escorted A., as a guard of honor, through the streets of the metropolis. When about to enter the temple in which it was intended that he should be received with solemn pomp, he retired a moment to relieve nature, but fainted, and died of a violent hemorrhage. His disciples declared that he had been poisoned, while the orthodox devoutly affirmed that God had answered the prayers of Alexander.

Slight as might appear the verbal difference between the two parties, the bitterness of the controversy was intense, and pervaded almost all departments of public and private life. Constantius having by the death of Constans (350) and conquest over Magnentius (353), gained dominion over the west, the Arian cause, which he favored, triumphed at the synod of Arelate or Arles (353) and at that of Milan (355). These victories, however, were more apparent than real. The Nicene doctrine had still strong support on its side, and was strictly maintained by the banished Athanasius and his friends, while the Antiniciæans, soon after their triumph, were divided into at least three parties. The old Arians, also styled Anomœoi, or Heterousians, asserted, in the boldest style, their doctrine of 'distinct substances.' The semi-Arians (a large majority in the Eastern Church) maintained the Homoiousian doctrine of similar substances. A third party held the same doctrine with some qualification. Morally, the victory was leaning to the side of the Nicæans. Julian the Apostate (361—363), in his hatred of the Christian religion, left all parties at liberty to contend as they pleased with one another, so that they did not interfere with his plans. Jovianus and his followers in the west, Valentinianus I., Gratianus, Valentinianus II, extended full toleration to both parties. Arianism, at last, was virtually abolished in the Roman empire, under Theodosius in the east (379—395), and Valentinianus II. in the west. Among the German nations, however, it continued to spread through missionary efforts. Bishop Ulfilas, the translator of the Bible into the Mæso-Gothic language, had been the means of converting the West Goths to Arian Christianity as early as 348; and they adhered to it until the synod of Toledo in 589. The East Goths, Vandals, Burgundians, the Suevi in Spain, and the Longobards also adopted Arianism; but in all these instances the Nicene doctrine ultimately prevailed, most slowly among the Longobards, who retained the Arian creed until 662. The Arian controversy has never excited any great interest in modern times, though in England it was revived for a time by the writing of the learned Dr. Samuel Clarke (1675—1729) and also by Whiston, who died in 1752. More re-

cently, a part of the Arian doctrine, the denial of 'the eternal sonship,' was broached in the Wesleyan Methodist Society by Dr. Adam Clarke and a few followers; but it was soon suppressed by the Conference. Pure Arianism can hardly now be said to exist. It has gradually lapsed into Unitarianism. See UNITARIANS.

ARIZO'NA, a territory of the United States, lying between 31° 90′ and 37° N. lat., and 109° and 115° W. long. It is bounded N. by Nevada and Utah, E. by New Mexico, S. by Mexico, W. by California. Area, 113,916 sq. m. The surface consists of elevated table-lands intersected by mountains and interspersed with valleys. Grazing lands cover three-fourths of the territory, but its chief wealth lies in its minerals. Pop. (1870) 9658; (1880) 40,441; capital, Prescott. A., formerly a part of New Mexico, was organized as a separate territory in 1863. See ARIZONA in AMERICAN SUPPLEMENT.

ARKA'NSAS, one of the larger states of the American Union, taking its name from the river A. Throughout its entire length, it occupies the right bank of the Mississippi, being separated by that stream, towards the east, from Tennessee and the N. half of Mississippi. Its boundaries to the S., W., and N. are purely arbitrary and conventional, and are best learned from a map. With a length of 240 miles, and an average breadth of about 225, the area of A. is 53,850 square miles, being nearly 3000 miles larger than England (without Wales). In 1870, out of 34,000,000 acres, only 1,860,000 were cultivated, very little more than $\frac{1}{17}$ of the whole. This area had increased to 3,595,000 in 1880. In 1879, the agricultural productions of the state, were 22,432,800 bushels of Indian corn, 1,384,000 of wheat, 1,603,120 of oats, 696,600 of potatoes, and 323,872,500 bales of cotton. Pop. (1820) 14,273; (1870) 484,471; (1880) 802,564, of whom 210,593 were colored, Indians, and Chinese. Though nominally colonized by the French in 1685, it was still virtually a wilderness, when purchased as a part of Louisiana by the United States in 1803. It was only in 1819 and 1836 respectively that it became first a territory, and then a state of the Union. The towns of A. are small, the principal being Little Rock, the seat of government, with 12,380 inhabitants, which is about four times as populous as any other of the principal towns, which are, Camden, Fort Smith, Pine Bluff, Helena, Hot Springs, and Princeton.

In climate and productions A. occupies, as it were, an intermediate position between the states of the west and those of the south. A. is rich in minerals, particularly in manganese, zinc, and gypsum. It also contains the principal varieties of coal—cannel, anthracite, and bituminous. It likewise possesses lead-ores, which are said to contain a large proportion of silver. The manufactures of the state are comparatively insignificant.

The internal improvements of A. consist in great measure of plank-roads and levees or embankments against the Mississippi. In 1880, there were about 500 miles of railway in A. The state, however, is comparatively independent of works of this description, penetrated as it is by so many navigable rivers—the A., the White River, the St. Francis, the Red River, the Washita, &c.

In 1880, the public indebtedness of A., contracted mainly in support of banks, amounted to 5,096,405 dollars, nearly half of it representing 'interest accrued and unpaid.' The taxation for the same year was 613,957 dollars, chiefly the result of a direct assessment on property of almost every description—lands, houses, furniture, horses, mules, cattle, stock-in-trade of all trades, gold watches, jewelery, &c.

The state legislature meets only once in two years. To the Lower House of Congress A., in the proportion of its population, sends four representatives; while, like every other state, it has two senators in the Upper House. See ARKANSAS in AM. SUPP.

ARKA'NSAS RIVER, next to the Missouri the largest affluent of the Mississippi. It is 2000 miles long, rising in the Rocky Mountains on the borders of Utah, and joining the 'Father of Waters' in lat. 33° 54′ N., and long. 91° 10′ W. Flowing generally through a level country, it presents but few obstacles to navigation. The principal difficulty is connected with its periodical rise and fall—the difference between season and season being not less than 25 feet. Notwithstanding this, however, the A. is practicable for steamboats, during nine months of the year, to a distance of 800 miles from its mouth. It divides the state which takes its name into nearly equal parts, varying in breadth within the limits of the same from 3 furlongs to half a mile. Its banks also, in its lower course, contain a good deal of stone-coal.

A'RKLOW, a seaport town in the south-east corner of Wicklow county, in lat. 43° 40′ N. and long. 4° 38′ W., at the mouth of the river Avoca, which is crossed here by a bridge of nineteen arches. It consists of an upper well-built town, and a lower, inhabited by fishermen. 200 boats are employed in the herring and oyster fishery. Near the town is Shelton Abbey, the seat of the Earl of Wicklow. Sand-banks unfit the harbor for ships of any size, and extensive sand-dunes exist on the adjacent coast. In 1798, a bloody encounter took place here between the royal troops and the United Irishmen. Pop. (1871) 5178.

ARK OF THE COVENANT, ARK OF THE TESTIMONY, or ARK OF JEHOVAH, one of the most important parts of the furniture of the tabernacle, which, by divine direction, the Israelites constructed in the wilderness, and afterwards of the temple built by Solomon at Jerusalem. A description of it is to be found in Exodus xxv., in the command given to Moses for its construction; and also in Exodus xxxvii., from which it appears it was a chest of shittim-wood (very generally supposed to be the wood of a species of acacia, but by some regarded more probably as that of the wild-olive), overlaid with gold within and without, two cubits and a half in length, one cubit and a half in breadth and in height—that is, according to the common estimate of the length of the cubit, 3 feet 9 inches in length, and 2 feet 3 inches in breadth and height—the lid being formed entirely of pure gold, with a crown or raised border of pure gold round about. Within the ark was deposited the 'testimony,' consisting of 'the two tables of the law,' i. e., the stone tablets upon which the ten commandments were inscribed. The golden lid of the ark was called the *mercy-seat* or *propitiatory*, and above it were the *cherubims* (q. v.), made of the same piece of gold with it, and between them was the place of the *Shechinah* or manifestation of the Divine presence.

The ark had also golden rings, through which passed staves of shittim-wood, overlaid with gold, for carrying it in the journeyings of the Israelites, concerning which very particular rules were laid down (see Numbers, iv.). Whilst being carried from one place to another, it was covered first with a 'covering of badgers' skins,' and above this with 'a cloth wholly of blue;' and in the tabernacle and temple it was put into the 'most holy place,' into which the high-priest alone was to enter upon the 'day of atonement.' The ark was called the A. of the C., because it was the appointed symbol of the presence of God as the God of Israel, and of his covenant with his people. The things of the Jewish dispensation being regarded as typical, and the Jewish religion as essentially one with the Christian, the ark is commonly regarded as a type of Christ; the excellency and unchangeableness of the moral law, as indicated by the place assigned to it within the ark, which, however, sprinkled with the blood of typical sacrifice, was interposed between it and men, who, having transgressed it, were exposed to its curse; and the mercy-seat, in like manner sprinkled with the blood of sacrifice, was interposed, as it were, between the law and God, who is represented in the Old Testament as 'dwelling between the cherubims,' and thence shining forth as the God of mercy, favorable to his worshipers. A complete harmony is thus made out between these Old-Testament types and Christian theology.—It is worthy also of notice, that sacred arks or chests have been connected with the worship of various heathen nations, and have been placed as the most sacred things in the innermost parts of the temple, which only the priests were permitted to enter. The relation of these to the ark of the Jews has been the subject of much learned inquiry, but has not yet received thorough and satisfactory elucidation.—The ark appears not to have been brought back from Babylon, and so never to have been in the second temple. No figure of it appears among the sacred vessels of the temple represented on the Arch of Titus.

ARKO'NA, the north-east promontory of the island of Rügen, in the Baltic, almost the most northern extremity of Germany. Its steep cliffs mainly consist of mixed chalk and loam, with horizontal veins of flint; there is a small deposit of pure chalk towards the east. Myriads of sand-martins build in the clefts of these cliffs. The view from their summit extends to the coast of Jasmund on the right, on the left to the islands of Hiddensöe and Möen. The name A. is very ancient. In the chronicles of Saxo Grammaticus we find it written Archona, but its derivation is quite uncertain. On the west side is the famous wall or fortified enclosure in which stood the temple of the Wend deity Swantewit. King Waldemar I. of Denmark, after a bloody conflict, took possession of the fortress in 1168, burnt the idol and its temple, and carried away its treasures to Denmark. On its site, a light-house, 75 feet high, was built in 1827.

A'RKWRIGHT, SIR RICHARD, celebrated for his inventions in cotton-spinning, was born at Preston, in Lancashire, Dec. 23, 1732. Of humble origin, the youngest of thirteen children, and bred to the trade of a barber, his early opportunities of cultivation were exceedingly limited. In 1760, he gave up his business as a barber in Bolton, and became a dealer in hair. A secret process for dyeing hair, said to have been discovered by himself, increased considerably the profits of his trade. Very little is known regarding the first movements of his mind in the direction of mechanical invention. His residence in the midst of a cotton-spinning population naturally led him to take an interest in the process used in that manufacture. That the development of his mechanical ingenuity was not, however, due to circumstances, is sufficiently proved by the fact, that his first effort was an attempt to discover the perpetual motion. Having no practical skill in mechanics, he secured the services of a watchmaker, named Kay, to assist him in

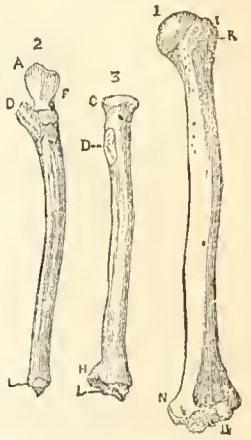
the construction of his apparatus. About 1767, he seems to have given himself wholly up to inventions in cotton-spinning. In the following year he removed to Preston, where he set up his first machine, the celebrated *spinning-frame*, consisting chiefly of two pairs of rollers, the first pair moving slowly in contact, and passing the cotton to the other pair, which revolved with such increased velocity as to draw out the thread to the required degree of fineness. No previously invented machinery had been able to produce cotton-thread of sufficient tenuity and strength to be used as warp. An invention, indeed, by Mr. Charles Wyatt of Birmingham, which was patented in 1738, but never succeeded, deprives A. of the honor of having been the first to use rollers in spinning; but there is no reason to believe that he owed anything to this previous attempt. The first suggestion of the idea, he said, was derived from seeing a red-hot iron bar elongated by being made to pass between rollers. At this time A. was so poor that he needed to be furnished with a suit of clothes before he could appear to vote at an election as a burgess of Preston. Soon after, he removed to Nottingham, to escape the popular rage, which had already driven Hargreaves, the inventor of the *spinning-jenny*, out of Lancashire. Here he fortunately fell in with Mr. Jedidiah Strutt of Derby, the celebrated improver of the *stocking-frame*, who entered into partnership with him, in conjunction with his partner Mr. Need. In 1769 A. set up his first mill, driven by horses, and took out a patent for his invention.

In 1771 he set up a larger factory, with water-power, at Cromford, in Derbyshire. The remarkable capabilities of his mind were strikingly evinced in the management of the great business which now demanded his undivided attention. Without personal experience, and with no model to guide him, he introduced a system of management so admirable that it was afterwards universally adopted, and has never been materially improved. In 1775 he took out a fresh patent for various additional improvements in machinery. The success attending these undertakings stimulated rivals to invade his patent; and to such an extent did other cotton-spinners use his designs, that he was obliged, in 1781, to prosecute nine different manufacturers. The first action against Colonel Mordaunt, backed by a strong combination of Lancashire manufacturers, was lost, solely on the ground that his description in his specification was not sufficiently clear and distinct. The other actions were abandoned; and, in the following year, A. published a pamphlet containing a statement of his case. In a new trial, in 1785, he obtained a favorable verdict. The whole question, however, was brought finally before the Court of King's Bench, a few months after, when A.'s claim to the inventions patented was for the first time called into dispute. On the doubtful evidence of a person named Highs, or Hayes, combined with that of A.'s old assistant Kay, the jury decided against him, and his patent was annulled. This was but the formal outcome of an opposition which had from the beginning marked out A. as an object of hostility. The manufacturers at first combined to discountenance the use of his yarn. When the yarn was made into calicoes, and parliament was petitioned to lessen the duty on that cloth, they strenuously opposed the measure, but in vain. Popular animosity was also excited against the man who abridged labor, but in reality increased its sphere; and on one occasion, a large factory belonging to A. was destroyed in the presence of a powerful military and police force, without a word of interference from the magistrates. The energy and good sense of A., however, triumphed over all opposition; and at the time of his death, in 1792, the value of his property amounted to about half a million sterling. In 1786 he was appointed high-sheriff of Derbyshire; and on the occasion of presenting an address to the king, congratulating him on his escape from the knife of the maniac Margaret Nicholson, he received the well-merited honor of knighthood. A severe asthma had pressed upon him from his youth; and a complication of disorders, the result of his busy sedentary life, terminated his honorable career at the comparatively early age of sixty.

ARLES (anciently, Arelate), one of the oldest towns in France, situated on the left bank of the principal branch of the Rhone, after it has divided into a delta, in the department of Bouches du Rhone. Pop. (1876) of the municipality, 23,997; of the town, 15,563. A. carries on a considerable trade. It has manufactures of silk, hats, tobacco, brandy, &c., and forms a market for the productions of the surrounding country. It also possesses a college, a naval school, a public library, and a superb museum of antiquities in natural history. The marshes which rendered the district so unhealthy for a long time, have been considerably drained, and a canal has been formed which connects it with the south coast. Railways also bring it into easy communication with Marseille, Avignon, Nimes, Montpellier, &c. Under the Romans, it was the seat of a prefect; afterwards, for some time, the residence of the Gothic king, Eurich; and, in 879, was the metropolis of the kingdom of Arelate (See BURGUNDY). In the early Christian times, several important synods were convened here (314, 354, 452, and 475 A.D.). Among the antiquities of A. are a magnificent amphitheater, which could contain between 20,000 and 30,000 spectators; the ruins of a theater, also of a palace of Constantine the Great; an obelisk of granite, dug up from the mud of the Rhone in 1389; a burial place (the Elysian Fields) used by the Romans; and a medieval cathedral, in the old Roman style, with a splendid portal arch.

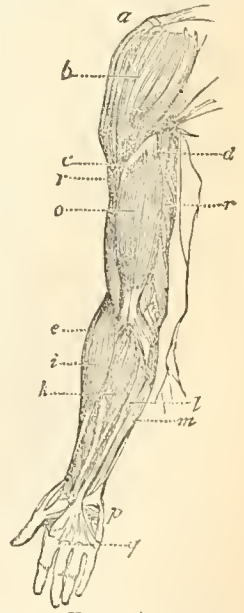
ARLON (anc. *Orolanum*), a town of Belgium, the capital of the province of Luxemburg, 24 m. W.N.W. from Luxemburg. It is a neat and prosperous town, and has a considerable trade in corn, woollen stuffs, leather, iron, &c. It has frequently suffered the ravages of war. The French pillaged it in 1793, after a victory won in its neighborhood over the Austrians. Pop. (1870) about 5800.

ARM, the upper extremity of the human body, consists of two portions—the *A.*, strictly so called, and the forearm; the former having one bone, the humerus (1), which moves freely by a globular head upon the scapula, forming the shoulder-joint; and the latter having two bones, the radius (3) and ulna (2), which move on the lower end of the humerus, forming the elbow joint, and below, with the carpus, forming the wrist.



Bones of the Human Arm.

The humerus is attached by a loose capsular ligament to the scapula, allowing great freedom of motion; and were it not for the muscles passing into I and K, would be frequently dislocated, but it is supported by these muscles on all sides except underneath or opposite the armpit, into which the head of the bone is often driven. The roundness of the shoulder is due to the head of the humerus, so that any displacement is accompanied by a flattening, which at once suggests the nature of the accident. On the shoulder is a large triangular muscle, the deltoid, which lifts the A. from the side. At the back is the triceps, which extends the forearm; in front are two muscles which flex or bend it—the biceps, and the brachialis anticus; and on each side below are muscles passing to the forearm and hand; while on each side above, the great muscle of the back (latissimus dorsi) and that of the chest (the pectoralis major) are inserted on each side of a groove, wherein lies one of the tendons of the biceps (q. v.). The motions of the ulna are flexion or bending effected by the biceps, and extension or straightening by the brachialis anticus and the triceps, its projections D and A being received in these movements into corresponding depressions on the humerus. The movements of the hand are principally due to the radius, the head of which rolls at C and H upon the ulna at F and L, thereby turning the palm downwards (pronation), or restoring the palm upwards (supination), these movements being effected by muscles, two for each movement, which taking their fixed points from the humerus and ulna, pull the radius round on the latter. The elbow-joint is ginglymoid or hinge-like, and therefore has strong lateral ligaments; but it is extremely liable to dislocations, often accompanied by fracture, especially in the young. The accident being followed by severe inflammation, the joint is very apt to stiffen, thereby seriously (see ANKYLOSIS) deteriorating from the usefulness of the limb; it is therefore, unadvisable to keep the limb too long in any one position after such an injury. This joint is also very liable to disease; but as this is confined to the ends of the bones, the small portions of the latter affected can be readily cut out, and the arm be restored to usefulness and mobility in a few weeks.



Human Arm:
abc, deltoid muscle; *d*, coraco brachialis muscle; *r, r*, triceps; *e, i*, extensors of wrist and long supinator of the hand; *km*, flexor of fingers and radial and ulnar sides of the wrist, and *l*, palm of the hand, or palmaris longus; *p*, palmaris brevis; *q*, palmar fascia; *o*, biceps.

The upper extremity is supplied with blood by the brachial artery, the continuation of the axillary trunk. The veins collect into large superficial trunks, which unite at the bend of the elbow, at which situation one is frequently selected for venesection, and then pass on to the axillary, on the outside by the cephalic vein, on the inner side by the basilic.

The nerves pass down as large cords by the side of the artery, and diverge from it to their ultimate distributions; the musculo-spiral soon passing round at the back to appear on the outside, and become the radial and posterior interosseous nerves; the ulnar running behind

the internal condyle, N, for which it has obtained the term 'funny bone,' from the electric-like thrill which passes along the arm when the nerve is struck or pressed. The median, as its name implies, keeps a middle course with the artery.

In wounds of the forearm, the bleeding is often excessive, but may be at once controlled by pressure on the brachial artery, on the inner side of the biceps.

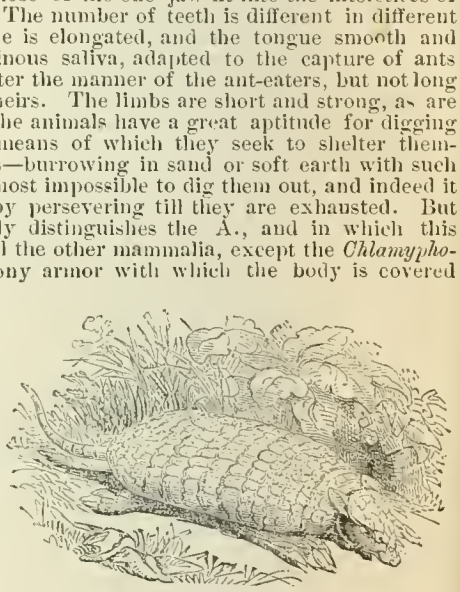
The arm affords excellent illustrations of some of the principles of mechanics. The insertion of the muscles so near, as will be seen, to the fulcra or centers of motion, involves a loss of power in the usual sense of the word; there is, however, a corresponding gain in velocity at the end of the lever; and for most of the purposes to which the hand is put, agility is of far greater moment than dead strength.

ARM. In maritime language, besides the obvious application to weapons of warfare, this term is applied to each extremity of a bibb, or braeket, attached to the mast of a ship for supporting the trestle-trees. The same name is also given to a part of the anchor. See ANCHOR.—In military language, the infantry, the cavalry, the artillery, and the engineers are each called 'an A.' of the service—equivalent to branch or department.

ARMA'DA, a Spanish word signifying simply an armed force, but applied specially to the great Spanish fleet which invaded England in 1588. The king of Spain, Philip II., had resolved to strike a decisive blow at the Protestant interest, by conquering England, which Pope Sixtus V. had made over to him. The ports of Spain, Portugal, and other maritime dominions belonging to him, had long resounded with the noise of his preparations, and the most eminent Catholic soldiers from all parts of Europe flocked to take a share in the expedition. The Marquis of Santa-Croce, a sea-officer of great reputation and experience, was destined to command the fleet, which consisted of a hundred and thirty vessels, of greater size than any that had been hitherto seen in Europe. The Duke of Parma was to conduct the land-forces, 20,000 of whom were on board the ships of war, and 34,000 more were assembled in the Netherlands, ready to be transported to England; so that, as no doubt was entertained of success, the fleet was ostentatiously styled the Invincible A. Nothing could exceed the terror and consternation which seized all ranks of people in England upon the news of this terrible A. being under sail to invade them. A squadron of not more than thirty ships of the line, and those very small in comparison, was all that Elizabeth had to oppose it by sea; and it was considered impossible to make any effectual resistance by land, as the Spanish army was composed of men well disciplined and long inured to danger. But although the English fleet was much inferior in number and size of shipping to that of the enemy, it was much more manageable, while the dexterity and courage of the mariners were greatly superior. Lord Howard of Effingham, a man of great valor and capacity, took upon him, as lord high admiral, the command of the navy; Drake, Hawkins, and Frobisher, the most renowned seamen in Europe served under him; while another squadron, consisting of forty vessels, English and Flemish, commanded by Lord Seymour, lay off Dunkirk, in order to intercept the Duke of Parma. Such was the preparation made by the English; while all the Protestant powers of Europe regarded this enterprise as the critical event which was to decide for ever the fate of their religion.

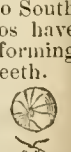
In the meantime, while the Spanish A. was preparing to sail, the admiral, Santa-Croce, died, as likewise the vice-admiral, Paliano; and the command of the expedition was given to the Duke of Medina Sidonia, a person utterly inexperienced in sea-affairs; these unexpected circumstances served, in some measure, to frustrate the design. Some other accidents also contributed to its failure. Upon leaving the port of Lisbon, the A. next day met with a violent tempest, which sank some of the smallest of the ships, and obliged the rest to put back into the harbor. After some time spent in refitting, the Spaniards again put to sea, where they took a fisherman, who gave them intelligence that the English fleet, hearing of the dispersion of the A. in a storm, had returned to Plymouth, and that most of the marines were discharged. From this false intelligence, the Spanish admiral, instead of going to the coast of Flanders, to take in the troops stationed there, resolved to sail directly to Plymouth, and destroy the shipping laid up in the harbor. But Effingham was very well prepared to receive him, and had just got out of port, when he saw the Spanish A. coming full sail towards him, disposed in the form of a half-moon, and stretching seven miles from the one extremity to the other. The English admiral, seconded by Drake, Hawkins, and Frobisher, attacked the Spaniards at a distance, pouring in their broadsides with admirable dexterity. They did not choose to engage the enemy more closely, because they were greatly inferior in number of ships and guns, as well as in weight of metal; nor could they pretend to board such lofty vessels without manifest disadvantage. In this action, however, two Spanish galleons were disabled and taken. As the A. advanced up the Channel, the English still followed and infested its rear; and as their ships continually increased from different ports, they soon found themselves in a capacity to attack the Spanish fleet more nearly, and accordingly fell upon them while they were taking shelter in the port of Calais. To increase their confusion, Howard selected eight of his smaller vessels, which, after filling them with combustible materials, he sent one after another, as if they had been fire-ships, into the midst of the enemy. The Spaniards, taking them for what they seemed to be, immediately bore off in great disorder; while the English, profiting by their panic, captured or destroyed about twelve ships. The Duke of Medina Sidonia being thus driven to the coast of Zealand, held a council of war, in which it was resolved, that, as their ammunition began to fail, as their fleet had received great damage, and as the Duke of Parma had refused to venture his army under their protection, they should return to Spain by sailing round the Orkneys, as the winds were contrary to their passage directly back. Accordingly, they proceeded northward, and were followed by the English fleet as far as Flamborough Head, where they were terribly shattered by a storm. Seventeen of the ships, having 5000 men on board, were afterwards cast away on the Western Isles and the coast of Ireland. Of the whole A., fifty-three ships only returned to Spain, and these in a wretched condition. The seamen, as well as the soldiers who remained, were so overcome with hardships and fatigue, and so dispirited by their discomfiture, that they filled all Spain with accounts of the desperate valor of the English, and of the tempestuous violence of that ocean by which they were surrounded.

ARMADI'LLO (*Da'sypus*), a genus of mammalia of the order *Edentata* (i. e., toothless)—not, however, truly toothless, but having feeble teeth destitute of true roots, and set apart from each other, and so that those of the one jaw fit into the interstices of those of the other. The number of teeth is different in different species. The muzzle is elongated, and the tongue smooth and slender, with a glutinous saliva, adapted to the capture of ants and other insects, after the manner of the ant-eaters, but not long and extensile, like theirs. The limbs are short and strong, as are also the claws, and the animals have a great aptitude for digging and burrowing, by means of which they seek to shelter themselves from enemies—burrowing in sand or soft earth with such rapidity that it is almost impossible to dig them out, and indeed it can only be done by persevering till they are exhausted. But that which peculiarly distinguishes the A., and in which this genus differs from all the other mammalia, except the *Chlamyphorus* (q. v.), is the bony armor with which the body is covered and which consists of polygonal plates not articulated, united on the head to form a solid covering, and similarly to form solid bucklers over the shoulders and the haunches; and between these, disposed in transverse bands, which allow of freedom of motion to the body, similar bands in most species protecting also the tail. Armadillos feed not only on insects, but on vegetable and animal food of almost every kind, which by decomposition or otherwise has acquired a sufficient softness. Some of them prefer vegetable food, others delight chiefly in carrion. They are all natives of the warm and temperate parts of South America, in the woods and pampas of which they are found in immense numbers. They are timid, and inoffensive, although, when they are incautiously assailed, injury may be received from their claws. Their flesh is esteemed a delicacy, particularly that of the species which feed chiefly on vegetable food. The largest species is fully three feet long, exclusive of the tail; the smallest, not above ten inches. The species are numerous, and the genus has been divided into a number of subgenera, which some naturalists elevate into genera, naming the family *Loricata* (i. e., mailed). To this family belongs also the genus *Chlamyphorus*, also South American. Fossil remains of gigantic extinct armadillos have been found in the pleistocene strata of South America, forming the genus *Gly'ptodon* of Owen, so named from the fluted teeth.



Armadillo.

ARMADI'LLO is also the scientific name of a genus of *Crustacea* of the order *Isopoda* of Cuvier. This is one of the genera usually included under the popular name of Woodlouse, and one of which (*Porcellio*) is very generally known by that of Slater. The armadillos derive their name from the scaly armor of their body, in which an analogy is found to the mailed quadrupeds of South America. They have, in a remarkable degree, the power of rolling themselves into a ball, when alarmed, so as to expose nothing but



Armadillo.

the plates of the back, and have thence received the name of Pill Beetles. Like some of the other closely allied *Isopoda*, they were at one time reputed to possess medicinal virtues, now accounted merely imaginary. They were not only used in a dried and pulverized state, but they are said to have been actually swallowed entire as pills. *A. vulgaris* is not uncommon in damp places, under stone, &c., in Britain.

ARMA'GH, a small inland county in Ulster, Ireland; bounded N. by Lough Neagh, E. by Down, S. by Louth, W. by Monaghan and Tyrone. Its greatest length is 32 miles, and breadth 20. Area, 512½ square miles, about four-fifths being arable, and a 36th part in woods. The surface is hilly in the south, and undulating in the center, attaining in Slieve Gullion, in the south-west, the height of 1893 feet. The other chief heights are the Newry Mountains, 1385 feet; the Armagh-breague Hills, 1200; and Mullyash, 1034. The country bordering upon Lough Neagh is low and boggy, and the Louth plain extends into the south end of A. The principal rivers, navigable in their lower parts, are the Upper Bann, flowing out of Down north-west for 11 miles before it enters Lough Neagh; and the Blackwater, which, in its lower part, separates A. from Monaghan. The rocks of A. are—Lower Silurian in the south and middle of the county; the trap of Antrim, with the underlying greensand, around Portadown; carboniferous limestone in the basins of the Blackwater, and its tributary the Callan; granite in the mountains of the south-east; and tertiary strata bordering Lough Neagh. The soil is fertile except in the southern extremities. In 1880, 163,236 acres were in crop, the principal crops being oats, potatoes, wheat, turnips, and flax. The stock in that year was 13,815 horses, 79,474 cattle, 9125 sheep, 15,136 pigs. The north and central parts of A. exhibit a dense population, low hills cultivated to the tops, hedgerows, orchards, and thickly-scattered farm-steadings. The county is mostly in the diocese of Armagh. It returns three members of parliament—two for the county, and one for the city. The chief towns are A., Lurgan, Portadown, and Newry. Pop. (1871) 179,260, of whom 85,057 are Roman Catholics, 58,343, Episcopalians, and 28,344 Presbyterians; (1881) 163,177—a large decrease.

ARMA'GH, the capital of the county of A., in a carboniferous limestone district, in the north-west of the county. It is situated around and on a gentle eminence, hence its original name, Ard-Magha, 'the high field.' It is built of limestone. The cathedral is built of red sandstone, and is cruciform—184 by 119 feet—and is supposed to occupy the site of that erected by St. Patrick in the 5th c. It has recently been repaired, chiefly at the cost (£10,000) of the late Lord Primate, Lord Beresford. A Gothic Roman Catholic cathedral occupies the principal height to the north, and the primatial palace that to the south. There is a fever hospital for forty patients, maintained by the late primate, and a lunatic asylum for four counties. A. is the seat of the archiepiscopal see of the Primate and Metropolitan of all Ireland, who, before the disestablishment of the Irish church, had an income of £12,087 a year. Pop. (1871) 8946, of whom 4691 were Roman Catholics, 3020 Episcopalians, 918 Presbyterians; while in 1881 it was 10,070. The chief manufacture is linen-weaving. A., from the year 495 to the 9th c., was the metropolis of Ireland, the native kings living at Eamania, 2 miles to the west of the city. It was then renowned as a school of theology and literature—its college being the first in Europe. After the Reformation, it suffered severely in the conflicts between the English and Irish; and it contained only three slated houses in 1765.

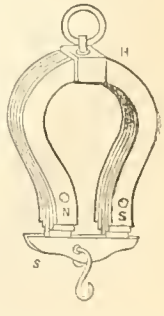
ARMAGNAC (*Ager Aremonicus*), the old name of the district in the south of France, which at one time seems to have extended from the valleys of the Pyrenees to the Garonne. It is now included in the departments of Hautes Pyrénées and Gers. The remarkably fertile land, producing grain and the best descriptions of wine, and also favorable for pasturage, is cut up into an extraordinary number of small estates, and divided among numerous petty proprietors. The principal branch of trade is the distillation of the brandy known in commerce as *Eau d'Armagnac*, which rivals those of Cognac and Saintonge. The ancient capital is Lectoure, on the river Gers, with (1872) 2820 inhabitants. To the south of it lies Auch, the chief town of the department of Gers. Pop. (1872) 9414. The people are noted for their simplicity, strength, and bravery; but, on the other hand, they are extremely credulous and ignorant. Formerly, their services were highly valued in times of war. The A. family, descended from the old Merovingian king, Clovis, played an important part in French history.

A'RMAMENT is a general name for the weapons of war employed in sea and land battles; all the weapons collectively being called *the* A. of a ship or an army.

ARMANSPERG, Jos. Ludw., Count of, formerly president of the government in Greece, was born in Lower Bavaria in 1787, and early embraced an administrative and diplomatic career. On the accession of King Louis to the throne, A., who had already occupied several important posts, was summoned to Munich, where, rapidly rising from one dignity to another, he at length became minister of finance and of foreign affairs. In both capacities he proved active and successful; but he drew upon himself the hatred of the Camarilla by his strenuous opposition to the claims of Rome, as well as by his attempts to identify himself with the decidedly liberal party. The consequence was that, in 1831, he lost his post, and in the same year was appointed ambassador to London, but preferred retiring to his family estate. However, he could not resist the king's repeated request that he should undertake the formation of his son's government in Greece, and accordingly, accompanying young King Otho, A. landed at Nauplia in January 1833. For four years he was at the head of public affairs, and Greece derived many benefits from his administration; but the heat of the party strife and court intrigues led to his dismissal, and he left Greece in March 1837. After that time he lived in retirement upon his property, near Deggendorf, till his death in 1853.

ARMATO'LES, a body of Greek militia, first formed under the reign of Sultan Selim I. about the beginning of the 16th c. They were intended to preserve the fertile plains from the ravages of the *Klephts* (mountain robbers of Thessaly), who had never been entirely conquered by the Turks. The A. themselves were orginally Klephts, but received their more honorable designation when the Porte had metamorphosed them into a sort of military police. The safety of the public roads was intrusted to their care. The whole of Northern Greece was divided into sixteen districts (*capitaineries*), each placed under the supervision of a chief of these militia, who, however, had himself to receive orders from a Turkish pasha or Greek bishop. But although the A. frequently suppressed the brigandage of the Klephts, they still regarded them in the light of brothers, inasmuch as they had a common origin and faith; both detested the oppressors of their country; and the sentiment of patriotism overruled every other consideration. This sympathy at last appeared to the Turks so dangerous that they grew alarmed, and desired to substitute for the A. the Mohammedan Albanians, who were the implacable enemies of the Greeks, which resolution did not a little to hasten the insurrection which the Porte ever dreaded. The moment it broke out, the A. pronounced themselves in favor of the national cause, and in the war of independence that ensued, distinguished themselves by their brilliant exploits.

A'RMATURE (*armatura*, armor; Ger. *anker*). The term A. is applied to the pieces of soft iron that are placed at the extremities or poles of magnets to preserve their magnetic power. When magnets are allowed to remain any length of time without such appendages, in consequence of the disturbing influence of terrestrial magnetism they lose considerably in strength; but when they are provided with them their magnetism is kept in a state of constant activity, and thereby shielded from this disturbance. The reason of this is found in two facts well known in the science of magnetism—viz., that when a piece of soft iron is brought into contact with the extremity of a magnet, it is itself induced to become magnetic; and that the unlike poles of two different magnets powerfully attract each other. Referring to the figure the north pole, N, of the horseshoe magnet, NHS, acting on the armature *sn*, induces it to become a magnet, having its south pole, *s*, next to N, and its north pole, *n*, at the opposite extremity. The pole S, by virtue of its magnetic affinity, powerfully attracts the north pole, *n*, thus formed, and adds its own inducing influence to heighten the magnetic condition previously induced in the armature by the pole N. The A., from the combined action of both poles of the horseshoe magnet, is thus converted into a powerful magnet, with its poles lying in an opposite direction to that of the primary poles. The original magnet is, in consequence, brought into contact with one of its own making, the exact counterpart of itself—a condition highly favorable to the maintenance of its strength. It is due to the same mutual attractions that much larger weight can be suspended from the A. thus placed, than what the single poles can together sustain. Bar magnets may be armed in the same way by laying them at some distance parallel to each other, with their unlike poles towards the same parts, and then connecting their extremities by two pieces of soft iron. When a magnet, such as a compass-needle, is free to take up the position required by the magnetism of the earth, the earth itself plays the part of an armature.



ARMED SHIP, in the official language of the Royal Navy, occupies a sort of medium position between a merchant-ship and a man-of-war. It is a private vessel, hired occasionally by the Admiralty for a special purpose, and commissioned for a temporary period. The duty is usually that of guarding some particular coast, or attending on a particular fleet, during a time of war; and while so employed, it is officered and equipped like one of the smaller ships-of-war in the Royal Navy.

ARME'NIA, a high table-land on the southern slope of the Caucasus, stretching down towards Mesopotamia. It has had

different boundaries in the various centuries of its history. It is the original seat of one of the oldest civilized peoples in the world, the Armenians, who belong to the Indo-Germanic family of nations. Their oldest records contain nothing certain beyond the facts that, in ancient times, they were governed by independent kings, but afterwards became tributary to the Assyrians and Medes. That dim period which wavers between myth and history begins, in the case of A., about the middle of the 6th c. B.C., when King Dikran, or Tigranes I. of the Haig Dynasty, restored the independence of the kingdom. The last king of this dynasty was slain in battle against Alexander the Great, who conquered the country. After Alexander's death, A passed through several changes of fortune under the Seleucidæ, who appointed governors over it. Of these, two—Artaxias and Zariadres—made themselves independent of their sovereign, Antiochus the Great, during the time when he was engaged in his contest with the Romans, 223—190 B.C. They divided the province into two districts—Artaxias taking A. Major (that part of the country lying E. of the Euphrates), and Zariadres A. Minor (the part to the W. of that river). The dynasty of Artaxias did not reign long; for about the middle of the 2d c. B.C., we find A. Major in the possession of a branch of the Parthian Arsacidæ, of which the most powerful king was Tigranes the Great, who added to the conquests made by his predecessors in Lower Asia and the region of the Caucasus, Syria, Cappadocia, and A. Minor; defeated the Parthians, and took from them Mesopotamia and other countries. He lost all these territories by his war with the Romans, into which he was led by his father-in-law, Mithridates, king of Pontus, in 63 B.C. After this, the assaults of the Romans from the west ever growing more and more vigorous, and those of the Parthians from the east, hastened the downfall of A. Major. The successors of Tigranes became dependent, partly on the one nation and partly on the other, while internally the nobles broke through the restraints of a feeble monarchy, and claimed the privileges of petty kings. Under Trajan, A. Major was for a short time a Roman province. Its subsequent history exhibited an unbroken series of tumults and wars, of violent successions to the throne, despotic reigns, and rapid decay. In 232 A.D. the province was conquered by the Sassanides, who held possession of it 28 years, until Tiridates III., the rightful heir, was restored to the throne by Roman assistance.

It was about this time that Christianity became the religion of A., which was thus the first nation to embrace the new religion. Tiridates himself had been converted by St. Gregory the Illuminator as early as about 300 A.D. The old religion of Armenia had for its basis the doctrines of Zoroaster, with a curious intermixture of Greek mythology, and of ideas peculiar to the country. It is certain that the Armenians worshiped as their mightiest gods, Aramazt and Mihir (the Ormuzd and Mithras of the old Persians); but they had also a kind of Venus, whom they styled Anaitis, and several other deities, to whom they offered animal sacrifices. This change of creed, however, made no improvement in the political circumstances of the falling state. The Byzantine Greeks on one side, and the Persians on the other, regarded A. as their prey; and in 428, Bahram V. of Persia made A. a province of the empire of the Sassanides, and with the deposition of Artasir the dynasty of the Arsacidæ was brought to a close. The rule of the Sassanides in A. was marked chiefly by their sanguinary but unsuccessful attempts to extirpate Christianity. In 632, the unhappy country was subjected to another form of despotism under the Arabian califs, and suffered terribly during their contest with the Byzantine emperors. In 885 A.D., Aschod I., of an old and powerful Armenian family, ascended the throne, with the permission of the califs, and founded the third Armenian dynasty—that of the Bagratidæ. Under them A. was prosperous till the 11th c., when divisions and internal strife began to weaken the country; till at length the Greeks, having murdered the last monarch of the Bagratidæ, seized a part of the kingdom, while the Turks and Kurds made themselves masters of the rest—only one or two of the native princes maintaining a perilous independence. In 1242, the whole of A. Major was conquered by the Mongols, and in 1472 became a Persian province. Afterwards the western part fell into the hands of the Turkish sultan, Selim II.

The fate of A. Minor was hardly better. The dynasty founded by Zariadres prevailed to the time of Tigranes the Great, sovereign of A. Major, who conquered the country about 70 B.C. Afterwards A. Minor was subjugated by the Romans, and made a Roman province. On the divison of the Empire into eastern and western, it became attached to the former, and shared in all its changes of fortune until near the close of the 11th c. At this time A. Minor—which had long been a place of refuge for many who had fled from the rage of the Turks and Persians in the sister province—was again raised to independence by Rhupen (a refugee from A. Major, and descendant of the Bagratidæ). His successors extended their dominion over Cilicia and Cappadocia, and took a prominent part in the Crusades.

This dynasty ruled prosperously until 1374, when A. Minor was conquered by the Egyptian sultan Schaban. Since that time A., with the exception of the parts which Russia has won in the present century from Persia, and which are better governed, has remained subject to the despotism of the Turks and Persians. Notwithstanding this, the Armenians have steadily preserved their nationality, both in its physical and moral lineaments; their faith; and even—though only a relic of their ancient culture—a higher civilization than their conquerors. The political storms which devastated the country during the middle ages, and the persecutions of the Turks, have driven many of the inhabitants from their homes. This is the reason why we find them scattered over all Asia and Europe. In Hungary, Transylvania and Galicia they number 10,000. They are very numerous in Russia, but most of all in Asia Minor, and in the neighborhood of Constantinople, where they number 200,000.

The greater part of A. is an elevated table-land. Its area is estimated at 90,000 square miles; pop. about 2,000,000. It is watered by the rivers Kur, Aras, Joruk, Euphrates, and to a slight extent by the Tigris. The lakes which lie within this mountainous region are Van, Urumiyah, and Sevan. The Armenian plateau, on the eastern side of which the volcanic range of Ararat lifts itself, forms the central point of several mountain-chains, such as Taurus and Antitaurus, the mountains of Kurdistan, and those which run north to the Black Sea. It exhibits numerous traces of having been subject to volcanic agency, and even yet—as was shown by the severe earthquake of the summer of 1840, and by the total destruction of Erzerum in 1859—possesses an internal volcanic activity. The climate in the higher regions is hot in summer and cold in winter, but in the valleys it is more temperate. The country labors under a great scarcity of wood, and in some parts is sterile, through a deficiency of water; in other parts the soil is extremely fertile, producing rice, hemp, flax, tobacco, wine, cotton, and many varieties of fruit. Cattle breeding and grazing are more extensive than agriculture. The mountains contain iron, copper, lead, salt, and naphtha. The number of the inhabitants of pure Armenian origin is reckoned at nearly 1,000,000, but there is a large admixture of Turkomans, Greeks, Jews, Kurds, &c. The Armenians belong physically to the finest variety of the Indo-Germanic race. Their intellectual capacity is also remarkable, as is shown both by their literature, and their singular dexterity in business. Still, long centuries of oppression have exerted a withering influence on their native strength of character. The north-east portion of A., about one-third of the whole, was wrested from Persia in 1828, and is under the Russian sceptre. About a sixth part to the south-east still belongs to Persia. The western portion, comprising two-thirds of the Armenian area, is Turkish. After the war of 1877–78 between Russia and Turkey, the Berlin Conference sanctioned the cession to Russia of a strip of A., including Kars and Ardahan; and the Sultan engaged to carry out in A. much-needed reforms, guarantee the Armenians security against the Circassians and Kurds, and undertook to report to the European powers the measures adopted.

ARME'NIAN CHURCH. Christianity appears to have been introduced into Armenia as early as the 2d c. It was for the first time firmly established, however, about the end of the 3d c. by the apostolical exertions of Bishop Gregory (q. v.), who converted Tiridates (see ARMENIA). The Bible was translated into the Armenian language in the 5th c. After this period great animation prevailed in the A. C. Numbers flocked to the colleges at Athens and Constantinople. In the ecclesiastical controversy concerning the twofold nature of Christ, the Armenian Christians held with the Monophysites (q. v.); refused to acknowledge the authority of the Council of Chalcedon; and constituted themselves a separate church, which took the title of Gregorian from Gregory himself. For several centuries a spirit of scientific inquiry, especially in theology, manifested itself among them to a far wider extent than in the other Eastern churches. Their greatest divine is Nerses of Klah, belonging to the 12th c., whose works have been repeatedly published. The most recent edition was issued in Venice, 1833. The Gregorians have continued to entertain a deeply rooted aversion to the so-called orthodox church. The Roman Catholic popes at various times, especially (1145, 1341, 1440) when the Armenians accepted the help of the West against the Mohammedans, tried to persuade them to recognize the papal supremacy; but for the most part only the nobles consented to do so, while the mass of the people clung to their peculiar opinions, as we see from the complaint of Pope Benedict XII., who accuses the A. C. of 117 errors of doctrine. There is a sect of *United Armenians* in Italy, Poland, Galicia, Persia, Russia, and Marseille. Since the formation of this body in 1835, vigorous and constant attempts, succored especially by French influence, have been made to secure the acknowledgment of the pope as the head of the Roman Catholic portion of the A. C. When this end seemed nearer attainment than ever before, the Ultramontane utterances of their representative, Mgr. Hassun, at the Ecumenical Council at Rome, 1870, in favor of infallibility, created such a reaction at home as has greatly strengthened for the present the cause of the old Gregorian party. The recent humiliation of France has further weakened

the cause of the pro-papal party. In theology the A. C. attributes only *one* nature to Christ, and holds that the Spirit proceeds from the Father alone; the latter doctrine, however, being held by it in common with the 'orthodox Greek Church,' although contrary to the theology of the western churches. With respect to the 'seven sacraments,' it entertains the peculiar notions that at baptism one must be sprinkled three times, and as often dipped; that confirmation is to be conjoined with baptism; that the Lord's Supper must be celebrated with pure wine and leavened bread; that the latter, before being handed round, must be dipped in the former; and that extreme unction is to be administered to ecclesiastics alone, and that immediately after (and not before) their death. It believes in the worship of saints, but not in purgatory. It exceeds the Greek Church in the number of its fasts, but has fewer religious festivals. These, however, are more enthusiastically kept.

Divine service is held in Turkey chiefly by night. Mass is celebrated in the old Armenian language; preaching is carried on in the new. Its sacerdotal constitution differs little from the Greek. The head of the church, whose title is Catholikos, resides at Etshmiadzin, a monastery near Erivan, the capital of Russian Armenia. To this place every Armenian must make a pilgrimage once in his life. The monks of this church follow the rule of St. Basil. The Wartabieds form a peculiar class of ecclesiastics; they live like monks, but are devoted exclusively to learning. Secular priests must marry once, but none are at liberty to take a second wife.

ARME'NIAN LITERATURE. Previous to the introduction of Christianity by Gregory (300 A.D), the Armenians had adhered to the Assyrian or Medo-Persian system of culture; but excepting a few old songs or ballads, no remains of that early period exist. After their conversion to Christianity, the Greek language and its literature soon became favorite objects of study, and many Greek authors were translated into Armenian. (See Wenrich *De Auctorum Græcorum versionibus Arabicis, Armeniacis*, &c. Leipzig, 1842.) The Armenian language has an alphabet of its own, consisting of 36 letters, introduced by Miesrob in 406. The most flourishing period of A. L. extends from the 4th to the 14th c. The numerous Armenian theological writers and chroniclers of this era supply materials for a history of the East during the middle ages which have hitherto been too much neglected. These Armenian writers generally copied the style of the later Greek and Byzantine authors; but in adherence to facts and good taste, they are superior to the general order of oriental historians. In the 14th c., literature began to decline, and a few remarkable works were afterwards produced; but since the time of their dispersion, the Armenians have preserved recollections of their national literature; and wherever they are found—in Amsterdam, Lemberg, Leghorn, Venice, Astrakan, Moscow, Constantinople, Smyrna, Ispahan, Madras, or Calcutta—the printing-office is always a feature in their colonies. The most interesting Armenian settlement is that of the Mechitarists (q. v.), on the island of San Lazaro, near Venice.

The Bible translated into Armenian (the Old Testament from the text of the Septuagint) by Miesrob and his scholars (411 A.D.), is esteemed the highest model of classic style. Translations of several Greek authors made about the same time, have been partly preserved, and contain some writings of which the originals have been lost—namely, the Chronicle of Eusebius; the Discourses of Philo; Homilies by St. Chrysostom, Severianus, Basil the Great, and Ephraim Syrus. Several old geographical and historical works have been preserved. Among philosophical and theological writers may be mentioned: David, the translator and commentator of Aristotle, Esnik, and Joannes Ozniensis. The *Vitæ Sanctorum Calendarii Armeniaci* (Lives of Armenian Saints, 12 vols. Ven. 1814) contains many notices of the history of Armenia. In poetry and fiction, A. L. is poor. Somal, in his work entitled *Quadro della Storia Litteraria di Armenia* (Venice, 1829), gives a general view of the contents of A. L. The Armenian belongs to the Indo-Germanic group of languages, but has many peculiarities of structure. It is harsh and disagreeable to the ear. The old Armenian, the language of literature, is no longer a living tongue; while the new Armenian, split up into four dialects, contains many Turkish words and grammatical constructions.

ARME'RIA. See THRIFT.

ARMENTIERES, a town of the dep. of Nord, France, on the Lys, 8 m. from Lille. The town is well built, and is active and prosperous, having manufactures of cotton, linen, and hemp, and a considerable trade in grain. A. was formerly famous for its cloth, cheese, and brick. Pop. (1876) 20,565.

ARMFELT, GUSTAF MAURITZ, a celebrated Swede, whose public life was characterized by striking vicissitudes of fortune, was the eldest son of Baron Armfelt, and born at Juva, in the government of Abo, on the 1st of April, 1757. Having, as an officer of the royal guard, displayed great activity and zeal in opposing the machinations of the nobles, who were at that period disaffected towards Gustavus III., the latter appreciated the value of his services, and appointed him to a post in the service of the Crown Prince. During the war between Sweden and Russia (1788—90), in which he was commander of one of the three divisions of the Swedish army, he displayed remarkable courage and spirit, and advanced still higher in the good graces of the monarch. He defeated a Russian force at Summa, near Fredrikshamn; and as military representative of Gustavus, had the honor of concluding a peace at Verela on the 14th of August, 1790. On the 16th of March, 1792, Gustavus was assassinated. His wound, though mortal, did not instantly deprive him of life, and he employed the brief interval that elapsed before his death in drawing up a codicil to his will, by which the regency was intrusted to the king's brother, Charles, Duke of Sudermania, during the minority of Gustavus IV., A. being named governor of Stockholm, and member of the council appointed to advise with the regent. The Duke of Sudermania, however, could not brook the idea of a check being placed upon his liberty of action, and found means to destroy the codicil, the conditions of which he never intended to observe. A. soon became conscious that his influence was rapidly evaporating. He was rarely permitted to see the young king; and at last, after a secret interview with young Gustavus, departed as ambassador to Naples in July 1792. While in Italy, he entered into correspondence with certain parties in Sweden for the purpose of overthrowing the regency, and inducing the States to proclaim Gustavus IV. of age. The correspondence was discovered. A. fled to Poland, and afterwards to Russia. He was condemned, during his absence, for high treason, and stripped of his goods and titles, while one of his associates, the beautiful Countess Rudenskold, was subjected to the most brutal punishment, being publicly declared 'infamous,' exposed on a scaffold for some hours, and imprisoned in a house of correction for life. A. expressed his horror for such an atrocity in language sufficiently emphatic, yet, at a later period, he did not scruple to accept office under Charles, on his election to the throne. In 1799, Gustavus IV. received the crown at the age of eighteen, and A. was restored to all his honors. In 1805, he was appointed governor-general of Finland; and in 1808 he commanded the Swedish army raised for the invasion of Norway; but his plans were so completely frustrated, that he was compelled to witness the invasion of Sweden by the successful Norwegians, and was in consequence recalled and dismissed by the king. In the following year a revolution took place, Gustavus was deposed, the Duke of Sudermania elected in his place, and A. was appointed president of the Military Council. But shortly after, being implicated in the poisoning of the Prince of Augustenburg, he was obliged to fly to Russia, where he lived during the remainder of his life in high honor. The title of Count was conferred on him, he was made chancellor of the university of Abo, president of the Board of Finnish Affairs, and member of the Russian senate. He died at Tzarskoe Selo on the 19th of August, 1814.

ARMIDA, one of the most prominent female characters in Tasso's *Jerusalem Delivered*. As the poet tells us, when the Crusaders arrived at the holy city, Satan held a council to devise some means of disturbing the plans of the Christian warriors, and A., a very beautiful sorceress, was employed to seduce Rinaldo and other Crusaders. Rinaldo was conducted by A. to a remote island, where, in her splendid palace, surrounded by beautiful gardens and pleasure-grounds, he utterly forgot his vows, and the great object to which he had devoted his life. To liberate him from his voluptuous bondage, two messengers from the Christian army, Carlo and Ubaldo—came to the island, bringing a talisman so powerful that the witchery of A. was destroyed. Rinaldo escaped, but was followed by the sorceress, who, in battle, incited several warriors to attack the hero, and at last herself rushed into the fight. She was defeated by Rinaldo, who then confessed his love to her, persuaded her to become a Christian, and vowed to be her faithful knight. The story of A. has been made the subject of an opera both by Gluck and Rossini.

ARMIES, armed forces under regular military organization, employed for purposes of national offence or defence. An army may comprise the whole military men employed by the state, or only a portion under a particular commander. When an armed force is under no constituted authority, and imperfect in its organization and discipline, it cannot be said to be worthy of the name of an army, and may be little better than a horde of banditti. Of this nature are the *fillibustering* expeditions (see FILLIBUSTERS) in which certain portions of the citizens of the United States frequently engage. Through long ages of experience, the principles of military organization, and the laws to which A. are specially amenable, have gradually reached a high degree of perfection. The primitive wars among barbarous people are always stealthy, depending on the forest and the wilderness for their tactics, and considered successful if an enemy can be attacked unawares, despoiled, and carried into slavery. After a time, war advances to the position of an art, and is conducted by men who have received a certain training. An army becomes an instrument not only for

vanquishing enemies, but for seizing countries. Even then the highest position of an army is not reached; for the defence of a country requires more military skill, perhaps, and a better organization of troops, than an attack.

In the several historical articles in this *Encyclopædia* relating to the chief nations of ancient and modern times, the wars in which these nations engaged are succinctly noticed as elements in the life of each nation; but it seems desirable, in the present place, as a means of rendering intelligible certain minor details scattered through the work, to give a brief description of the chief points in which the A. of different states or countries have differed in constitution.

ARMIES, ANCIENT—*Egyptians*.—The most extraordinary conqueror among the Egyptians, Sesostris or Rhamses, lived sixteen centuries before the Christian era; and although the evidence for his deeds of valor is very questionable, there is reason to believe that the organization of his A. can be pretty accurately traced. His father, Amenophis, laid the foundation for the military glory of Sesostris. When the latter was born, Amenophis caused all the male children who were born on the same day as his son, to be set apart as a special body, to be reared for a military life; they were taught everything that could strengthen their bodies, increase their courage, and develop their skill as combatants and leaders; and were to consider themselves bound as the chosen dependents or companions of the young prince. In due time Sesostris became king of Egypt; and then he formed a sort of militia, distributed as military colonists, each soldier having a portion of land to maintain himself and his family. When this militia had been drilled to military efficiency, Sesostris headed them as an army for military conquest in Asia, and placed the chosen band above mentioned as officers over the different sections of the army.

Persians.—In the great days of the Persian empire, the flower of the army consisted of cavalry, who were distinguished for their bravery and impetuosity of attack. The infantry were little better than an armed mob. The war-chariots, too, though calculated to strike terror when dashing into hostile ranks, were available only on level ground. As to the numbers of men composing the great Persian A., the statements are too wild to be trustworthy. Allowing for all exaggeration, however, it is certain that the Persian A. were very large. When Darius was opposed to Alexander the Great, his army was set down at various numbers—from 750,000 to 1,000,000 men. The king was in the center, surrounded by his courtiers and body-guard; the Persians and Susians were on the left; the Syrians and Assyrians on the right. The foot-soldiers, forming the bulk of the army, and armed with pikes, axes, and maces, were formed in deep squares or masses; the horsemen were in the intervals between the squares; and on the right and left flanks; and the chariots and elephants in front.

Lacedæmonians.—The Greeks introduced many important changes in A, both in the organization and in the manœuvres. Every man, in the earlier ages of the country at least, was more or less a soldier, inured to a hard life, taught to bear arms, and expected to fight when called upon. The leading men in each state paid attention to organization and tactics in a way never before seen. It was not standing armies, but a sort of national militia, that gained Marathon, Platæa, and Mycale. So far as concerned the arrangement of A., the Lacedæmonians invented the *phalanx* (q. v.), a particular mode of grouping foot-soldiers. This phalanx consisted of eight ranks, one behind another; the front and rear ranks being composed of picked men, and the intermediate ranks of less tried soldiers. The number of men in each rank depended on the available resources of the commander. These men were mostly armed with spears, short swords, and shields.

Athenians.—The Athenians made a greater number of distinctions than the Lacedæmonians in the different kinds of troops forming their A. They had heavy infantry, constituting the men for the phalanx, and armed with spears, daggers, corslets, and shields; light infantry, employed in skirmishes and uncovering the phalanx, and armed with light javelins and shields; a sort of irregular infantry, who, with javelins, bows and arrows, and slings, harassed the enemy in march, and performed other services analogous in some degree to those of sharpshooters in a modern army. It is recorded that Miltiades, the Athenian hero at Marathon, invented the 'double-quick march,' to increase the momentum of a phalanx when rushing on the enemy.

Macedonians.—Philip of Macedon, the father of Alexander the Great, having the sagacity to see that he could not vanquish his neighbors so long as he adopted the same formation and tactics as themselves, set about inventing something new. He resolved to have a standing army instead of a militia; to have at command a set of men whose trade was fighting instead of citizens who were traders and soldiers by turn. As a further change he made the phalanx deeper and more massive than it had been among the Lacedæmonians. He brought into use the Macedonian pike, a formidable weapon 24 feet in length. With a phalanx sixteen ranks in depth, four rows of men could present the points of their long pikes protruding in front of the front rank, forming a bristling array of steel terrible to encounter. Besides these heavy infantry, there were light troops marshalled into smaller bodies for more active manœuvres. Philip organized three kinds of cavalry—heavy, armed with pikes, and defended by cuirasses of iron-mail; light, armed with lances; and irregular.

Thebans.—This nation introduced the army-formation of *columns*, much deeper than broad, or having more men in file than in rank. A new kind of tactics were introduced in accordance with this formation; the movement being intended to pierce the enemy's line at some one point, and throw them into confusion.

Romans.—These noble warriors initiated changes in army matters, which had a wide-spread influence on the nations of the civilized world. About the period 200 B.C., every Roman, from the age of 17 to 46, was liable to be called upon to serve as a soldier; the younger men were preferred; but all were available up to the middle time of life. They went through a very severe drilling and discipline, to fit them alike for marching, fighting, camping, working, carrying, and other active duties. Every year the Senate decreed the formation of *legions*, or army corps, deputing this duty to the consul or prætor. Magistrates sent up the names of eligible men, and tribunes selected a certain number from this list. See LEGION. The Roman legion, in its best days, had many excellent military qualities—great facility of movement; a power of preserving order of battle unimpaired; a quick rallying-power when forced to give way; a readiness to adapt itself to varying circumstances on the field of battle; a formidable impetuosity in attack; and a power of fighting the enemy even while retreating. The heavy infantry were armed with javelins, heavy darts, pikes, and swords; the lighter troops with bows and arrows, slings, and light javelins; while the defensive armor comprised shields, cuirasses, helmets, and greaves.

Those ancient nations which had no distinctive features in their A., need not be noticed here.

ARMIES, MEDIEVAL. The downfall of the Roman Empire marked the dividing-point between ancient and medieval times in military matters, as well as in other things that concern the existence of nations. The barbarians and semi-barbarians who attacked on all sides the once mighty but now degenerate Empire, gradually gained possession of the vast regions which had composed it. The mode in which these conquests were made gave rise to the *Feudal System* (q. v.). What all had aided to acquire by conquest, all demanded to share in proportions more or less equal. Hence arose a division of the conquered territory; lands were held from the chief by feudal tenure, almost in independent sovereignty. When European kingdoms were gradually formed out of the wrecks of the Empire, the military arrangements put on a peculiar form. The king could not maintain a standing army, for his barons or feudal chieftains were jealous of allowing him too much power. He could only strengthen himself by obtaining their aid on certain terms, or by allowing them to weaken themselves in intestine broils, to which they had always much proneness. Each baron had a small army composed of his own militia or retainers, available for battle at short notice. The contests of these small armies, sometimes combined and sometimes isolated, make up the greater part of the wars of the middle ages. Of military tactics or strategy, there was very little; the campaigns were desultory and indecisive; and the battles were gained more by individual valor than by any well-concerted plan.

One great exception to this military feudality was furnished by the *Crusades* (q. v.). So far as concerns A. however, in their organization and discipline, these expeditions effected but little. The military forces which went to the Holy Land were little better than armed mobs, upheld by fanaticism, but not at all by science or discipline. Numbers and individual bravery were left to do the work, combination and forethought being disregarded.

A much greater motive-power for change, during the middle ages, was the invention of gunpowder. When men could fight at a greater distance than before, and on a system which brought mechanism to the aid of valor, everything connected with the military art underwent a revolution. Historically, however, this great change was not very apparent until after the period usually denominated the middle ages. The art of making good cannon and hand-guns grew up gradually, like other arts; and A. long continued to depend principally on the older weapons—spears, darts, arrows, axes, maces, swords, and daggers.

During the greater part of the 14th and 15th centuries, the chief A. were those maintained by the Spaniards and the Moors on one European battle-ground, by the English and the French on another, and by the several Italian republics on a third. In those A., the cavalry were regarded as the chief arm. The knights and their horses alike were frequently covered with plate or chain armor; and the offensive weapons were lances, swords, daggers, and battle-axes. A kind of a light cavalry was sometimes formed of archers on smaller horses. As to army-formation, there was still little that could deserve the name; and there was no particular order of battle; each knight sought how he could best distinguish himself by personal valor; and to each was usually attached an

esquire, abetting him as a second during the contest. Sometimes it even happened that the fate of a battle was allowed to depend on a combat between two knights. No attempt was made until towards the close of the 15th c., to embody a system of tactics and manœuvres for cavalry; and even that attempt was of the most primitive kind. Nor was it far otherwise with the foot-soldiers; they were gradually becoming acquainted with the use of firearms; but, midway as it were between two systems, they observed neither completely; and the A. in which they served presented very little definite organization.

ARMIES, Modern. The formation of *standing* A. may be said to have introduced the modern military system. When the remarkable exploit of Jeanne d'Arc (Joan of Arc) had enabled Charles VII. to check the victorious progress of the English in France, he set about remodelling his army. By gradual changes, and amid great difficulty, he converted his ill-governed forces into a disciplined standing army. During the reign of his son, Charles VIII. (1483—1498), the consequences of this change made their appearance. Charles conducted a well-appointed army into Italy (1494), in support of some pretensions which he had to the throne of Naples.

The change made by Charles VII. was not simply that of substituting a compact standing army for an ill-organized medley of feudal troops and of mercenaries; feudalism itself gave way under the influence of this combined with other reforming agencies. So far as concerned the actual formation and discipline of the standing A. above noticed, a few changes were from time to time introduced: pistols and carbines were given to the cavalry; cuirasses were worn by the heavy troopers; and new evolutions were introduced. During the Thirty Years' War (1618—1648), Gustavus Adolphus and Wallenstein adopted opposite modes of dealing with masses of infantry: the former spread them out to a great width, and only six ranks in depth; whereas the latter adopted a narrower front, with a depth of twenty to thirty ranks. Frederick the Great, in the next century, introduced a most complicated system of tactics and drilling; insomuch that when he could manœuvre, he nearly always won his battles; but when the result depended on bold and unexpected onslaughts, he was more frequently a loser than a winner. The great military leader in the early part of the present century, Napoleon Bonaparte, made a larger use than any previous European general of the method of moving masses of troops with great celerity, beating the enemy in detail before they could combine in one spot.

It is desirable to present, in the most condensed form, a few statistics of the actual A. of Europe; leaving to future articles, under the names of the several countries, cities, and battle-fields, all details concerning special A. and military encounters.

France.—A law passed in 1872 enacts that every Frenchman, with a few specified exceptions, is liable to personal service in the army, and forbids substitution. Every Frenchman not declared unfit for military service, or specially exempted therefrom, must be for five years in the active army (composed of those who have reached the age of 20 years), for four years in the reserve of the active army, for five years in the territorial army, and for six years in the reserve of the territorial army. By the law of July 24, 1873, France is divided, for military purposes, into 18 regions, each occupied by a corps d'armée, containing 2 divisions of infantry, 1 brigade of cavalry, 1 of artillery, 1 battalion of engineers, 1 squadron of the military train. When the present reorganization is completed, the *active* army will be composed of 156 regiments of infantry (line, light, Zouaves, Algerian tirailleurs, &c.), 25 single battalions, and 293 companies (depots, &c.); making in all, for the infantry, 279,986 men; of cavalry, 67 regiments in France, 3 in Algiers, 13 depots of these regiments, and a cavalry school, comprising 67,888 men; artillery, 40 regiments and 17 companies, with 58,096 men; engineers, 4 regiments, having 13,551 men; of the military train, 11,486 men; in all, for the active army, 441,007. On the war footing this number would be increased to 1,104,735, without taking account of sanitary corps, gendarmes, &c. Including the *territorial* army, its reserve force, and the reserves of the active army, the total military force of France is 2,505,000. The effective army in 1881 was officially said to comprise 502,764 men, with 120,126 horses, including gendarmes, &c.

Germany.—By the imperial constitution, April 16, 1871, the Prussian obligation to serve in the army is extended to the whole empire. Every German capable of bearing arms is bound to be in the standing army for seven years, as a rule from the end of his twentieth to the beginning of his twenty-eighth years. Of the seven years, three must be in active service, and four in the reserve. Then he must serve for five years in the landwehr. The whole of the land forces of the empire form a united army, all the troops being bound unconditionally to obey the emperor in war and peace. The army of the German Empire consists of 18 corps d'armée; viz., the corps d'armée of the guard, 13 Prussian corps d'armée (Nos. I—XI., XIV.—comprising the troops of Baden —and XV.), the corps d'armée of Saxony (XII.), of Würtemberg (XIII), two of Bavaria (I. and II.), and the division of Hesse. In time of peace the German army has: (1) of infantry, 146 regiments of the line, 26 battalions of chasseurs, with 4687 commissioned and non-commissioned officers of the landwehr, amounting to 274,711 men; (2) cavalry, 93 regiments, containing 65,513 men; (3) artillery, 35 regiments of mounted, 13 of foot artillery, having 45,439 men; (4) engineers, 19 battalions, 9568 men. In all, with 2056 staff officers, military train, &c., 17,036 officers, 401,659 men. On the war-footing, this force is increased by the following additions: field-troops, 16,976 officers, 676,486 men; depot troops, 4431 officers, 245,793 men; garrison troops, 9599 officers, 354,247 men. Total of the German army in time of war: 33,281 officers, and 1,392,011 men; with 299,562 horses. The maximum number of troops employed by Germany in the war with France was 1,350,787 men, and 263,735 horses.

Austria.—The military forces of the Austro-Hungarian empire are divided into the standing army, the landwehr, and the landsturm. Subjects of the empire are universally liable to service. The term of service is ten years, three of which the soldier must spend in active service, being afterwards enrolled for seven years in the army of reserve. He is still further liable to serve two years in the landwehr. The regiments of the standing army are under the control of the Minister of War for the empire, while the landwehr is controlled by the Austrian and Hungarian Ministers of National Defence. The emperor-king is the supreme chief of the whole of the military and naval forces of the empire. The Austrian infantry constitutes 80 regiments of the line, with 148,480 men; of the chasseurs, 40 battalions, with 21,451 men; of the cavalry there are 41 regiments (dragoons, hussars, lancers), 43,993 men; of artillery, 13 regiments of field artillery, and 12 battalions of fortress artillery—in all, 28,695 men. The engineers and pioneers make 3 regiments, 8898 men. The sanitary troops and military train have 5748 men. The miscellaneous establishments (schools, magazines, &c.) number 25,174. In all, for the active army in time of peace, 284,435 (of whom 253,513 are combatants). On the war-footing these numbers are thus augmented: infantry, 485,680; chasseurs, 59,340; cavalry, 58,671; artillery, 70,614; engineers, 24,502; sanitary troops and military train, 45,727. Then the Austrian landwehr (infantry, chasseurs, and cavalry) comprises 3669 men in peace, 145,045 in war; and the Hungarian landwehr (the Honveds) 13,591 in peace, and 206,707 in war. The total of the Austrian military forces in peace-time is therefore 301,695; in war, 1,137,401.

Russia.—According to a law of military re-organization, the Russian forces are to be raised by annual conscription, to which all are liable who have completed their twenty-first year, and are not physically incapacitated. Substitution is prohibited. The period of service is fifteen years; six in active service, and nine in the reserve. The Russian military forces are composed of regular and irregular troops. The regular troops comprise 164 regiments of infantry, 281,012 men; cavalry, 52 regiments, 42,444 men; artillery, 33,021 men; engineers, 9819 men; train, 4617 men. Total of field troops in time of peace, 370,913. In war as follows: infantry, 568,253 men; cavalry, 47,379; artillery, 40,846; engineers, 13,306; train, 21,329—total, 691,113. With local and other troops (in fortresses, &c.), and reserve troops, the Russian army in Europe amounts, on the peace-footing, to 19,103 officers, and 508,674 men; in war, 22,871 officers, and 879,755 men. The army of the Caucasus amounts in peace to 125,643; in war, to 167,841. The army of Turkestan to 22,906; of Siberia, from 25,000 to 27,000. Besides some thousand troops as gendarmes and in various military establishments, there is a grand total for the regular Russian army of 33,000 officers and 733,000 men; on the war-footing, 39,380 officers and 1,213,259 men. In addition there are the irregular troops, comprising about 190,000 men, chiefly cavalry.

Denmark.—All able-bodied young men 21 years of age are liable to serve eight years in the regular army of Denmark, and eight years in the reserve. Denmark has 31 battalions of infantry (guards, line, reserve), comprising 26,750 men; 5 regiments of cavalry, with 2122 men; 2 regiments and 2 battalions of artillery, with 6523 men; 2 battalions of engineers with 580 men. The total, line and reserve, is 1031 officers, 35,975 men; on the war-footing, 52,656 men.

Sweden and Norway.—There are five classes of soldiers in Sweden; the enlisted troops, the national militia (indelta), the conscription troops (bevaering or landvaern), the militia of Gothland, and the volunteers. Of the soldiers of the line there is a total of 35,646 men; of the reserve (landvaern), 86,101; of the Gothland militia and volunteers, 150,830. Norway has an army of its own, divided into the troops of the line, with reserve, military train, the landvaern, the civic guards, and the landstorm. The troops of the line are 12,000 in time of peace; in time of war not more than 18,000 without the assent of the Storthing.

Holland.—The army of the Netherlands is formed partly by conscription and partly by enlistment; and there is besides a militia. The European army has, of infantry, 1122 officers and

43,690 men; cavalry, 184 officers and 4318 men; engineers, 1035 men; artillery, 421 officers and 10,610 men. With the staff, &c., the total force is 62,068 officers and men. There is besides in the East Indies a force of 27,659 officers and men.

Belgium.—The standing army is formed by conscription. Substitution is permitted. The legal period of service is eight years. Belgium has 74,000 infantry (16 regiments), 8848 cavalry (7 regiments and 2 squadrons), 14,513 artillery (6 regiments), 2486 engineers. In all, and without officers, 99,847.

Italy.—The Sardinian law of conscription forms the basis of the Italian military system. The infantry of the line under arms on the peace-footing number 86,017; the bersaglieri, 16,818; depots, 11,560; the cavalry, 18,449; the artillery, 19,732; engineers, 3027; carbineers, 20,915; administrative troops, &c., 7047; giving a total of 183,205. On the war-footing, these several forces are so increased as to give a total of 541,575; and with the addition of the provincial militia, 743,656.

Spain.—The army of Spain was reorganized in 1868 after the model of that of France. The active army has 60,000 infantry, 9000 cavalry, 2500 engineers, and 8500 artillery, making a total of 80,000 men. The reserves increase this number to 216,000. There is besides an army of 54,500 in Cuba, 9400 in Porto Rico, and of 9000 in the Philippines.

Switzerland.—The federal army has 1269 engineers, 8401 artillery, 1942 cavalry, 6078 tirailleurs, 65,991 infantry, and 364 of a sanitary corps. In all, 84,045. There are besides, of the reserves, 51,102; the landwehr, 65,562; giving a total available military force of 201,578.

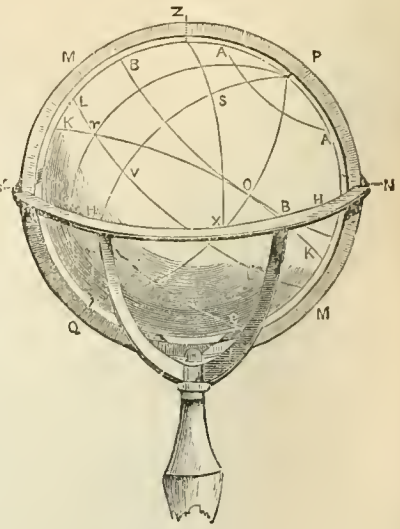
Turkey.—In 1871, the Turkish regular army had infantry to the number of 72,000; cavalry, 9000; artillery, 9500; engineers, 1600; with 1200 miscellaneous troops amounting to 93,300. The irregular (Bashi-bazouks, Spahis, &c.) are about 70,000. During the war, Turkey put on the war footing no less, apparently, than 752,000 men, including reserves and irregular troops. At the end of the war, the disorganized army consisted of less than 120,000 men. In 1880 about 150,000 men, fairly armed and equipped, were in the Turkish ranks.

United States.—At the commencement of 1861 the United States army consisted only of about 14,000 regular troops. In various successive levies by the president during the civil war (1861—1865), as many as 2,653,062 men had been called out—nearly one-fourth of the entire population of the Northern States. After the war, the standing army was steadily diminished; and by a law passed in 1870, it is provided that there shall be no more than 30,000 enlisted men at one time. That force is distributed amongst 25 regiments of infantry, 10 of cavalry, 5 of artillery, and 1 battalion of engineers. Besides the regular army there is the militia, of which the nominal strength was at the last census, 3,245,000. See UNITED STATES ARMY in AM. SUPP.

A separate and fuller treatment of the army of Great Britain is reserved for BRITISH ARMY; and for that in our Indian possessions see EAST INDIA ARMY. All the various matters relating to the formation, organization, discipline, arms, equipments, duties, and tactics of A., will be found succinctly treated under appropriate headings.

ARMI'LLARY SPHERE (*armilla*, a ring), an instrument intended to give a just conception of the constitution of the heavens, and of the motions of the heavenly bodies, as seen by an observer on the earth. It consists of a number of rings fixed together so as to represent the principal circles of the celestial sphere, and these are movable round the polar axis within a meridian and horizon, as in the ordinary celestial globe. It was by means of such rings furnished with sights that Hipparchus, Ptolemy, and other ancient astronomers made many of their observations, and we find even Tycho Brahé making most of his planetary observations with the help of such an instrument. The A. S., is however, now only used as an aid to instruction in astronomy, and in this respect is generally supplanted by the celestial globe. The object aimed at in the A. S. will be better understood by reference to the celestial globe represented in the diagram. Supposing the observer on the earth to be in the center of the sphere, the earth on which he stands shuts out from his view the lower half of the heavens, or the part lying below the horizon HH. The hemisphere above him may be regarded as divided into two equal portions, an eastern and a western, by the meridian MM, which passes through the pole P, and the zenith Z, of which the eastern half is shown in the figure.

The north pole is supposed to be elevated above the horizon, and its elevation is measured by the arc NP, or the height above the north point; and the heavens appear to rotate round an axis PQ, of which P is one extremity; the south pole, Q, the other extremity, being below the horizon. The meridian MM, and the horizon HH, are the only circles which maintain a fixed position with regard to the observer. Of the other leading celestial circles, the equator or equinoctial LL, extending from the east to the west point of the horizon, the tropics of Cancer and Capricorn, respectively BB and CC, and the arctic circle AA, although rotating with the stars, maintain the same position with regard to the horizon; while the ecliptic, KK, is constantly changing its inclination and position towards it. Circles which extend from pole to pole, cutting the equator at right angles, are called circles of declination. The circle which passes through the vernal equinox ♈ (see ARIES), is denominated the equinoctial colure; and that passing through the summer solstice O (see SOLSTICE), the solstitial colure. The circles just named, together with the Antarctic Circle, are represented by corresponding rings in the A. S. If S be a star, the following are the names given to the arcs which determine its position with regard to these circles: ♈V Right ascension; SV, Declination; SP, Polar distance; SZ, Zenith distance; XS, Altitude; (XN + 180°), Azimuth, reckoned from the south pole westward.



ARMI'NIUS, JACOBUS, the founder of Arminianism, was born at Oudewater (Old Water) in 1560. His real name in Dutch was James Harmensen; but in accordance with the prevailing custom amongst scholars in those days, he Latinized it. His father was a cutler, and died when A. was a child. After a preliminary education at Utrecht, he commenced (in 1575) a course of study at the newly founded university of Leyden, where he remained for six years, and where he seems to have acquired a high reputation, for the Amsterdam merchants undertook to bear the expense of his further studies for the ministry, on condition that he would not preach out of their city unless permitted to do so. In 1582, he went to Geneva, and received the instructions of Theodore Beza, the most rigid of Calvinists. Here he made himself odius by the boldness with which he defended the logic of Peter Ramus, in opposition to that of the Aristotelians of Geneva and in consequence had to retire to Basle, whither his fame must have preceded him, for he was offered by the faculty of Divinity in that university the degree of doctor gratis, which, however, he did not venture to accept, on account of his youth. At Basle he studied under Gyrnæus. He subsequently (1586) traveled into Italy. On his return to Amsterdam (1588), he was appointed minister. Shortly after this, he was commissioned to defend the doctrine of Beza, regarding predestination, against the changes which the ministers of Delft had proposed to make on it. A. carefully examined both sides of the question, but the result of his study was, that he himself began to doubt, and at last came to adopt the opinions he had been commissioned to confute. Some time after this change of view, he came, in the course of his expositions, upon the Epistle to the Romans, the most explicitly doctrinal in the New Testament, and the 8th and 9th chapters of which have always been considered the strongholds of Calvinism. His treatment of this epistle excited much dissatisfaction, and involved him in sharp disputes with his orthodox brethren. Still his views were, as yet, either ambiguously or vaguely expressed, or, at least, had not attained to that clear consistency they subsequently acquired, for in 1604 he was made professor of theology in the university of Leyden.

The greatest enemy of A. was Francis Gomar, his colleague in the university of Leyden. In the course of the year 1604, the latter attacked his doctrines, and from that hour to the end of his life, A. was engaged in a series of bitter disputes with his opponents. The *odium theologicum* was never exhibited in more unmingled purity. Arminius asserted, in substance, that God bestows forgiveness and eternal life on all who repent of their sins and believe in Christ; he wills that all men should attain salvation, and only because he has from eternity foreseen the belief or unbelief of individuals, has he from eternity determined the fate of each. On the other hand, Gomar and his party, appealing to the Belgic Confession and the Heidelberg Catechism, maintained, that God had, by an eternal decree, predestinated what persons shall, as being elected to salvation, be therefore awakened to repentance and faith and by grace made to persevere therein; and what persons shall, as being rejected (*reprobati*), be left to sin, to unbelief, and to perdition. See PREDESTINATION, PERSEVERANCE OF SAINTS.

While these fierce disputes were continuing, A., who was not destitute either of friends or influence, was created *rector magnificus* of the university, but resigned the honor on the 8th of February 1606, having held the office only for one year. All the pulpits in Holland now fulminated against him. At length, in 1608, A. himself applied to the states of Holland to convoke a synod for the purpose of settling the controversy; but, worn out with care and disease, he died, on the 19th of October 1609, before it was held, leaving seven sons and two daughters by his wife, Elizabeth Reael, daughter of Laurent Reael, a judge and senator of Amsterdam.

There can be no doubt that A. himself was much less Arminian than his followers. He had not matured his opinions sufficiently to elaborate a complete system of anti-Calvinistic doctrine, though it is perfectly certain that the conclusions at which his disciples arrived—as stated in the famous 'Five Articles'—are the logical and legitimate results of his teaching. He always complained, however, that his opinions were misrepresented; but this is invariably the fate of controversialists, and the penalty of controversy. A. was an extremely good man, as even his enemies allow; his abilities were also of a high order; his thinking is clear, bold, and vigorous; his style remarkably methodical, and his scholarship respectable, if not profound.

After the death of A., his followers gained strength, and boldly asserted their views, but still remained in a minority. In 1610, they presented to the assembled states of the province of Holland a 'Remonstrance'—from which they were styled 'Remonstrants'—which contained the following propositions: 1. That God had indeed made an eternal decree, but only on the conditional terms that all who believe in Christ shall be saved, while all who refuse to believe must perish; so that predestination is only conditional. 2. That Christ died for all men, but that none except believers are really saved by his death. The intention, in other words, is universal, but the efficacy may be restricted by unbelief. 3. That no man is of himself able to exercise a saving faith, but must be born again of God in Christ through the Holy Spirit. 4. That without the grace of God, man can neither think, will, nor do anything good; yet that grace does not act in men in an irresistible way. 5. That believers are able, by the aid of the Holy Spirit, victoriously to resist sin; but that the question of the possibility of a fall from grace must be determined by a further examination of the Scriptures on this point.

This last point, left as an open question, was decided by the Remonstrants in the affirmative soon afterwards (1611). Whereupon the Gomarists (Calvinists) put forth a strong 'Counter-remonstrance,' asserting plainly absolute predestination and reprobation. After several fruitless discussions, the states of Holland, in January 1614, acting under the advice of Oldenbarneveld, a senator, and the learned Hugo Grotius, issued an edict of full toleration of both parties, prohibiting at the same time the continuance of the controversy. The Counter-remonstrants (or Calvinists) refused to submit to this edict, and the strife soon became so furious, that in 1617, or soon afterwards, the Arminians found it necessary to guard themselves from personal violence by appointing a safeguard of militia-men (*Waardgelders*). The controversy now merged in the strife of party politics. The ambitious Maurice of Orange took advantage of the passions of the majority to crush his opponents of the republican party, whose leaders were adherents of the Arminian doctrines. Several Arminians were put to death—among them the aged senator Oldenbarneveld, May 13, 1619—while Grotius and others were imprisoned. In these circumstances, the Synod of Dort was held (1618—1619), attended by selected representatives from the Netherlands, England, Scotland, the Palatinate, Switzerland, Nassau, East Friesland, and Bremen. From this convocation (January 14, 1619), the thirteen Arminian pastors, with the learned and eloquent Simon Episcopius at their head, were excluded. The doctrines of the Counter-remonstrants were embodied in ninety-three canons; the Belgic Confession and the Heidelberg Catechism were confirmed as authorities for the reformed churches of the Netherlands; and three hundred Arminians (chiefly preachers) were expelled from office. In consequence of this decision, the defeated party sought shelter in France, Holstein, England, &c. Afterwards, under Frederick-Henry, the stadt-holder after Prince Maurice (1630), they were again tolerated in Holland, and in 1634 Episcopus opened his theological college in Amsterdam.

Since that time, the Remonstrants (or Arminians) in Holland have inclined more and more towards freedom of thought on religious questions and independence in church government. The rejection of all creeds and confessions; the free interpretation of the Scriptures; a preference of moral to doctrinal teaching; Arian views respecting the Trinity; the virtual rejection of the doctrines of original sin and imputed righteousness, and the view of the sacraments as merely edifying forms or ceremonies: all these and other points of belief display the same tendency which is found in their church polity. Their annual conference on ecclesiastical affairs is composed of ministers and lay-deputies, and takes place in June, alternately at Amsterdam and Rotterdam. The number of Remonstrants is now only about 5000, and is still decreasing. In 1809, they had 34 congregations with 40 preachers in Holland; but in 1880, only about 20 congregations. The largest society of Arminians is in Rotterdam, and numbers only 600 members.

Although the Arminians are thus dwindling away as a distinct body, their tenets respecting predestination have been adopted with greater or less modification by several other Christian denominations (see METHODISTS, BAPTISTS); as well as by multitudes of the individual members of those churches whose formularies are Calvinistic (see CALVINISM). They are also very prevalent in the Church of Rome.

A'RMISTICE, a suspension of hostilities between two armies, or two nations at war, by mutual agreement. It sometimes takes place when both are exhausted, and at other times when an endeavor to form a treaty of peace is being made. A particular example will best illustrate the nature of an A. On the 25th of February 1856, the representatives of England, France, Austria, Prussia, Sardinia, Turkey, and Russia, met in congress at Paris, to consider the terms of a treaty of peace which should terminate the war at that time going on between five of the above-named powers. The British nation was very unwilling to suspend hostilities during the sitting of the congress—partly on account of the numerous failures of diplomacy in the preceding year, and partly because Russia was suspected of only wishing to gain time. It was agreed, however, at the first sitting, in conformity with the laws of nations and the usages of war, that an A. should be declared, to be announced by telegraphic message to the commanders in the Crimea, and to last until the 31st of March. During that period of about one calendar month, the hostile armies were to remain strictly at peace, but the fleets of the allies were to continue their blockade of Russian ports. The information reached the generals late on the 28th of February. On the morning of the 29th, a white flag was hoisted in the Russian camp outside Sebastopol; several Russian officers assembled around it; and a glittering cavalcade of British, French, and Sardinian officers proceeded thither. The accredited officers compared notes, found the terms of the A. clear, agreed on a boundary-line between the hitherto hostile forces, and formally gave pledges for a cessation of fighting. The courtesy of civilized nations at once succeeded to the horrors of war; the Russian commander gave a magnificent entertainment to the allied commanders, and was entertained in turn; the soldiers 'fraternized,' by little gifts of tobacco, and ludicrous attempts at conversation, across a small stream which formed part of the boundary-line; and a few British officers were permitted to make excursions into the interior of the Crimea. The A. ended on March 31, not by a renewal of hostilities, but by the signing of a treaty of peace.

ARMO'RICA, the country of the Armorici, i. e., 'the dwellers on the sea' (Celt. *ar*, on or near; and *mor*, sea), the name by which the people occupying the coast of Gaul between the Seine and the Loire were known to Cæsar. At a later period, the name A. was confined to the country afterwards styled Britannia Minor, or Bretagne (q. v.).

A'RMORY may mean a storehouse for arms; but the name is also often applied to a collection of ancient armor and weapons—such as those in the Tower of London, in Sir Samuel Meyrick's mansion at Goodrich Court on the Wye, and in Warwick Castle.

A'RMOR is a general name for the apparatus for personal defence, as contradistinguished from arms or weapons of offence. Little of it is worn by soldiers at the present day, seeing that hand-to-hand conflicts, in which it is especially serviceable, are rather exceptional in modern warfare. It was before the invention of gunpowder that A.—often called in England by the name of *harness*—was especially used.

All the ancient nations who occupy a place in history were accustomed to adopt one or other of the defensive clothing or implements which collectively come under the denomination of A. Leather-A. was sometimes worn; but brass, iron, and other metals were preferred. Some of the more luxurious leaders had much silver and gold in their A. In the Bible, shields, helmets, breast-plates, and greaves, are mentioned among the articles of A. borne or worn by the Israelites and their opponents. The classical writers—Homer, Xenophon, Herodotus, Livy, Tacitus, Varro, &c.—supply abundant evidence of the use of A. among the nations concerning whom they wrote.

It is believed that the early Britons bore little or no other A. than shields. The Anglo-Saxons were more fully provided. At different times before the Norman Conquest they appeared to have had four-cornered helmets; laricæ made of leather; scale-A.; leathern helmets; wooden shields covered with leather; sheep-skin shields; conical caps or helmets of metal; pectorals or neck-guards; breast-guards of undressed hide; flat-ringed A.; byrnes or tunics of overlapping pieces of leather; close-fitting cuirasses of leather, and sometimes of strong linen; leg-guards of twisted woollen cloth; shields of various sizes, from half a yard to a yard and a

half in length; and casques having more or less resemblance to the ancient helmets. When the Danes were in Britain, they had at first no other A. than leathern neck-pieces, which descended some way over the shoulders and chest; and greaves or shin-pieces for the legs. In the time of Canute or Knute, however, they adopted a kind of A. which Sir Samuel Meyrick supposes them to have borrowed from the Norsemen or Norwegians. It comprised a tunic, with a hood and long sleeves; pantaloons with covered feet as well as legs; and sugar-loaf shaped helmets or skull-caps, with attached pieces which hid nearly the whole face except the eyes. All these were probably made of leather; but most of the surfaces were strengthened by macles or mascles, a perforated net-work of steel.

With William the Conqueror came in the kinds of A. which were at that time prevalent among the knights and soldiers of the continent of Europe, and which became afterwards more or less combined with the A. previously known in England. William himself occasionally wore a hauberk of ring-A. This kind of A. was much worn during his reign, the rings being usually attached to a foundation of leather. One curious variety of ring-A., called the haubergeon, had the tunic and breeches all in one piece. The helmets were generally conical, with a nasal or nose guard descending from the front.

A distinct ring-A., called *hose*, was often worn on the legs. The shield was generally kite-shaped, unlike the oval shields carried by the Anglo-Saxons. Gradual changes in these various portions of A. were made between the reigns of William Rufus and John. Under Henry III., we find stitched and padded hauberks and chaussés, called 'ouvrages de pourpointerie; suits of ring-A; greaves or shin-pieces of steel; poleyns or knee-guards; vambraces or arm-guards; jacks, jaques, or jackets, made of leather, and worn over the ring-A.; interlaced ring-A., of oriental invention, not requiring to be stitched to any garment or foundation; helmets, visors, and skull-caps of various forms; and chanfrons, or A. for the head and face of horses. During Edward III.'s reign, iron plate-A. was much used by troopers, in the various forms of helmet, breast-plate, gauntlet, and greaves. In the 14th c., chain-mail fell into disuse, and was succeeded by plate-A.; this last-named kind became more and more complicated, and reached its greatest pitch of elaboration in the reign of Richard III. During the times of Henry VII. and VIII., the A. was sometimes fluted, often elaborately engraved, and even damascened or inlaid with gold. Under James I., the knightly ideas of the feudal times gave way, and the use of A. declined; a knight armed *cap-à-pie* was a rarity. Charles I. tried to revive its use, but he had few followers; and the days of Cromwell may be regarded as the last in which A. was worn to any considerable extent by the regular soldiers. Helmets and cuirasses are still worn by the three regiments of Household Cavalry (Life-guards and Horse-guards), but more for show than for service. The chief pieces of A. will be found briefly described and illustrated under the proper headings.

Suit of Armor.
presented by the Emperor Maximilian to Henry VIII.

A'RMORER. The old meaning of this word has nearly passed away with the system to which it belonged. The armor-smiths, or makers of armor, were among the most skilful workers in metal during the feudal times; but their trade afterwards fell away. In the year 1690, the workmen-armorers of London, in a petition to parliament, complained that their trade was well-nigh ruined.

Armorers, in a somewhat different sense of the word, belong to the British army and navy at the present time. There are armorers to every regiment, not to make armor, but to repair arms. There is one to each regiment of cavalry, and one to each battalion of infantry and brigade of artillery. The A. is paid 4*s.* 11*d.* a day, besides a small allowance for certain work performed. There is a school for training 'A.-sergeants' at the Small Arms Factory, Enfield, where the men work, after enlistment, until drafted to a regiment; and whither they return from time to time to refresh their mechanical memories.

On shipboard, the A. is a first-class petty officer, who has, under the gunner, charge of all the muskets, pistols, cutlasses, boarding-pikes, &c., which he is expected to keep clean and in ready order. He is assisted by certain seamen called the 'A.'s crew;' and all are skilled in the general routine of smith's work.

A'RMOR-PLATES. The employment of thick slabs of iron to protect the sides of ships of war and the fronts of fortifications, is quite a recent invention; or rather, the modern system is the practical realization of plans suggested long ago by Mersenne and others. In 1842, Mr. Balmano of New York proposed that war-ships should be clad with several thicknesses of iron plate, riveted one upon another, the plates being individually ¾th inch thick. Soon afterwards, Mr. Stevens, an American shipbuilder, made further suggestions on the same subject, and other practical men kept the matter before the attention of the authorities in various countries. In 1854, the French sent several floating-batteries to the Black Sea, clad with iron plates; and the English Admiralty hastily imitated this example, producing eight very slow and unmanageable batteries in 1855—1856. Then came in a flood of suggestions for arming our regular ships of war in a similar way. The Admiralty, dismayed at the thought of dismantling the existing fleet, which had cost so much, delayed the subject as long as they could, but without abandoning it. In 1860, the French sent to sea *La Gloire*, a timber-built ship of war, altered from a 90-gun three-decker to a 40-gun corvette, clad with 4½-inch iron plates, having a burden of 3000 tons. This proceeding at once set the English government on the alert; they saw that further delay would be imprudent, and they set about the creation of an armor-clad navy. Many problems had to be solved—whether to case old wooden ships; or to build new vessels, of which the hull as well as the armor should be of iron. Then arose further problems—how near the bulwarks should the armor-plates come, how near the bottom of the vessel, how near the stem and stern; also, what thickness of iron, and whether the same thickness in every part.

In 1865 the 'Iron-Plate Committee' reported, as the conclusion to which their experiments had determined them, that the best material for ship armor was wrought-iron of the softest and toughest quality. All the British armored men-of-war built between 1860 and 1876 are 'iron-clads,' plated solely with iron, to the exclusion of all steel, and in that period the thickness of the plates had increased from 4½ inches to 14 inches, the weight of the plates increasing proportionately from 4—5 tons to 20—25 tons. The first 'steel-faced' plates used were on the turrets of the *Inflexible;* steel plate of 9 inches thick, forming the outside, iron plate of 7 inches thick the back layer, a slab of strong teak being interposed 'sandwich fashion' between the two. The *Colossus* and *Majestic* of the first class of armor-ships constructed since 1881, are plated wholly of steel. The *Agamemnon* and *Ajax*, of the second class, are steel-faced. The cruising turret-ship, *Impérieuse*, has 4 barbette turrets and an outer casing of wood. The 50 (or so) 'efficient' iron-clads of which, exclusive of three or four for the colonies and about 20 'inefficient,' the British armor-clad fleet of war consists, are divided into five classes, according to streugth of armor and armament and modes of construction. The *Inflexible*, the first British man-of-war, though considerably short of the weight of the *Duilio* and *Dandolo* of Italy, has a weight of armor amounting to 3155 tons.

The citadel in the center, 110 feet long, 75 feet broad, and 12 feet deep, one half above, one half below water, is surrounded by rectangular walls (inclosing engines, boilers, base of turrets, hydraulic loading-gear, magazines, &c.) 41 inches thick, consisting of armor-plates varying in thickness from 16 inches to 24 inches, with an interstratification of strong teak and a backing of the same wood—the whole forming a 'rectangular armed castle.' The other five turret-ships of the first class are built on much the same plan, but not so large nor of equal thickness of armor, the plate of the *Dreadnought* being 14 inches thick, that of the *Devastation* and *Thunderer* from 12 to 14 inches thick, and that of the *Colossus* and *Majestic* from 16 to 18 inches. Of the third class, comprising 16 rigged ships especially adapted for cruising and foreign service, the *Monarch*, a rigged turret-ship, has armor-plate of 8 inches thick along the water-line, a 10-inch plate over the port-holes, and an 8-inch over the rest of each of its two turrets. Each of the four vessels of the fourth class, 225 feet long and 45 feet beam, has its hull protected by an armor-belt 7 feet wide running in two strakes, the upper 8 inches thick, the lower 6 inches thick amidships, tapering fore and aft. The breastwork surmounting the hull, 117 feet by 14 feet, has a plating of 6 feet 6 inches thick and from 8 to 9 inches thick. The ships of the fifth class, mostly converted line-of-battle ships, were successively condemned from 1876 to 1879. Of some 20 armor-ships of the Italian navy, two of the first class, the *Duilio* and *Dandolo*, are armored with steel-plate of the surpassing thickness throughout of 22 inches. The deck passage at bow and stern, 4½ feet above the water-line, is also sheathed by horizontal armor against either water or projectile. The still more gigantic men-of-war, the *Italia* and *Lepanto*, have a panoply of three feet thickness throughout. The two largest French iron-clads, the *Devastation* and the *Foudroyant*, are plated to a thickness of 14 inches throughout; while Germany's *Kaiser* and *Deutschland* have a 10-inch armor-mail throughout.

Since 1860, experiments have been conducted by our government at home, as by foreign governments abroad, to determine

the conditions of the utmost practicable resisting power in ship-armor, and the utmost practicable destructive power in ship artillery, experiments causing a constant enlargement of cannon and constant thickening of armor-plate. The experiments (so far as England is concerned) have been conducted principally at Shoeburyness, but also on board the *Thunderer* at Portsmouth.

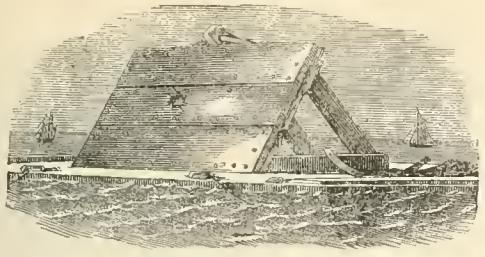


Fig. 1.—Front View of *Warrior* Target, after practice with 600-pounder Armstrong Gun.

The usual mode is, to construct a target in all respects tallying with the armed side of one of our iron-clads, and then to try to pierce it with shot fired from guns at various distances. A *Warrior* target, for instance, consisting of a 4½-inch armor-plate, backed by 18 inches of teak, and an inner skin of ⅝-inch iron; while a *Lord Warden* target had 4½ inches plate, 30 inches teak, and 1½ inch skin. In early experiments on the *Warrior* target, Alderson's steel shell, Armstrong's conical shell, and Palliser's chilled-

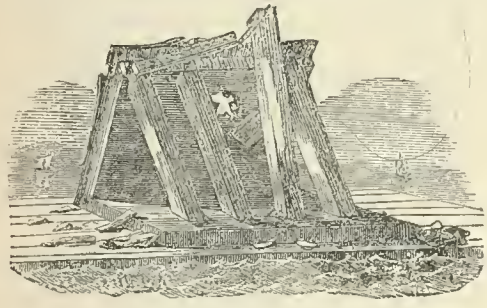


Fig. 2.—Back View of do.

iron shell were fired at it from a 7-inch gun at 200 yards: the Palliser shot excelled the others, going clean through the target, armor and all, and bursting behind. On another occasion, a Palliser 115-lb. shot went through the target even at an angle of 30° from the perpendicular.

The advantage contemplated in the 'sandwich fashion' of armor-plating adopted in the case of the *Inflexible* and other ships was, in addition to the increased defensive power implied in the increased thickness of plating, that broader and larger plates of practicable weight could by this means be produced, and that higher excellence of workmanship could be insured to thinner plates, than to plates of 20 inches and upwards of thickness. The Italian Admiralty tested on an unprecedented scale the relatively defensive properties of iron and steel armor, in 1876, and decided on the adoption of steel armor, the *Duilio* and *Dandolo* thus being the first steel-plated ships.

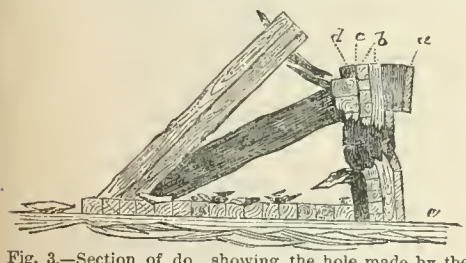


Fig. 3.—Section of do., showing the hole made by the 600-lb. shell, and displacement of the upper plate:
a, armor plating, 4½ in. thick (displaced); *b*, teak backing, 18 in. thick; *c*, boiler-plate skin, ⅜ in. thick; *d*, wrought-iron beams; *e*, platform.

The next move in armor-plating was with a view to combining the superior resistance to perforation characterizing hard steel with the superior resistance to cracking possessed by tough rolled iron; and 'steel-faced' armor—with a front-plate of steel and a back-plate of rolled iron—attained precedence of iron in English war-ships. The hard steel-plate in front resists perforation better than iron, breaking up the projectiles, or rendering them unavailing, while the steel and iron plate does not crack as would steel alone. For thicknesses up to twelve inches, a steel-faced plate, it is calculated possesses as much resistance to perforation, in case of normal impact (or straight charge), as an iron-plate from 25 to 30 per cent. thicker and heavier; and in case of oblique impact, the superiority of the steel-faced over the iron plate is still greater, glancing projectiles at angles of obliquity at which mere iron would be 'bitten' into. At Spezzia, again, in Nov. 1882, three targets were erected, the armor-plate on each 11 feet × 8½ × 19 inches; one, a steel-faced plate made by Messrs. Cammell; another steel-plate made by Messrs. Brown; a third, a steel-plate made at Creusot—all of them being backed, each by four feet of oak. The Creusot steel-plate was fastened by 20 bolts; the two steel-faced plates by only 6 bolts each. A 2000 lb. chilled cast-iron projectile having been hurled on each of them from a 100-ton muzzle-loading gun by a powder-charge of 329 lbs., the perforations were as follows: 3½ to 5 inches in the steel-faced plates; 8½ inches in the steel-plate.

The steel-plate did not crack at first shot. The powder charge being next increased to 480 lbs., the Creusot steel-plate was split into six pieces, but its bolts still held them in position, whereas each of the two steel-faced plates was broken into five pieces, which fell to the ground, leaving the target exposed. It was therefore to be inferred that a larger number of bolts were needed for a given area of steel or steel-faced plate than had been previously supposed. With even the lighter of the above two charges, a 19-inch iron-plate would have been completely perforated. Iron, though thus demonstrated to be inferior to steel-faced plate for the protection of the sides and batteries of ships, is found to be of superior value for plates of not above 3 to 4 inches thick used for the sheathing of decks.

Armor-clad forts are also attracting attention. Iron has been used largely in the defences of Plymouth and Portsmouth. In 1864, a line of iron-clad forts was built up at Shoeburyness, to test several modes of construction.

Regarded as articles of manufacture, armor-plates were at first produced mainly by hammering, several thicknesses of iron being welded one upon another, at a white-heat, by blows of a ponderous steam-hammer; but it is now more customary to produce them by rolling than by hammering—pressure being considered to produce more satisfactory results than percussion.

ARMS, or weapons of offence, may be divided into two great classes—those that act by means of gunpowder, and those that do not. Of arms that act otherwise than by explosion, the greater part have been in use from the earliest times; they include the bow and arrow, sling, pike, spear, lance, dart, javelin, dagger, axe, mace, spiked or knotted club, scythe for chariots, dirk, bayonet, sword, cutlass, &c., together with such artillery as the ballista, catapulta, and battering-ram. Weapons depending on the use of gunpowder are of two kinds—those that can be held in the hand, and those that are too heavy to be portable. In the first class, we find the names of the hand-cannon, hand-gun, arquebus, haquebut, demi-haque, matchlock, wheel-lock, firelock, currier, snaphaunce, caliver, escopette, petronel, dragon, hand-mortar, dag, tricker-lock, carbine, fusil, fowlingpiece, blunderbuss, pistol, musket or musquet, musketoon, rifle, &c. In the second class, more usually included under the name of artillery, we find the springel, war-wolf, bombard, cart-of-war, culverin, demi-culverin, serpentine, falcon, saker, cannon, howitzer, petard, carronade, mortar, rifled cannon, war-rockets, &c. The more important of these are briefly noticed under the proper headings. It is needless, perhaps, to add that nine-tenths of these are utterly obsolete.

The Surveyor-general of the Ordnance in the British army has the duty of providing and keeping efficient the arms in use by the regular and auxiliary forces, and of maintaining an ample reserve in the Royal Arsenals. Each regiment makes a report on these subjects yearly. If the commanding officer of a regiment ascertains that a new supply of arms is needed for the men under him, or a supply of anything in relation to the arms, he indents upon the Controller of the District for the supply required; which is forthwith made by that officer, subject, however, to a pecuniary fine upon the regiment, if the arms have not lasted a fair time.

ARMS, ARMO'RIAL BEARINGS, or ENSIGNS, are the names given to such devices as when painted on a shield form a coat. These terms in popular speech include all the accompaniments of a shield—viz., the crest, helmet, and where such exist, the supporters, &c. See these terms, and HERALDRY.

ARMS, ASSUMPTIVE. See HERALDRY.

ARMS, BELLS OF, are tents, mostly of a conical shape, for containing the small-arms for each company in a regiment of infantry. The tent is frequently painted with the color of the facings of the regimental uniforms.

ARMS, MESSENGER AT. See MESSENGERS-AT-ARMS.

ARMS, SERJEANT AT. See SERJEANT-AT-ARMS.

ARMS, STAND OF. A stand of A. is the complete set necessary for the equipment of one soldier, whether horse or foot.

A'RMSTRONG, JOHN, physician and poet, was born about 1709 at Castletown, a pastoral parish in Roxburghshire, of which

his father was minister. He studied medicine at the university of Edinburgh, where he took the degree of M.D., February 4, 1732. Soon after he commenced practice in London, and became known by the publication of several fugitive pieces and medical essays. In 1737 he published a very objectionable poem, *The Economy of Love*, which injured his reputation for a time. His principal work, *The Art of Preserving Health*, a didatic poem in blank verse, extending through four books, appeared in 1744. In 1746 he was appointed physician to the hospital for sick and lame soldiers. In 1751 he published a volume on *Benevolence;* in 1753, a poetical epistle on *Taste;* and in 1758, a volume of prose essays of no great merit. In 1760 he was appointed physician to the forces in Germany. In 1761 appeared from his pen *Day, a Poem*. On the peace in 1763, he returned to London, and resumed practice. In 1771 he made a continental tour with Fuseli, the painter, an account of which he published, with the title of *A Short Ramble through some Parts of France and Italy, by Lancelot Temple, Esq.* His last work was a volume of medical essays. He contributed to Thomson's *Castle of Indolence* the four stanzas at the end of the first part, descriptive of the diseases resulting from sloth. Died 7th September, 1779. A. was the friend of Thomson, Mallet, Aaron Hill, Dr. Young, Wilkes, and the principal wits and literary men of the period. He seems to have been a reserved, indolent, and splenetic man, 'who quite detested talk;' kind-hearted withal, and of frugal habits, having left £3000 saved out of a small and precarious income. His fame rests entirely on *The Art of Preserving Health*, his other works being now only known by name.

A'RMSTRONG, JOHN, an eminent physician and medical writer, was born 8th May, 1784, at Ayres Quay, near Bishop-Wearmouth, where his father was the superintendent of some glassworks. He studied medicine at the University of Edinburgh, and in June 1808 took the degree of M.D. He commenced practice at Bishop-Wearmouth, and in 1811 was chosen physician to the infirmary at Sunderland. In 1816 he published a work on *Typhus*, which greatly extended his reputation. His researches concerning the cause and phenomena of febrile diseases having made his name well known in the metropolis, he was induced in February 1818, to remove to London, where his practice became extensive, and he was elected physician to the Fever Hospital. In 1821, in concert with Mr. Edward Grainger, he established a medical school in Webb Street, Borough, where he lectured on the practice of physic. He also delivered a course of lectures on Materia Medica. In 1826 he joined Dr. Boot and Mr. E. Bennett in establishing a new school of medicine in Dean Street, Soho, but shortly after relinquished his connection with it. He died of consumption, 12th December, 1829, aged 45. Exclusively devoted to the duties of his profession, Dr. A. was very successful in the elucidation of medical science. His works are numerous, and he contributed various papers to the medical journals. His lectures, inserted in the *Lancet* in 1825, were published in a separate form after his death, with the following title: *Lectures on the Morbid Anatomy, Nature, and Treatment of Acute and Chronic Diseases, by the late John Armstrong, M.D. Edited by Joseph Rix*—one of his pupils. (London, 1834, 8vo.)

A'RMSTRONG, SIR WILLIAM GEORGE, noted for various mechanical inventions, especially in artillery and in water-power machinery, was born 1810 at Newcastle, where his father was an eminent corn-merchant, and in 1851 filled the office of mayor. A. was educated at the school of Bishop-Auckland; but his peculiar mental powers were chiefly cultivated by the opportunities which his father's tastes gave him at home, of acquainting himself with chemistry, electricity and mechanics. Though the natural bent of his mind was to some profession in which these sciences would have been available, he readily yielded to his father's wishes, and was articled to Mr. Armourer Donkin, an eminent solicitor in Newcastle, who, at the expiration of his time, adopted him as a partner. A high sense of duty enabled A. to give his excellent general powers of mind to business; but he devoted much of his leisure to his favorite pursuits, and his inventive faculty was constantly active. About 1838, observing one day a little stream descending along a height near Newcastle, and driving but a single mill, he thought to how much more purpose it might be applied hydraulically, and thus was led into a course of experimenting, which resulted in his producing a much improved hydraulic engine, of which a description was given in the *Mechanics' Magazine* for April 18, 1840.

Following up this invention with a view to practical applications, he gave to the world, in 1845, a hydraulic crane, which has proved to be of eminent utility in raising weights at harbors and in warehouses. The discovery of electricity in steam by a workman at a fixed engine on the Cramlington Railway in 1840, had meanwhile led A. into a new path, and in 1842 he brought to perfection an apparatus for producing electricity from steam, which was soon after introduced into the Polytechnic Institution in London. The evolution of the electricity depending in reality on the friction sustained by the small quantity of water which accompanies the steam in its discharge, the great merit of A.'s invention in this case lay in the form he gave the orifice through which the steam passed. This and other inventions brought him into prominent notice; he was elected a member of the Royal Society in 1846; and, shortly afterwards, in conjunction with some friends, commenced the Elswick Engine-works, in the suburbs of his native town. This establishment is upon a large scale, at first chiefly employed in producing hydraulic cranes, engines, accumulators, and bridges, for use in Great Britain, the continent, and India, but now embracing also works for the production of ordnance.

In 1854, while war was raging in the Crimea, the War Office was solicited by many inventors to make trial of new forms of cannon and projectiles. Mr. Armstrong, one of the number, attracted the attention of the authorities, and was employed to make explosive apparatus for blowing up the ships sunk at Sebastopol. This led him soon afterwards to consider improvements in ordnance, and he devised a form of breech-loading cannon, combining many peculiarities in structure and action. He received encouragement to make a few field-pieces on his new method. He made lengthened experiments on the strength of iron and steel, on the relative merits of cast and wrought iron, on the best number of grooves in rifling, on the best pitch or twist for these grooves, on the most convenient modes of loading at the breech of the gun, on the mechanism for lessening the recoil, on the best form and structure of shot and shells, and on the fuses best suited for igniting the shells during their flight.

Most of the early experiments were made with guns throwing 6-lb. and 18-lb. shot and shells, and subsequently 32-lb. shells. The last-named gun was built up piecemeal, to avoid flaws or faults, and to insure strength, lightness, and durability. It was made in 3-feet lengths. Bars of wrought-iron, 2 inches wide, were heated to whiteness, twisted spirally round a steel bar or core, and welded; other bars were twisted over these in a similar way, but with an opposite turn of the spiral; a third, and perhaps a fourth were added, according to the thickness and strength needed. Another heating to whiteness preceded a thorough welding of all the layers of bars by a steam-hammer. The ends of two of these 3-feet pieces were then nicely trimmed and adjusted, placed in contact, and bound together by the enormous pressure of a wrought-iron ring shrunk on while at a white heat. By varying the number and length of these sections, a gun of any length could be made.

The core was then removed, and the bore of the gun rifled by exquisite machinery. The rifle-grooves were so small and close as to be upwards of 40 in number; their pitch or twist such as to make a complete circuit in a gun 10 feet long. The breech of the gun was wholly distinct, and constructed in a different way; it could be drawn backward by unscrewing, and had a hole through its center for introducing the shot or shell and the charge. At first, the inventor adopted a steel interior for his gun; but afterwards relied on the toughest wrought-iron. The projectile employed with this gun might be solid shot, shell, case-shot, or canister-shot; but the shell was that to which most interest is attached. It was about three diameters in length; and thus a 32-lb. shot or shell could be fired from a gun of much smaller calibre than if it were spherical. The shell was built up of abont 50 separate pieces of cast-iron, very accurately fitted, and enveloped in an iron sheath. Outside of it were two bands of lead, soft enough to be forced into the rifled grooves of the gun, and thus to acquire the rotatory movement by which the straightness of flight is so much insured.

The actual results obtained by a gun such as is above described were almost incredible. An ordinary long 32-pounder weighs 57 cwt.; Armstrong's 32-pounder weighs 26 cwt. The former requires 10 lb. of powder as a charge; for the latter 5 lb. will suffice. The former will send a shot or shell 3000 yards; the range of the latter exceeds 9000 yards. The fuses attached to the shells are so exquisitely adjusted that the shell can be made to burst either directly on leaving the gun, or half-way on its path, or when it strikes an object; in the last-named case, even a sack of shavings will afford the necessary concussion; and yet, so close is the structure, that an uncharged shell has been fired completely through 9 feet of solid oak without the pieces separating. A.'s elaborate experiments were made chiefly with a 6-pounder, 1¾ inch calibre, and so light that two men could carry it (without its carriage); this small gun could reach 1500 yards with wonderful accuracy of aim, and had a range of 3000 at a certain elevation.

When A. had spent much of his time and thoughts during four years on this subject, the government, supported by the strongly expressed opinions of artillery officers of all ranks, proposed to secure the result of these experiments for the nation. A. offered to the government, without any stipulation, not only all his past inventions, but also all such as he might hereafter discover. This led to arrangements which the ministers in parliament characterized as liberal and patriotic on his part; and the terms thus suggested were accepted. An office was created for him, that of Chief-engineer of Rifled Ordnance, for seven years provisionally;

and a certain amount of salary was determined on, in consideration at once of his past inventions and of his future services. He was knighted by the queen in 1858.

The peculiar connection, partaking in some degree of the nature of a partnership, between the government and the Elswick firm, underwent changes from time to time, and was brought to a close in 1863. During its continuance, guns of gradually increasing power were made on A.'s system; 3, 5, and 12 pounders; then 18, 20, 32, and 40 pounders; then rapidly increasing in calibre, until at length a 600-pounder was produced, weighing upwards of 20 tons. The coil system of construction, the adoption of a large number of rifle grooves, and the use of the beautifully formed segment shell, were continued; but A. made variations in the combination of steel and iron, and adopted muzzle-loading for many of his larger guns. Elaborate experiments made by the War Office led to a conclusion that the A. breech-loader has many disadvantages for large ordnance. Notwithstanding its range, accuracy, power of working in a small space, easiness to clean, and safety to the gunners while loading, it is neither so cheap nor so simple as the muzzle-loader; it is difficult to handle, complicated, apt to get out of order, and not so useful for general purposes. The comparative cheapness has had much to do with the preference of the War Office for the Woolwich gun, a muzzle-loader. A. supplies, and has long supplied many foreign governments with his guns, chiefly of large calibre. The manufacture is of the highest order, effected through the medium of machine tools of exquisite construction; but the practical utility of the gun, as compared with the Whitworth, Palliser, and other kinds, is still matter of controversy.

The great reputation and commercial success of A. depend on his skill as a constructor of water-power machinery. Early in his career, in 1847, when a plan was adopted for supplying Newcastle with water, he suggested that the power derived from the descent of the water through pipes from the reservoir, should be utilized for working hydraulic cranes on the quay, and for various mechanical purposes in the town; this was done with marked success. The system has rapidly grown; until, at length, the A. hydraulic machinery is largely adopted in England and abroad for raising, lowering, hauling, and other purposes in connection with railways, canals, docks, piers, harbors, lock-gates, manufactories, warehouses, &c. The fabrication of the machinery employs a very large number of hands at Elswick, where the works are carried on by a joint-stock company. A., who belongs to several scientific societies, was in 1863 elected president of the British Association; he was instrumental in bringing about the appointment of the Coal Commission in 1866. He has also taken an active part in the inquiries concerning the operation of the Patent Laws. Cambridge and Oxford have conferred honorary degrees on A., who is a member of several foreign knightly orders.

ARMY. Referring to ARMIES (ANCIENT, MEDIEVAL, and MODERN) and to BRITISH ARMY for brief historical notices of national military forces, and leaving to other portions of this work all details concerning the formation and tactics of such forces, it may be well to mention here certain distinctions in the application of the name A. A *Covering A.* is encamped or in cantonments, for the protection of the different passes or roads which lead to the town or place to be protected. A *Siege A.* is ranged around or in front of a fortified place, to capture it by a regular process of besieging. A *Blockading A.*, either independent of or auxiliary to a siege A., is intended to prevent all ingress and egress at the streets or gates of a besieged place. An *A. of Observation* takes up an advanced position, and by celerity of movement keeps a close watch on all the manœuvres of the enemy. An *A. of Reconnaissance* has a more special duty at a particular time and place, to ascertain the strength and position of the enemy's forces. A *Flying A.* comprises a strong body of horse and foot, moving quickly, to alarm the enemy, and to protect garrisons.

ARMY ADMINISTRATION. The whole of the operations connected with the raising, clothing, paying, maintaining, and controlling of the British army, are included in the term A. A. They are distinct matters from military command and discipline. The Sovereign has the supreme command of the British army; but the Secretary of State for War is her responsible representative in all that concerns administration—the Commander-in-chief being her representative in matters relating to military command and discipline. The Secretary is the organ through whom the wishes of the Sovereign are reconciled with the wishes and intentions of parliament. Until the war with Russia in 1854, the administrative departments were much scattered; but now they are all consolidated under the Secretary of State for War. See WAR DEPARTMENT.

ARMY DISCIPLINE. Military law is now consolidated in the Army Discipline and Regulation Act of 1879, which, under the heads of (1) discipline, (2) enlistment, (3) billeting and impressment of carriages, (4) general provisions, (5) application of military law, incorporates the main provisions of the Mutiny Acts (q. v.), and the Articles of War (q. v.), and is independent of an annual continuance act.

ARMY ESTIMATES. In the spring of every year, the British government having formed a plan concerning the extent and appliances of the military force for that year, the War Office sends to the Treasury a series of accounts setting forth the probable cost of everything required. These accounts are called the A. E. If they are approved by the Treasury, the Chancellor of the Exchequer adverts to these, along with other estimates, in his annual 'financial statement,' made to the House of Commons in his capacity as guardian of the public purse. In preparing the A. E. the Secretary of State for War applies to the heads of all the departments under him for detailed accounts of their probable requirements. Another functionary then incorporates and adjusts these into a whole; they are submitted to the Treasury; and, if approved, are presented to the House as the A. E. Should the Commons grant the money, the Accountant-general of the War Office makes the requisite drafts or demands from time to time; and the Treasury authorizes the Paymaster-general of the Forces to honor these drafts. The money itself is in the Bank of England; this establishment receives a certain annual sum from the government for managing such financial matters.

The A. E. are drawn up in conformity with a model which differs little from year to year. There are certain great headings, each comprising many minor divisions: viz., 1. *Regular Forces* (4 votes); 2. *Auxiliary and Reserve Forces* (4 votes); 3. *Ordnance Establishments and Manufactures, and Purchases of Stores* (4 votes); 4. *Works and Buildings* (barracks, fortifications, &c.); 5. *Educational Establishments* (schools, libraries, &c.); 6. *Administration of the Army;* 7. *Non-effective Services* (half-pay, retiring allowances, pensions, &c.). The various items are more or less sifted by the House of Commons; and any one or more of them can be refused altogether, or granted in diminished amount. The A. E. for 1879—1880, which may be cited here as an illustrative example, refer to the period from April 1, 1879 to March 31, 1880. The total number of men, including the staff of the Militia Forces, on the Home and Colonial Establishment of the Army, and exclusive of those serving in India, was 135,625. The total number serving in India was 62,653, which are charged against the Indian Treasury. The horses were 26,218, of which 10,830 were for India service. Without going into any details, we will simply give the amounts under the six great headings:

1. Regular Forces—pay and allowances	£4,944,200
2. Auxiliary and Reserve Forces	1,258,500
3. Ordnance Services (provisions, clothing, arms, stores)	5,531,000
4. Works and Building	853,300
5. Various Services (education, administration, &c.)	432,900
6. Non-effective Services	2,625,800
	£15,645,700

ARMY LIST is the name of a publication issued monthly by authority of the War Office. It contains the names of all commissioned officers in the British army. Then come the general and field officers of the dying-out Indian Army. Next the names of all officers who hold military honors or staff appointments. The bulk of the work, however, is taken up with an enumeration of all the regiments in the Queen's army, and all the officers in each regiment, arranged according to the numerical rank of the regiments. To this are added lists of the officers of the Rifle Brigade, Colonial Corps, Royal Artillery, Royal Engineers, Royal Marines, Control, and Army Medical Department; and of officers retired on full-pay and on half-pay. Next follow the officers of the Militia, Yeomanry, and Volunteers; and then the Militia and Volunteer officers of the several colonies. A full index, an obituary, a list of the changes gazetted during the past month, and of the new regulations, complete the work. A larger work of similar but non-official character, *Hart's A. L.*, by a more condensed arrangement of type, gives all the information contained in the official list, and much in addition.

ARMY SCHOOLS. The colleges, academies, and schools relating to military matters in this country may be grouped into three classes—those intended to increase the military efficiency of the officers and men; those for imparting military knowledge to persons not yet in military service; and those which bear relation to the ordinary school-tuition of soldiers of the ranks and their children. The principal of those in the first group are the Staff College, the Royal Military College at Sandhurst, the School of Military Engineering at Chatham, the Department of Artillery Studies at Woolwich, the School of Gunnery at Shoebury, the School of Musketry at Hythe, and the Royal Artillery Institution at Woolwich. The second group is represented by the Royal Military Academy at Woolwich; while in the third are the Royal Military Asylum (better known as the Duke of York's School) at Chelsea, the Royal Hibernian School at Dublin, the Regimental Schools, and the Garrison Schools. Chelsea Hospital is an asylum for veterans, not a school of instruction. See MILITARY ACADEMY, MILITARY SCHOOLS, SANDHURST, &c.

ARMY WORKS CORPS. When the British generals engaged in the Crimean war, in the later months of 1854, knew that the siege-army would need to winter outside Sebastopol, grave difficulties were presented to their notice. The distance from the landing-place at Balaklava to the front of the siege-camp was not less than eight miles; and the only road was a mud-track, almost impassable in wet weather. How to get the heavy guns, the shot and shell, the provisions, and the general stores, up to the front, was a question not easy of solution. The British soldiers were too few even for the ordinary military duties, and yet they were called upon for services of an extra and arduous nature. When these facts became known in England, a suggestion was made that an 'Army Works Corps' should be formed, to consist of strong and efficient railway excavators, Cornish miners, and well-sinkers; that these should have with them all the tools and appliances for making roads and digging wells; and that they should be accompanied by traveling workshops and skilled artisans, to effect that which might require more skill than physical labor. The immediate necessities of Lord Raglan, in regard to bringing up supplies, were met by the construction of a railway from Balaklava to the heights outside Sebastopol, by special contract with Messrs. Peto and Brassey; but the large amount of bodily labor continually needed for various services, led to the formation of the A. W. C. The raising and organization of this force were entrusted to Sir Joseph Paxton. As soon as he had obtained 1000 efficient men, he sent them out; and their value was so soon felt by Lord Raglan, that other detachments gradually followed, until the corps comprised 3500 men in the later months of 1855. The men were paid well, and they worked well; and as their engagement related only to the special duties connected with the siege-camp, the country was not saddled with any burden after the need for these services had ceased. They did not require to be drilled for their duties, like sappers; and they were ready for work at once, as artisans or laborers. There were some cases of disagreement between the men and their employers, after the whole of the British had returned from the Crimea, in a matter of wages due; but this was a question of detail, and did not affect the usefulness of the corps. The experience was valuable, as showing the relative advantage and disadvantage of employing civilian laborers in military operations. As one result, it may be observed that the military authorities have been careful not to repeat the experiment in later wars.

ARNAULD, Angélique, a daughter of Robert Arnauld d'Andilly, was born on the 28th November 1624. From her earliest years, she exhibited an extraordinary force and resoluteness of character, and excited much anxious speculation concerning her future career among her relatives. When not quite twenty years of age, she became a nun at Port-Royal des Champs, where she had been educated by her aunt, Marie Jaqueline Angélique Arnauld, sister of the great Arnauld. Nine years after, she was made subprioress; and on removing some years later to Port-Royal de Paris, she held the same office. During the persecution of the Port-Royalists, A. A., by her piety and courage, sustained the spirit of the sisterhood. The whole family, male and female, were determined Jansenists, and none more so than Mother Angélique de Saint-Jean (her conventual name). She had much to endure, but she met misfortunes with earnest intrepidity. A royal order was issued to break up the nunnery. The police arrested the inmates, who were dispersed in various convents throughout France, and constant efforts were made by the Jesuits to induce them to sign the 'Formulary of Alexander VII.' A. A. was alone exempted from listening to their arguments and solicitations, her 'obstinacy' being supposed invincible. At length, by command of the Archbishop of Paris, the nuns were restored to Port-Royal des Champs; but for some years they were subjected to a strict surveillance by soldiers, who watched all their movements, and allowed them no intercourse with persons out of the convent. In 1669, however, was issued the edict of Clement IX. for the peace of the church, which was a kind of compromise on this vexed question of Jansenism and Jesuitism. The nuns received back the privileges of which they had been stripped, and constituted their society anew. A. A. was again elected prioress. In 1678, she was made abbess. The next year, her protectress, the Duchesse de Longueville, died, and the persecution recommenced, by the prohibition to receive any more novices. Still Angélique did not despair. She consoled the nuns, and exerted all her influence with persons in power, but with little effect. At last she sank under a complication of griefs, and expired on the 29th of January 1684, leaving behind her as bright and beautiful a memory as any of her countrywomen. She was learned without being pedantic, pious without bigotry, and gentle to others in proportion as she was severe to herself. A. A. wrote several works, the most valuable of which is *Mémoires pour servir à la Vie de la Mère Marie Angélique Arnauld de Sainte Madeleine, Réformatrice de Port-Royal.*

ARNAULD, Antoine, the greatest advocate of his time in France, was born at Paris in 1560. He was descended from an ancient family of Auvergne, which had distinguished itself both in civil and military affairs. A. was not less remarkable for his eloquence than for his probity. His zealous defence of the university of Paris against the Jesuits in 1594 won for him a wide celebrity. It was reprinted in 1717. He published another work against the Society of Jesus, and several tractates of an earnest political character. The Jesuits accused him of being a Huguenot, but the accusation was unfounded, for he had no personal predilection in favor of Protestantism as a distinct religious system. He had several children, who formed the nucleus of the Jansenists and Port-Royalists. He died 29th December 1619.

ARNAULD, Antoine, known as 'the great A.,' the twentieth and youngest son of the preceding, was born at Paris, February 6, 1612. Although originally intended for the bar, he could not conceal his dislike of the legal profession, and was in consequence dedicated by his mother to the service of the church. Entering the Sorbonne, he became a pupil of Lescot, the confessor of Cardinal Richelieu, and afterwards Bishop of Chartres. Lescot initiated him into the scholastic theology; but his attention having been drawn to the writings of Augustine, he soon conceived an admiration for that profoundest of the early Christian thinkers which he ever after retained. It was Augustine, he himself admitted, who first showed him the great difference between the two states—that of a nature whole and sound, and that of a nature corrupted by sin. In 1641, the Sorbonne wished to receive him into their society, on account of his extraordinary piety and talents, but Cardinal Richelieu opposed this. In the following year he was ordained a priest, and in 1643 he published a work entitled *De la Fréquente Communion*, which was received in the most favorable manner by all except the Jesuits, who had taken alarm at the virtues of A., and were already attempting to defame one whom they instinctively felt to be a reproach to their order. As a consequence of this publication, he was now admitted 'of the Society' of the Sorbonne. A. not only replied to the aspersions of the Jesuits in his *Avertissement*, but also sent forth a work which was the prelude to a long and fierce contest with his adversaries, *Théologie Morale des Jésuites* (Moral Theology of the Jesuits). But the hatred of the latter was not confined to literary libels; they advised the chancellor of the Sorbonne to carry the dispute to Rome, whither A. would be obliged to follow and defend himself. In this scheme, however, they were defeated.

A. now buried himself in seclusion for twenty-one years, during which period, however, his pen was almost continuously active. In 1644 appeared his *Tradition de l'Eglise sur la Pénitence* (Opinion of the Church on the doctrine of Penitence). It was a reply to the attacks which the Jesuits had made against his *Frequent Communion*. A. was still entangled in the disputes which arose out of this treatise, when he became involved in another controversy that colored the whole of his subsequent career, and may be said to have won for him his position in history. In 1640 had appeared a posthumous work of Jansenius, Bishop of Ypres, entitled *Augustinus; seu Doctrina Sancti Augustini de Humanæ Naturæ Sanctitiate, Ægritudine, Medicinâ, adversus Pelagianos et Massilienses.* It laid down with a rigor equal to that of Calvin the doctrines of predestination, the corruption of human nature, and the depravity of the will. It was specially intended as a counteractive against the lax principles and morality of the Jesuits, many of whom, and especially their great champion, Molina, entertained extreme Pelagian views of the freedom of the human will, which they had cunningly interwoven into their 'scarlet-colored' web of ethics. The work, in the meantime, was condemned by Pope Urban VIII., on the 1st of August 1641. A., who quickly apprehended its vital importance in the existing state of things, boldly ventured to defend it against the censures of the papal bull. He published several pamphlets, closing with a first and second *Apologie de Jansénius.* It is to the honor of the religion of A., however, that it was not always controversial. Whenever a moment of armistice was permitted him, he occupied it in writing such works as *Mœurs de l'Eglise Catholique, La Correction, La Grâce, La Vérité de la Religion, De la Foi, de l'Espérance, et de la Charité*, and the *Manuel de Saint Augustine.* He also varied these occupations by translating into Latin his *Frequent Communion*, and by his composition of his *Novæ Objectiones contra Renat. Descartis Meditationes*, and several smaller tractates. In addition to his literary labors, he undertook the direction of the nuns of Port Royal des Champs, a convent of which his sister, Marie Jaqueline Angélique Arnauld, was abbess. In this retreat he was surrounded by many friends, thirsting like himself for the quiet pleasures of study, some of whom have left their mark in the world, such as Pascal, Nicole, &c. Here they wrote in common numerous excellent works. A. executed parts of the *Grammaire Générale Raisonnée, Eléments de Géométrie*, and *L'Art de Penser.* In 1649 the Jansenist controversy broke out more fiercely than ever. The *Augustinus* of the Bishop of Ypres was again attacked and condemned by the Sorbonne and the pope. A. replied in his *Considérations.* In 1650 appeared what he conceived to be his best work, *L'Apologie pour les Saints Pères.*

For the next half-dozen years he was engaged in constant and

painful disputes; yet, in spite of the polemical character of his life, the impression of his piety and earnestness was deepened in the mind of the nation; and on reading some of his compositions, even Alexander VII. is reported to have praised the author, and to have exhorted him for the future to despise the libels of his adversaries. During the strife he published *La Concorde des Evangiles* and *L'Office du Saint-Sacrement*. In 1655—56, for prudential reasons, he left his retreat at Port-Royal; about the time he was expelled from the Sorbonne and the faculty of theology.

In 1656, the war with the Jesuits was renewed—not, however, by A. in person. An unknown knight with closed visor had ridden into the list—the great Pascal. Under the *nom de plume* of Louis de Montalto, he discharged his scorpion wit against the Jesuits for about a year and a half in the *Provincial Letters*. A. furnished him with materials; but, in 1658, he took the field *in propriâ personâ*, by publishing his *Cinq Ecrits en faveur des Curés de Paris contre les Casuistes relâchés*. In 1662 appeared *La Nouvelle Hérésie* (of the Jesuits); in 1669 the first volume of his *Morale Pratique* (of the Jesuits), the last of which was not published until the year of his death.

A., who was a sincere Catholic after his fashion, next had a theological controversy, properly so called, with the reformed minister Claude, the consequence of which was his volume, *Du Renversement de la Morale de J. C. par la Doctrine des Calvinistes touchant la Justification* (1672). In 1675 he returned to the subject in his *Impiété de la Morale des Calvinistes*. Some years previous to this, A. had enjoyed the peace of Clement IX., which put a stop for the time to the Jansenist controversy. He had been presented to the papal nuncio and to the *Grand Monarque*, both of whom flattered him highly; but the Jesuits, who could not breathe freely in his presence, used their utmost efforts to prejudice Louis against him, and at last the king issued an order for his arrest. A. hid himself for some time, but finally withdrew into Belgium. He felt his exile keenly, though honored by many learned and influential persons, and could not rest in one city, but wandered from place to place, ever displaying the same astonishing vigor of mind and the same polemical tendency. It is strange that this man, who was celebrated amongst his friends for equanimity and gentleness of heart, should have been so bitter in his controversies, even with his friends, for he wrote not against his enemies only, but against Pascal, Domat, Nicole, his protector, Pope Innocent XI., and his old friend Père Malebranche. So earnest was he for the truth—which earnestness had no doubt been greatly intensified by persecution and controversy—that he could never thoroughly realize the idea, that there might be truth on the other side also. He died at Brussels, 8th August 1694. His works, which amount to upwards of 100 volumes, were published at Paris, 1775—1783.

ARNAULD, Robert d'Andilly, the eldest son of Antoine Arnauld, the advocate, and brother of the great Arnauld, was born at Paris in 1588. He was a person of considerable consequence at the French court, where his influence was ever exerted beneficially. Balzac spoke very highly of him. At the age of fifty-five, he quitted the bustle of the world for the solitude of Port-Royal des Champs, where he devoted himself to religious history and biography. His chief works are translations, such as those of the *Confessions of St. Augustine*, and of the *History of the Jews*, by Josephus. The latter work is esteemed more elegant than accurate, however. In 1668, appeared his translation of the *Lives of the Holy Fathers of the Desert, and of several Saints;* and in 1670, that of the works of St. Theresa. He was likewise the author of some pieces of religious verse. He died 27th September, 1674.

ARND, or ARNDT, Johann, a German Protestant divine, born at Ballenstadt, in Anhalt, in 1555, became Lutheran pastor at Quedlinburg, Brunswick, and elsewhere, and died at Celle, Hanover, in 1621. As a man he was remarkable for his piety and active benevolence; but he is chiefly known for a work entitled *True Christianity* (Wahres Christenthum), which was translated into most European languages, and is yet popular in Germany. Its object is 'edification'—the promotion of practical religion; and it is written with great warmth and unction, and in a strain of piety bordering on mysticism. It has been called the Protestant à Kempis, and its author the Fenelon of the Protestant Church. There is an English translation by W. Jaques (Lond., 1815, 2 vols.).

ARNDT, Ernst Moritz, professor in the university of Bonn, and for half a century one of the leading political writers of Germany, was born in the island of Rügen in 1769. He gave up the clerical profession, for which he was at first intended, and after traveling over great part of Europe, became, in 1806, Professor of History in Greifswald. Here, among other writings, he published his *History of Serfdom in Pomerania*, for which he was formally denounced and accused by several nobles. In his *Spirit of the Times* (Altenb. 1807), he attacked Napoleon with such boldness, that, after the battle of Jena, he had to take refuge in Stockholm. Returning under a feigned name, he resumed his functions at Greifswald in 1810; but war becoming imminent, he resigned the following year, and became an active co-operator with the minister Von Stein, and other patriots, in throwing off the foreign yoke. His numerous fugitive writings, full of energy and fire, contributed not a little to rouse and sustain the spirit of Germany for the war of liberation. His best poems belong to this period, and several of them have become national songs. (A new selection, Leip. 1850). His song, *What is the German's Fatherland?* is sung wherever German is spoken. In 1818 he was made professor of modern history in the new university of Bonn, but became involved in 1819 in the prosecutions for what were called 'demagogic movements,' and was suspended.

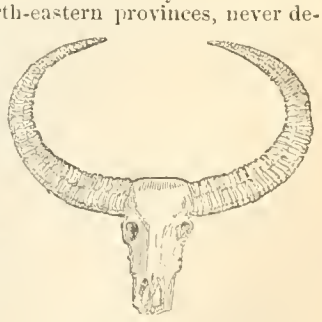
Though acquitted on trial, he was made to retire, retaining his salary. After twenty years' suspension, he was restored in 1840. His writings are numerous: we may mention his *Beschreibung und Geschichte der Schottländ. Inseln*, &c. (Leip. 1826); a collection of his fugitive *Schriften für und an meine lieben Deutschen* (3 vols. Leip. 1845); and *Erinnerungen aus dem äussern Leben* (3d ed. Leip. 1842). He was elected a member of the German national assembly in 1848, but seceded from it along with the whole Gagern (q.v.) party in 1849. He powerfully supported the party who advocated a constitutional hereditary monarchy, and took a prominent part in the appointment of the Archduke John as regent, and in the fruitless deputation to Berlin to offer the empire to the king of Prussia. After the dissolution of the Frankfort Assembly, A. did not cease in his fugitive writings to advocate the views of the German national party. He died 29th January 1860.

ARNE, Thomas Augustine, Doctor in Music, one of the best and most genial of English composers, was born in London, 1710, and received his early education at Eton. His father, who was an upholsterer, intended to educate him for the bar; but the love of music was too strong to be restrained. Young A. became skilful as a violin-player, forming his style chiefly on the model of Corelli; and his zeal in the study of music induced his sister (afterwards celebrated as Mrs. Cibber) to cultivate her excellent voice. He wrote for her a part in his first opera, *Rosamond*, which was first performed with great success in 1733. Next followed his comic operetta, *Tom Thumb, or the Opera of Operas;* and afterwards his *Comus* (1738), which displayed greater cultivation of style. He married a singer, Cecilia Young (1740); and after a successful visit to Ireland, was engaged as composer to Drury Lane Theatre, and wrote many vocal pieces for the Vauxhall concerts. The national air, *Rule Britannia*, which was originally given in a popular performance, *The Masque of Alfred*, was of his composition. He composed also two oratorios, the opera *Eliza*, and another, *Artaxerxes*, in the Italian style; but his genius was better adapted to simple pastoral melody than to great dramatic compositions. He died in London, 1778.

ARNEE, or ARNA, the largest animal of the ox kind yet

Arnee:—[From an Indian picture.]

known. It is a native of India, and is found chiefly in the forests of the Himalayas and in the north-eastern provinces, never descending to the low plains. It is usually regarded by naturalists as a wild variety of the buffalo; but Mr. Vasey thinks 'our information on the subject not yet sufficiently precise to determine this point.' It is named *Bos Arnee*, as a distinct species, by some authors. A pair of horns in the British Museum measure more than six feet each along the outer curve. When the head of an A. is placed with the muzzle on the ground, it requires the outstretched arms of a man to hold the points of the horns. From the manner in which the A. is introduced in Indian paintings, it would seem to have been sometimes tamed.



Skull and Horns of Arnee.

A'RNHEIM, or ARNHEM, the Roman Arenacum, capital of the province of Guelderland, in Holland, with a population of (1879) 40,978, is situated on the right bank of the Rhine, which is here crossed by a bridge of boats; it has a considerable transit-trade between Amsterdam and Germany. The environs of this strongly fortified town are exceedingly picturesque. Among its most remarkable buildings are the Reformed Dutch Church, which contains monuments of the Dukes of Guelderland; and the town-house, noted for the grotesque adornment of its front, which has gained it the name of Duivelshuis. There are several paper-mills in the neighborhood. Here Sir Philip Sidney died in 1586, after the battle of Zutphen. In 1813, A. was taken by storm by the Prussians, under General Bulow, and the way thus prepared for the occupation of Holland.

A'RNHEM LAND, a name formerly applied to a region in North Australia, so called from the ship of the Dutch navigators who discovered it in 1618.

A'RNICA, a genus of plants belonging to the natural order *Compositæ*, sub-order *Corymbiferæ*. The flowers of the ray are female and ligulate, those of the disk hermaphrodite and tubular. The receptacle is naked; the pappus hairy. The root, leaves, and flowers of the Mountain A. (*A. montana*), sometimes called Mountain Tobacco, are much valued in medicine, and administered in various forms as a stimulant in paralytic affections, typhoid fevers, and other diseases. They are also applied with much benefit to bruises, to promote the reabsorption of extravasated blood. They contain a peculiar volatile oil, a resin, an extractive matter, and an alkaloid (*Arnicina*). The root is perennial, and crooked, the stem about two feet high, simple or little branched, with few leaves, bearing on the summit a head of flowers of a dark golden yellow, often two inches in breadth. It flowers from June to August, forms an ornament of mountain meadows in Germany and Switzerland, and is found upon the continent as far south as Portugal, and as far north as Lapland, but is not a native of Britain.

Arnica montana.

A'RNIM, ELIZABETH VON, better known as Bettina, wife of Ludwig Achim von Arnim (q.v.), was born in 1785 at Frankfort-on-the-Main. From her childhood excitable and eccentric, an early and profound impression was made upon her mind by the suicide of her friend, the Canoness von Gunderode The next great event of her life was her devoted attachment to, and intimacy with Goethe, at that time a man of nearly sixty. Their correspondence, entitled *Goethe's Letters to a Child*, was published in 1835, and translated by Bettina into English. Her letters are poetical, graceful, and fascinating, though often careless and extravagant, and abound in graphic sketches of men of the time. Goethe turned many of these letters into verse. Bettina's later works were semi-political in their character, and like her earlier, full of fantastic beauty. She lived to a good old age, dying in 1859.

A'RNIM, KARL OTTO LUDWIG VON, a well-known writer of travels and other works, was born at Berlin 1779. After studying at Halle and Göttingen, he traveled at different times over the most of Europe, and was employed on the embassies at Stockholm and London. His *Flüchtige Bemerkungen eines flüchtigen Reisenden* (Passing Remarks by a Passing Traveler, 6 vols., Berl. 1837—1850), is recommended for its clear elegant style, as contrasted with the lumbering and involved writing of the 'Academic' school. A. also wrote in English *Napoleon's Conduct towards Prussia* (Lond. 1814), and published *German National Melodies*, with German and English text (Lond. 1816). He was the author of a play and several poems. He died in 1861.

A'RNIM, LUDWIG ACHIM VON, a fantastic but original German writer of romances, was born in Berlin, January 26, 1781. After devoting some years to the study of the physical sciences, he began his career as an imaginative author with *Ariel's Revelations*, a romance which, though based on the principles of the new poetic school which had then risen in Germany, indicated, nevertheless, that the author could strike out a way of his own. His travels through Germany afforded him an opportunity of catching the pecularities of popular life in its various provincial manifestations. He was especially interested in the old popular poetry, and stirred up among his countrymen a warmer sympathy for it by the publication, along with Clemens Brentand, of *The Boy's Wonderhorn* (Heidelberg, 1806—1808). In 1809 appeared the *Winter Garden*, a collection of novels; in 1810, the romance, entitled *The Poverty Riches, Guilt, and Repentance of the Countess Dolores;* in 1811 *Halle and Jerusalem, the Sports of a Student, and the Adventures of a Pilgrim*, in which last his humor took a very saucy turn. In 1817, he published the *Crown Guardians*, a work characterized by its originality, richness of fancy, and vivid potraitures. The later years of his life were spent partly in Berlin and partly at his estate near Dahme, where he died, Jan. 21, 1831.

A'RNO, next to the Tiber the most considerable river of Central Italy, rises on Mount Falterona, an offset of the Apennines, at an elevation of 4444 feet above the level of the sea, and 25 miles north of Arezzo. It flows through the deep fertile valley of Casentino, in a south-east direction; enters the richly cultivated plain of Arezzo, where it receives the water of the Chiana; and then flows in a north-west and north course through the upper valley of the A. (*Valdarno*), one of the most delicious parts of Tuscany; afterwards it receives the Sieve, its largest tributary, and turns its course toward the west, flowing past Florence, Empoli, and through the town of Pisa. The whole length of its course is about 140 miles. In old times, the embouchure of the A. was at Pisa; now it is about four or five miles distant, in lat. 43° 41′ N., and long. 10° 15′ E. It is navigable for barges as far up as Florence, but in the summer season even this frequently becomes impossible. The Italian poets speak of 'the golden A.;' but, in truth, its waters have mostly the unpleasant color of milk and coffee mixed together. The A. is noted for the rapid and destructive character of its inundations. The most memorable are those of September 1537, when the whole of the Valdarno was laid under water, which rose to the height of 8 feet in some parts of Florence; and 1740, the latter being caused by the long continuance of the sirocco, which completely melted the snows on the Apennines.

A'RNOLD, or ARNALD, OF BRESCIA, was a native of that town, and was distinguished by the success with which he contended against the corruptions of the clergy in the early part of the 12th c. He was educated in France under Abelard, and adopted the monastic life. By his preaching, the people of his native place were exasperated against their bishop, and the fermentation and insurrectionary spirit spread over a great part of the country, when he was cited before the second Lateran Council, and banished from Italy. He retired to France, but experienced the bitter hostility of St. Bernard, who denounced him as a violent enemy to the church. He thereupon took refuge in Zurich, where he settled for several years. Meanwhile his doctrines exerted a powerful influence in Rome, which ended in a general insurrection against the government, whereupon A. repaired thither, and endeavored to lead and direct the movement. He exhorted the people to organize a government similar to the ancient Roman republic, with its consuls, tribunes, and equestrian order. But they, provoked by the treachery and opposition of the papal party, and disunited among themselves, gave way to the grossest excesses. The city, indeed, continued for ten years in a state of agitation and disorder. Lucius II. was killed by the populace in an insurrection in 1145, and Eugenius III., to escape a similar fate, fled into France. These violent struggles were subdued by Pope Hadrian IV., who feeling the weakness of his temporal authority, turned to the spiritual, and resorted to the extreme measure of laying the city under excommunication, when A., whose party became discouraged, and fell to pieces, took refuge with certain influential friends in Campania. On the arrival of the emperor, Frederick I., for his coronation, in 1155, A. was arrested, brought to Rome, tried, hanged, his body burned, and the ashes thrown into the Tiber.

A'RNOLD, JOHANN, a miller of Neumark, who lived in the time of Frederick II. of Prussia, and gave rise to a remarkable legal process. He complained to the king that his landlord, by making a pond, had taken away water from the mill; that he (A.) had therefore refused to pay rent for the mill, of which he held a lease; but had been condemned to pay by the unanimous decisions of two legal courts. The king took up the case, and regarding as an oppression of the poor, reversed the decisions of the courts, dismissed his high-chancellor, imprisoned several other officers of justice, and gave orders that restitution should be made to the miller. Soon afterwards, the king died, and under Frederick William II. the case was more coolly investigated, when the result was, that the condemned chancellor and other official persons were exonerated from all blame in the matter, and the miller was recompensed by the state for loss of time and money.

A'RNOLD, MATTHEW, a living English poet, the eldest son of the late Dr. Arnold of Rugby, was born 24th December 1822, and educated at Winchester and Rugby. In 1840 he was elected scholar of Balliol College, Oxford; in 1844 he obtained the Newdigate prize; and in 1845 he was elected a fellow of Oriel College. In 1851 he was appointed one of Her Majesty's Inspectors of

British Schools. In 1857 he was elected Professor of Poetry at Oxford, and in 1859—1860 was sent to the continent by the English government as assistant to the Commissioners appointed to inquire into the state of education in France, Germany, and Holland. In 1865 he again visited the continent on a like mission. A. holds the honorary degrees of Edinburgh and Oxford, and Italian order.

Mr. A. was first known as a poet of classic taste and exquisite purity of imagination, but of late years he has almost exclusively betaken himself to prose. His chief productions in verse are *Poems* (1853), containing, among other fine pieces, *Sohrab and Rustum*, *Tristram and Yseult*, *Balder*, and *Merope* (1858), an attempt to naturalize in English literature the form of the Greek drama; and *New Poems* (1867). His prose writings are growing numerous. Among the chief are his lectures on *Translating Homer* (1861); his *Report on Education in France, Germany, and Holland* (1861); *A French Eton or Middle-class Education and the State* (1864); *Essays on Criticism* (1865); *Lectures on the Study of Celtic Literature* (1867); *Schools and Universities of the Continent* (1868); *Culture and Anarchy, an Essay in Political and Social Criticism* (1869); and *Higher Schools and Universities in Germany* (1874). In *St. Paul and Protestantism* (1871), and still more in *Literature and Dogma* (1872), he startled the public by his piercing and audacious application of literary criticism to religion. In 1875, he published *God and the Bible;* in 1877, *Last Essays on Church and Religion;* in 1879, *Mixed Essays;* and in 1882, *Irish Essays, and Others*. He has delivered interesting public addresses.

A'RNOLD, Thomas, D.D., head-master of Rugby School, was born June 13, 1795, at West Cowes, in the Isle of Wight. In 1807 he was sent to the public school at Winchester, where he remained till 1811, when he was elected a scholar of Corpus Christi College, Oxford. In 1815 he was elected fellow of Oriel College, and he gained the chancellor's prize for the two university essays, Latin and English, for the years 1815 and 1817. As a boy, we are told he was shy and retired; as a youth, disputatious, and somewhat bold and unsettled in opinions; but before he left Oriel, he had won the good opinion of a college which at that time boasted of such names as Copleston, Davison, Whately, Keble, Hawkins, and Hampden. He took deacon's orders in 1818, and the year after settled at Laleham, near Staines, where he occupied himself in preparing pupils for the university. In 1820 he married Mary, youngest daugher of the Rev. John Penrose, rector of Fledborough, in Nottinghamshire, and sister of one of his earliest school and college friends, Trevenen Penrose. About ten years were spent in this quiet and comparatively obscure life; he was preparing himself for the arduous post he afterwards occupied; he was maturing his opinions, and he had also already commenced his great literary undertaking, the *History of Rome*.

It was a period which he himself was accustomed to look back upon with some feeling of regret. His letters at this epoch reveal to us a fine ambitious spirit bending cheerfully to the task of tuition, more useful than glorious; they also prove to us that those views of a religious and political character which afterwards distinguished him, were being matured in the privacy of Laleham. 'I have long had in my mind,' he thus writes to a Mr. Blackstone, 'a work on Christian politics, or the application of the Gospel to the state of man as a citizen, in which the whole question of a religious establishment, and the education proper for Christian members of a Christian commonwealth, would naturally find a place. It would embrace also an historical sketch of the pretended conversion of the kingdoms of the world to the kingdom of Christ in the 4th and 5th centuries, which I look upon as one of the greatest *tours d'adresse* that Satan ever played. . . . . I mean that by inducing kings and nations to conform nominally to Christianity, and thus to get into their hands the direction of Christian society, he has in a great measure succeeded in keeping out the peculiar principles of that society from any extended sphere of operation, and insuring the ascendency of his own.' He here expresses, in a somewhat sportive and familiar manner, the great principle which he afterwards contended for with so much earnestness, that there should be a Christian laity, a Christian legislature, a Christian government; by which he did not mean a system of laws or government formed in the manner of the Puritans, out of texts of Scripture, rashly applied, but imbued with the *spirit* of the New Testament and of the teaching of Christ.

It was at Laleham also that A. first became acquainted with Niebuhr's *History of Rome*. This was an era in his life. It produced a revolution in his historical views, and his own *History of Rome* became modelled almost too faithfully on that of the great German.

From Laleham he was called to undertake the arduous duties of the head-mastership of Rugby School. On these he entered August 1828. Our space does not permit us to dwell upon the details of that system of public education which he perhaps carried to its perfection. We can only take notice of the high tone, moral and religious, which he preserved amongst the boys. He had the tact to make himself loved and feared. He guided with great dexterity the *public opinion of the school*. 'In the higher forms,' says his biographer, 'any attempt at further proof of an assertion was immediately checked. "If you say so, that is quite enough; of course I believe your word;" and there grew up in consequence a general feeling that it was a shame to tell A. a lie—he always believes one.' On one occasion, when he had been compelled to send away several boys, he said: 'It is *not* necessary that this should be a school of 300, or 100, or of 50 boys, but it *is* necessary that it should be a school of Christian gentlemen.'

But the school was very far from occupying the whole energies of A. The *History of Rome* went on; he took part in all the great questions of the day, political and theological. In politics he was a Whig, without being fettered—as we need hardly say—by the ties of party. In the theological discussions of the day, he was chiefly distinguished by the broad views he had adopted of the nature of a Christian church. As already intimated, it was his leading idea that a *Christian people* and a *Christian church* ought to be synonymous expressions. He would never tolerate that use of the word church which limited it to the clergy, or which implied in the clergy any peculiar sacredness, or any traces of mediatorial function. The *priest* was unknown to him in the Christian community; this placed him at once in antagonism to the High Church party; and even clergymen of the Low Church complained that he did not set sufficient value on their sacred order. But all men, of whatever party, admitted and admired the zeal with which he taught that the full spirit of Christianity should permeate the whole of our civil or political life. If he seemed to lower the altitude of the clergy, it was only because he would raise the general level of the laity. He was convinced that 'the founders of our present constitution in church and state did truly consider them to be identical, the Christian nation of England to be the church of England; the head of that nation to be, for that very reason, the head of the church.' It may be doubted whether this is quite historically correct; but it certainly presents a noble theory to the imagination.

In domestic life, Dr. A. was most happy; here he was distinguished by unfailing cheerfulness and amiability. In 1832, he purchased Fox How, a small estate between Rydal and Ambleside, and it was in this charming retreat that he enjoyed in the vacations, amongst the family circle, his own uninterrupted studies. Fox How has become a classical spot to every tourist.

For a brief time he held a place in the senate of the London University; he resigned the seat on finding that he could not introduce some measures which he had at heart. In the year 1842, he received from Lord Melbourne the offer of the Regius Professorship of Modern History at Oxford. This appointment he accepted with peculiar gratification. He delivered some introductory lectures, which were heard with enthusiastic interest; and it was his intention, on his retirement frem Rugby, to enter with zeal upon the duties of his professorship. But this and all other literary enterprises were cut short by a sudden and most painful death. The last vacation was at hand, the journey to Fox How was to be taken in a few days, when he was seized with a fatal attack of spasm of the heart. Few biographies end more abruptly or more mournfully; but the sufferer met his death with perfect fortitude and the full hope of a Christian. He died June 12, 1842. His principal works are *five volumes of sermons;* the *History of Rome* (3 vols.), broken off by his death at the end of the second Punic war, and an *edition of Thucydides*. See *Life and Correspondence of A.*, by Rev. A. P. Stanley, afterwards Dean of Westminster (1845; 12th edition, with additions, in 1881).

A'RNOTT, Neil, M. D., was born in 1788 at Arbroath. He was educated at the Grammar School of Aberdeen, and subsequently at Marischal College in the same city, where he had the advantage of studying natural philosophy under Professor Copland, one of the most successful expounders of mechanical science then living. A. made choice of medicine as a profession; and after going through the medical course at Aberdeen, he went to London 1806, where he became the pupil of Sir Everard Home, surgeon of St. George's Hospital. After spending some years in the naval service of the East India Company, he settled in 1811 as a medical practitioner in London. In addition to his extensive general practice, A. was appointed, in 1815, physician to the French embassy, and afterwards to the Spanish embassy. In 1836, Dr. A. was appointed a member of the senate of the University of London, then established by government. He was afterwards elected a fellow of the Royal Society, and then of the Geological Society. In 1837, he was named a Physician Extraordinary to the Queen.

In 1823—1824, Dr. A. was induced to deliver a course of lectures on natural philosophy in its applications to medicine. The substance of these lectures formed the basis of his *Elements of Physics, or Natural Philosophy, General and Medical*, published in 1827. Of numerous new applications of physical science to medical practice, and to the alleviation of human suffering in general, invented by Dr. A., may be mentioned the Water-bed (q. v.). But it is in connection with improvements in the warming

and ventilation of houses that the name of Dr. A. is most extensively known. In 1838, he published a treatise on *Warming and Ventilating;* and in 1855, another *On the Smokeless Fire-place, Chimney-valves,* &c. The 'Arnott Stove' and the 'Arnott Ventilator,' which, with characteristic philanthropy and disinterestedness, Dr. A. refrained from patenting, are noticed under WARMING AND VENTILATION. In 1861, he published *A Survey of Human Progress,* full of interesting and enlightened views on improvement generally. In 1864, appeared Part I. of the long-promised revision of the *Physics;* this was followed by Part II., which contains the subjects of Optics and Astronomy for the first time, and also an interesting supplement entitled *Arithmetic Simplified.* A.'s last publication was a small work on national education. He died in London, March 2, 1874. In the year 1859 he expressed a wish to a friend to make a contribution to Marischal College, Aberdeen, in aid of a course of lectures on natural philosophy, to be available to young men not regular students of the university. The union of the two Aberdeen Colleges interfered with the project; and a few years later he gave £1000 to the united university, to provide a scholarship in natural philosophy. This was followed by the same gift to each of the other three Scottish universities, and for Aberdeen, a further gift of £500 to the Mechanic's Institution. In London, Mrs. Arnott had already given £1000 to each of two colleges for young ladies, to constitute scholarships for natural philosophy. In 1872, Dr. A. intimated through Dr. Lyon Playfair that he meant to repeat his gift to the Scottish universities; but, in consequence of a fall, his faculties had been permanently impaired, and he was no longer capable of continued thought or decision. An attack of cold in 1858 had permanently affected his hearing; but otherwise, his last years were characterized by his usual flow of spirits. A.'s genius showed itself in a very unusual combination of inventive power with the art of popular exposition. His bent of mind was strongly towards human improvement in every department of thought and conduct.

ARNO'TTO, ARNA'TTO, ANNO'TTA, ANNA'TTO, or ROUCOU, also known on the continent of Europe by the name of ORLEAN, is a red coloring matter, which is obtained in South America and the West Indies from the reddish pulp surrounding the seeds of the Arnotto-tree (*Bixa orellana*) by washing, maceration, fermentation, and subsequent evaporation. It appears in commerce in cakes or balls of 2—4 lbs. weight, wrapped up in leaves, externally brown, internally of a pale blood-red or yellowish-red color, and which have a peculiar animal smell and an astringent taste. Pure A. seldom appears in the market. It is obtained by the mere rubbing off and drying of the red pulpy pellicle which covers the seed; but that which is thus obtained is very pure, and occurs in small round or angular lozenges. The Indians rub this coloring matter into the skin of their whole body, thus intending both to adorn themselves, and to obtain protection against the bites of mosquitoes. Amongst us, A. is used in medicine for coloring plasters, ointments, &c.; and to a considerable extent by farmers for giving a rich color to cheese. It is also used in dyeing, although it does not produce a durable color. It is employed to impart an orange tint to simple yellows. It is an ingredient in some varnishes. It dissolves in alkalies, producing a brown solution, from which it is precipitated yellow by acids. It imparts little color to water, but dissolves in alcohol; alum and sugar of lead throw down a brick-red precipitate from the alcoholic solution. In South America, A. is very extensively mixed with chocolate, not only for the sake of the color, but also for the improvement of the flavor.—The genus *Bixa* belongs to the natural order FLACOURTIACEÆ (q. v.), and is distinguished by complete flowers with simple stigma, a hispid calyx of five sepals, and a two-valved capsule. The A. shrub is a native of tropical America, but has been introduced into other warm countries. It grows to the height of 7—8 feet, and has heart-shaped pointed leaves, and large flowers of a peach-blossom color, which grow in loose clusters at the extremities of the branches. The capsules are oblong, and contain 30—40 seeds enveloped in red pulp (the A.). The seeds are said to be cordial, astringent, and febrifugal. The roots are used in broth. They have the properties of A. in an inferior degree.

A'RNSBERG, one of the three departments of the Prussian province of Westphalia (q. v.), having an area of 2900 square miles, and a population (1880) of 1,068,141. With the exception of the valley of the Lippe, the whole department belongs to the highlands of the Lower Rhine. Only in a few of the valleys is there good arable soil; on the other hand there is a great deal of good timber, more than a third of the whole area consisting of forests. But the principal resources of the district are its subterranean riches, in coal, iron, lead, silver, &c. Its abundant water-power has also led to the establishment of numerous factories, mills, &c. ARNSBERG, the chief town of the department, is situated on the Rhur, 44 miles south-east from Münster; pop. (1880) 6131. It has several manufactures, such as linen, broadcloth, potash, &c. In the orchard below the castle is still pointed out the spot where the famous Femgerichte (q. v.) of A. was held.

A'RNSTADT, the chief town in the principality of Schwarzburg-Sonderhausen, is situated in a picturesque country on the banks of the Gera, twelve miles south of Erfurt, and has a pop. (1880) of 10,516. It is one of the oldest Thuringian cities, its existence being traceable as far back as 704 A.D. Formerly it was the chief emporium for the trade in fruit and timber between the fertile lowlands and the Thuringian forest region, but is now a manufacturing town, employing a very considerable number of hands in weaving, glove-making, brewing, pottery, &c. A rich vein of rock-salt has been recently discovered in the neighborhood of the town, and a new copper-mine opened.

AROKSZALLA'S, a town of Jazygia, Hungary, 44 miles north-east from Pesth, and an entrepôt for the trade between that city and Upper Hungary. It stands in a plain on the Gyöngöys Patak, a small stream, by which it is almost encircled. The surrounding country is fertile, and affords excellent pasture. Pop. (1880) 12,794.

ARO'MA, a term sometimes employed to designate those substances the extremely minute particles of which are supposed to affect the organ of smell so as to produce particular odors, and frequently as synonymous with *odor*. The particles diffused through the atmosphere, and affecting the olfactory nerves—if the theory of particles of matter so diffused be correct—must indeed be extremely minute, as odoriferous substances such as musk, the smell of which is felt at a considerable distance, continue to diffuse their odor, and according to this theory, these particles, for years, without sensible diminution of weight. See NOSE, &c. The term A. is usually employed only with reference to particular kinds of odor, not easily defined or distinguished in words. Thus, we speak of the *A.* of roast-meat, and of the *A.* or *aromatic* smell of hyssop, mint, and other plants. Aromatic smells are very characteristic of some natural orders of plants, as *Labiatæ* (Mint, &c.) and *Compositæ* (Milfoil, &c.). They have been very generally supposed to depend upon essential oils, but resins are often equally aromatic.

AROMA'TIC VINEGAR differs from ordinary vinegar (which is acetic acid diluted with water) in containing certain essential oils which impart an agreeable fragrance. It is generally prepared by adding the oils of cloves, lavender, rosemary, and *Acorus Calamus* (and sometimes camphor) to crystallizable acetic acid, or by distilling the acetate of copper in an earthen retort and receiver, and treating the liquid which passes over with the fragrant oils mentioned above. A. V. is a very pleasant and powerful perfume; it is very volatile, and when snuffed up by the nostrils, is a powerful excitant, and hence is serviceable in fainting, languor, headache, and nervous debility. A. V. is generally placed on a sponge in a smelling-bottle or in a *vinaigrette;* it can also be purchased as a liquid in phials; and a drop or two allowed to evaporate into a sick-room, overpowers, but does not destroy any unpleasant odor. The liquid must, however, be cautiously dealt with, as it is a very corrosive substance.

AROMA'TICS constitute a class of medicines, which owe their properties to the essential oils, to benzoic and cinnamic acids, to volatile products of distillation, or to odorous glandular secretions. The plants that contribute to this class of medicines are those which yield essences, camphor, or odorous resins, and amongst the families which yield the most important aromatics are the Labiatæ, Umbelliferæ, Lauraceæ, Myrtaceæ, Aurantiaceæ, Coniferæ, Scitamineæ, Orchideæ, &c. In some cases, the aromatic matter is diffused throughout all parts of the plant, but it is usually condensed in particular organs, such as the root, in the case of ginger and galanga; or the bark, in the case of cinnamon, canella, and cascarella; or the flowers, as in the case of cloves; or the fruit, as in the case of anise and vanilla; or the wood, as in the case of sandal-wood and aloes-wood; or the leaves, as in the case of most of the Labiatæ, Umbelliferæ, &c.

Aromatics may be arranged in the following sub-classes: (1.) Those in which the active principle is an essential oil, as the oil of thyme, lavender, cajeput. neroli, fennel, &c. (2.) Those containing camphor, or an allied body, such as artificial camphor obtained from turpentine. (3.) Bitter aromatics, in which there is a mixture of a bitter principle and an essential oil, as chamomile, tansy, wormwood, &c. These are tonics and vermifuges. (4.) Those of which musk is the type, such as civet and amber; and certain plants with a musk-like odor, such as *Malva moscata, Mimulus moschatus,* and *Hibiscus abelmoschus.* (5.) Those containing a fragrant resin, as benzoin, myrrh, olibanum, storax, and the balsams of Peru and Tolu, which possess stimulant properties. (6.) Lastly, those which are artificially produced by destructive distillation, as tar, creosote, benzol, or the various empyreumatic oils.

As a general rule, these substances act as diffusible stimulants of more or less power, and as anti-spasmodics, while those in which a bitter principle is present act as vermifuges and tonics.

The whole class were formerly regarded as possessing disinfectant and antiseptic properties, and there is no doubt that some, as coal-tar, creosote, &c., strongly possess this property. In this country we usually associate aromatics with other medicines; but in France aromatic infusion, lotions, baths, &c., are much prescribed. It will suffice to give the composition of aromatic infusion as an illustration. Take equal parts of the leaves of sage, ordinary and lemon thyme, hyssop, origanum, wormwood, and mint. Infuse 50 parts of these leaves in 100 parts of boiling water.

ARONIA. See CRATÆGUS.

AROO'STOOK, a river which, rising in the north of Maine, falls into the St. John in New Brunswick, after a course of about 120 miles. It possesses a historical interest from its connection with the long-agitated question of the north-east boundary between British America and the United States.

ARPAD, the national hero of Hungary, was the son of Amos, the leader under whom the Magyars first gained a footing in Hungary. He was chosen duke on his father's death in 889, and by a course of incessant and mostly successful warfare with the Bulgarians, Wallachians, Moravians, &c., extended the first conquests of the Magyars on all sides. He also made more than one successful incursion into Italy about 900, and returned laden with booty. He died in 907, leaving his son in possession of the supreme command. The A. dynasty became extinct in the male line with Andreas III. in 1301. A. yet lives in the popular songs of the country, and his history, even in the oldest chronicles, is mixed up with a deal of legendary matter.

ARPE'GGIO, in Music, a chord of which the notes are given, not contemporaneously, but in succession. From any one chord, several forms of A. may be produced. Bass-chords thus treated form an *Alberti Bass*, so named from Domenico Alberti (1730—1740), a popular singer and player, who often played the bass in this style.

ARPENT is the old French land-measure, corresponding to our acre. The name is from the ancient Gallic *aripennis*, which was identified by Columella with the Roman *actus*, or half *jugerum*. Ordinarily an A. may be reckoned as five-sixths of an acre; but the precise comparative value of the three most in use will be seen in the following table:

	French Hectares.
Acre, English imperial or statute	0·40466
Arpent, of Paris	0·32400
" d'ordonnance	0·48400
" common	0·40000

ARPI'NO, the *Arpinum* of the ancients, a town of Southern Italy, the birthplace of Cicero and Caius Marius, is situated in the province of Caserta, 65 miles north by east of Naples. It stands on the lower ridge of a lofty hill, some 6 miles to the left of the river Garigliano, the ancient Liris. The old town, in early Roman times, was built on the top of a steep rock, forming part of the territory of the Volscians. Many remains of the ancient structures are still to be seen, especially acyclopean wall, which runs along the northern brow of the hill occupied by the present town, and extending to the ancient citadel. About the year 188 B.C., the citizens received the freedom of the city of Rome, with all its privileges, and Arpinum, during the later years of the republic, was a flourishing municipal town.

The population of A. in 1872 was 5836. Manufactures of woollen cloth, parchment, paper, and leather are carried on. The town has a charming appearance from the highly picturesque character of the surrounding woods and mountains. Iron, white marble, variegated red marble, and marble of a yellowish color, are got in mines and quarries in the neighborhood.

A'RQUA, a village in the province of Padua, Venice, 12 miles south-west of Padua, in the heart of the Euganean Hills. Pop. 1200. Petrarch's furniture is still preserved in the house in which he died here (July 18, 1374), and his monument of red marble is to be seen in the churchyard.

A'RQUEBUS, or HA'RQUEBUS, was the first form of hand-gun which could fairly be compared with the modern musket. Those of earlier date were fired by applying a match by hand to the touch-hole; but about the time of the battle of Morat, in 1476, guns were used having a contrivance suggested by the trigger of the arbalest or cross-bow, by which the burning match could be applied with more quickness and certainty. Such a gun was the A. Many of the yeomen of the guard were armed with this weapon, on the first formation of that corps in 1485. The A. being fired from the chest, with the butt in a right line with the barrel, it was difficult to bring the eye down low enough to take good aim; but the Germans soon introduced an improvement by giving a hooked form to the butt, which elevated the barrel; and the A. then obtained the name of the *haquebut*. Soldiers armed with these two kinds of weapon were designated *arquebusiers* and *haquebutters*—the former were common in the English army in the time of Richard III., the latter in that of Henry VIII.

Arquebusier.

ARRACA'CHA (*Arracacha esculenta*), a plant of the natural order *Umbelliferæ*, a native of the elevated table-lands in the neighborhood of Santa Fe de Bogota and Caraccas, and of regions of similar climate in other parts of tropical America. It is much cultivated in its native country for its roots, which are used as an esculent. The root divides into a number of parts, which resemble cows' horns or large carrots. When boiled, they are firm and tender, with a flavor not so strong as that of a parsnip. The plant is very like hemlock, and has a similar heavy smell. Humboldt, indeed, referred to the genus *Conium* (Hemlock), but it has since been made the type of a new genus. The flowers are in compound umbels, and are of a dull purple color. The A. was at one time very strongly recommended as a substitute for potatoes; it was introduced into Britain through the exertions of the Horticultural Society, and its cultivation perseveringly attempted; but it has been found unsuitable to the climate of Britain and other parts of Europe, where it has been tried, perishing on the approach of the frosts of winter without having perfected its roots. The dry weather of summer is also unfavorable to it. The climate of the south of Ireland resembles that of its native regions more than any other in the British Islands. It seems to require a very regular temperature and constant moisture. There are probably some parts of the British colonies in which the A. would be found a very valuable plant. In deep loose soils, it yields a great produce. It is generally propagated, like skirret, by offshoots from the crown of the root. By rasping the root and washing, a starch similar to arrow-root, is obtained.—There is another species of the same genus, *A. moschata*, a native of the same regions, the root of which is uneatable.

Arracacha.

ARRA'CK, RACK, or RAKI, is the East Indian name for all sorts of distilled spirituous liquors, but chiefly to that procured from toddy or the fermented juice of the cocoa and other palms, and from rice. The palms in other tropical countries furnish a fermented beverage similar to the toddy of India, and in a few instances also it is distilled, but arrack essentially belongs to India and the adjacent countries. The cocoa-nut palm (*Cocos nucifera*) is a chief source of toddy or palm wine, and is obtained from trees ranging from twelve to sixteen years old, or in fact at the period when they begin to show the first indication of flowering. After the flowering shoot or spadix enveloped in its spathe is pretty well advanced, and the latter is about to open, the toddy-man climbs the tree and cuts off the tip of the flower-shoot; he next ties a ligature round the stalk at the base of the spadix, and with a small cudgel he beats the flower-shoot and bruises it.

This he does daily for a fortnight, and if the tree is in good condition, a considerable quantity of a saccharine juice flows from the cut apex of the flower-shoot, and is caught in a pot fixed conveniently for the purpose, and emptied every day. It flows freely for fifteen or sixteen days, and less freely day by day for another month or more; a slice has to be removed from the top of the shoot very frequently. The juice rapidly ferments, and in four days is usually sour: previous to that it is a favorite drink known in India by the natives as callu, and to the Europeans as toddy. When turning sour, it is distilled and converted into A., known better to the Hindus by the name of Naril, and by the Cingalese as Pol or Nawasi. A similar spirit is made pretty largely from the magnificent fan-leaf palm, *Borassus flabelliformis*, and also from the so-called date-sugar palm, *Areuga saccharifera*. Large quantities of arrack are made from fermented rice prepared as malt—both in India, Ceylon, and Batavia; in the last mentioned place, sugar and molasses are also added to the rice.

It is probable that the use of arrack is more widely diffused among the human race than the produce of the vine (wine and brandy) and of barley (whisky, beer). The date-palm of the Sahara, the oil-palm of West Africa, and the cocoa-nut palm of the Pacific Islands are made to yield it.

The unscientific method of preparing these alcoholic spirits renders them generally very distasteful to European taste, the process of rectification being rarely if ever employed. Some carefully prepared samples of great age, however, find favor, and are used in making punch and other drinks, not only in India and Java, but small quantities also find their way to Britain, for the gratifi-

cation of palates trained in India. The cocoa-nut tree is especially valuable for this industry, because it bears twelve times in the year after it once begins, and continues to do so for as much as forty years. It is the rule, therefore, to prevent undue exhaustion of so valuable a tree, to discontinue the collection of juice at intervals, and allow the natural process of fruit-bearing to go on: in this way, it is usual to divide the year between the two crops. Of late years a considerable amount of rum has been produced in the East Indies from the sugar-cane, and the molasses yielded by it. This is often called arrack by the natives, and leads to errors as to the statistics of the latter material. The word Saki, used by the Japanese for rice spirit, seems only an alteration of *Raki* or arrack. An imitation A. is prepared by dissolving benzoic acid in rum, in the proportion of 20 grains of the former to 2 pounds of the latter.

A'RRAGONITE, a mineral essentially consisting of carbonate of lime, and so agreeing in chemical composition with calcareous spar (q. v.), but differing from it in the form of its crystals, of which the primary form is a rhombic prism with angles of 116° 16′ and 63° 44′, the secondary forms being generally prismatic and pyramidal. The effects of heat on them shows another difference, A. being reduced to powder by a heat in which calcareous spar remains unchanged. Such differences between minerals of the same chemical composition appeared very improbable, and when Stromeyer, in 1813, detected the presence of a little carbonate of strontia in A., they were immediately ascribed to this as their cause; but it has since been shown not only that the quantity of strontia is very small, variable, and therefore to be regarded as accidental, but also that the differences between the two minerals may be accounted for by difference of temperature when crystallization was taking place. A. appears to be the product of crystallization taking place at a higher temperature than that in which calcareous spar is produced; and accordingly it is frequent in volcanic districts and in the neighborhood of hot springs, as at Carlsbad. It is frequently found in trap-rocks, as in Scotland. It derives its name from the province of Aragon in Spain. It sometimes occurs stalactitic. Its crystals are sometimes prisms shortened into tables, sometimes they are lengthened into needles. Twin crystal (*macles*) are very common. *Satin Spar* is a variety of it, in which the crystals are of a fine fibrous silky appearance, and combined together into a compact mass. *Flos ferri* (i. e., flower of iron) is a name given to a coralloidal variety which sometimes occurs in iron mines.

A'RRAH, a town in the district of Shahabad and the presidency of Bengal, in lat. 25° 31′ N., and long. 84° 43′ E. It is situated in a fertile country, and contains, according to the census of 1871, a pop. of 39,386. It is on the route between Dinapore and Ghazeepore, 25 miles W. of the former, and 75 E. of the latter. During the mutiny of 1857, A. became in variety and intensity of interest second only to Cawnpore, Delhi, and Lucknow, connected as it was with a heroic defence, a heavy disaster, and a brilliant victory. The defence was that of an isolated house, for eight days, against 3000 sepoys with 2 field-pieces, the garrison consisting of less than 20 whites, all civilians, and 50 Sikhs, whose fidelity perhaps was doubtful till proved by trial. The disaster was the nocturnal surprise in the jungle of a detachment almost entirely European, sent to the relief of the beleaguered dwelling—the loss having been 290 out of 415. The victory was won by a force of 172 men, 12 of them mounted volunteers, and 3 guns, over a host numbering nearly 20 to 1. In fact, A., happily with the exception of the cold-blooded massacre of women and children, presented, in miniature, nearly all the phases of the most formidable and eventful insurrection on record. For a detailed account of these events, see *Chambers's History of the Indian Revolt*.

ARRAIGN'MENT, in the practice of the criminal law in England, means calling a prisoner by his name to the bar of the court to answer the matter charged upon him in the indictment. And having the presumption of innocence in his favor, it is the law, and so laid down in the most ancient books, that, though charged upon an indictment of the highest nature, he is entitled to stand at the bar in the form and in the garb of a free man, without irons or any manner of shackles or bonds, unless there be evident danger of his escape, or of violence at his hands. When arraigned on the charge of treason or felony, the prisoner is called upon by name to hold up his hand, by which he is held to confess his identity with the person charged. This form, however, is not an essential part of the proceedings at the trial, and it is sufficient for the prisoner, when arraigned, to confess his identity by verbal admission or otherwise. When thus duly arraigned, the indictment is distinctly read over to the accused in the English tongue, and he then either confesses the fact—that is, admits his guilt—or he puts himself upon his trial by a plea of *Not guilty*. Formerly, one of the incidents of the A. was the prisoner *standing mute*, as it was called—that is, refraining from, or refusing, a direct answer to the indictment; in which case the court proceeded to inquire whether the silence was of malice on the part of the prisoner, or was produced by the visitation of God, and to deal with him accordingly. But by the 7 and 8 Geo. IV. c. 28, s. 2, it is enacted that where a prisoner shall stand mute of malice, it shall be lawful for the court to order the proper officer to enter a plea of 'Not guilty,' on which the trial shall proceed, as if the plea had been actually pleaded by the prisoner himself. Where there is reason to doubt, however, that the prisoner standing mute is sane or not, a jury consisting of any twelve persons who may happen to be present is forthwith charged to inquire whether he has intellect enough to plead and to understand the course of the proceedings. If they find the affirmative, the plea of 'Not guilty' is entered, and the trial goes on; but if the negative, the insane person will be ordered by the court to be kept in strict custody during Her Majesty's pleasure, according to the 39 and 40 Geo. III. c. 94, s. 2.

By 19 and 20 Vict. c. 16, facilities are provided for the trial of prisoners in the Central Criminal Court, although the offence may have been committed out of the jurisdiction of that tribunal, and it directs the A. to take place in the ordinary form.

In the Scotch criminal law, the expression *Calling the Diet* corresponds to A. The prisoner is called upon by name by the presiding judge to attend to the indictment against him, which is read aloud by the clerk, and the prisoner is then required to plead, which he does, as in England, by a plea of 'Guilty' or of 'Not guilty;' in the event of which latter, the trial proceeds—the prisoner, either by himself or by his counsel, having always the last word before the court and before the jury. In this respect, it is only so in England in some cases.

According to Sir Matthew Hale, the term A. is derived from *arraisoner, ad rationem ponere*, to call to account or answer, which in ancient French law would be *ad-resoner*, or, abbreviated, *a-resner*. See TRIAL, INDICTMENT, INFORMATION, PROSECUTION, PLEA, VERDICT, NOT PROVEN.

A'RRAN, an island in the mouth of the Firth of Clyde, Scotland, about 5 miles south-west of Bute, 13 west of Ayrshire, and 4 east of Cantire, from which it is separated by Kilbrennan Sound. It is of an oval form, about 20 miles long and 12 broad; area, 165 sq. miles, about 15,000 acres, or a seventh part, being cultivated. Pop. (1881) 4730. The general aspect of A. is mountainous and heathy, and in the north, the jagged peaks are singularly grand. Around the coast is a low belt of ground, with lofty cliffs on the south and south-west, from which the country rises abruptly. The highest point is Goatfell (in Gaelic named *Gaoth Bheinn* or *Beinn Ghaoith*, 'Wind Mountain'), an obtuse pyramid, 2865 feet high, and a prominent feature of the island. From its sides slope the romantic glens of Rosa and Sannox, and at its base to the south-east opens Brodick Bay, at the head of which lay, until lately, Brodick village. The houses which composed it have now been removed, and a new village has sprung up on the opposite side of the bay, called Invercloy, where there is a spacious hotel. To the south of this, round a bluff headland, is Lamlash Bay, the chief harbor of A., and the best on the Firth of Clyde, sheltered by Holy Island, once the seat of a monastery. A picturesque mass of columnar basalt, 900 or 1000 feet high, succeeds. Further south lies Whiting Bay, near which are two cascades 100 and 50 feet high respectively. At the south-east point of A. is Kildonan Castle, opposite which is the small isle of Piadda, crowned by a light-house. Large caverns occur in the cliffs of the south and south-west coasts. In one of these, the 'King's Cave,' in the basaltic promontory of Druimodune, Robert the Bruce hid himself for some time. Shiskan Vale, opening into Druimodune Bay, is the most fertile part of A. Loch Ranza, a bay in the north end of A., runs a mile inland, and is a herring-fishing rendezvous. There is daily communication with A. by means of steam-boats from the Clyde, the ports touched at being Brodick, Lamlash, and Corrie.

The geology of A. is almost unique, and displays a greater succession of strata than any other part of the British Isles of equal extent. The south-east half of A. consists of Devonian sandstone, extending from the east coast 4 or 5 miles inland, and running south-west from Brodick beyond the center of the island; and of trap rocks and carboniferous strata, which occupy the middle and western portions. The north-west half consists of a central granite nucleus, including Goatfell, bordered on the west by a tract of mica-slate, and on the north, east, and south by lower Silurian rocks, which, again, have a run of Devonian sandstone on the east and south. Lias and oolite lie on the mica-slate. There are only rivulets in A., and one of them tumbles over a precipice 300 feet high. Some level parts in the south half of A. are fertile. The chief crops are oats and potatoes. Cattle, sheep, fish, and oats are exported. The greater part of A. belongs to the Duke of Hamilton, whose seat is Brodick Castle. A. forms part of the county of Bute, and contains two parishes. Many antiquities occur, such as cairns, unhewn obelisks, monumental stones, and Druidical circles. Several stone coffins were found in a cairn 200 feet in circumference. Loch Ranza Castle, now in ruins, was once a residence of the Scots kings. See work by Landsborough and Bryce.

A'RRAN, SOUTH ISLES OF. These are three small islands lying N.E. and S.W. across the entrance to Galway Bay, about 4

miles off the W. coast of Ireland, and 27 west of Galway city. They form the barony of A., and give the title of Earl to the Gore family. Total area, 11,287 acres. The principal or west island, Inishmore, is 7 miles long and 2 broad; Inishmaan, or 'Middle Isle,' comes next; and then Inishere to the S.E. Pop. in 1871, 3050, of which number 2122 inhabited Inishmore, 433 Inishmaan, and 495 Inishere. Of the total pop. all but 57 were Roman Catholics; 504 could read and write, 143 could read only, and the rest were illiterate. The islands consist of the carboniferous limestone of the bed of Galway Bay, and rise to the height of 100 to 200 feet on the west side, ending in cliffs facing the Atlantic. Most of the land is rudely cultivated. The chief crops are rye, oats, and potatoes. Most of the inhabitants engage in fishing; and the *corragh* or wicker-work skiff is still to be seen here. They are subject to famines from parching rainless west winds in August destroying the potato-crop. These islands contained at one time 20 churches and monasteries. Inishmore was the center of these, still known as Aran-na-naomh, or 'Arran of the Saints.' Many pilgrims still visit the old shrines and relics scattered through the islands. St. Kenanach Church, built in the 7th c., still exists, all but its stone roof, as well as the stone oratories and little bee-hive stone huts of the monks of the 6th and and 7th centuries. There are nine circular cyclopean fortresses of unhewn uncemented stones (portions of the walls still being 20 feet high), supposed to have been built in the 1st c. by the Fir-Bolg or Belgæ. The largest of these, Dun-Aengus, on a cliff in Inishmore, 220 feet high, is one of the most magnificent barbaric monuments in Europe.

ARRA'NGING, a term in Music which means the adapting of a piece of music so as to be performed on an instrument or instruments different from those for which it was originally composed, as when orchestral or vocal compositions are set for the piano-forte, or the reverse. An arrangement is often a mere lifeless transposition of the original, the only guiding principle being the mechanical possibility of performance. Of this kind are most of the piano-forte arrangements of the orchestral works of Mozart, Beethoven, &c.—partly from the arranger working merely for hire, and partly from a mistaken reverence for, and fear of altering, the original. It is different when an arranger, who thoroughly comprehends the spirit of the original, takes advantage of the peculiar means of expression afforded by the new form of presentation, to reproduce as much as possible the original effects. In this last respect, the arrangements of Franz Liszt have excelled all others, although in some cases he may have overstepped the boundary of propriety. See POT-POURRI and FANTASIA.

ARRAS (the ancient *Nemetacum*), a fortified town and capital of the department of Pas-de-Calais, as it was formerly of the province of Artois, in France. It is situated on the banks of the Scarpe, partly on an eminence, and partly on a plain, and consists of four divisions—the city, upper town, lower town, and citadel. It is a principal station on the French Northern Railway, distant from Paris by this route 134 miles, and from Brussels 97. Pop. (1872) 21,447; (1876) 26,764. The houses are of hewn stone, and in the lower town they are handsomely built and uniform; the streets straight and wide, set off with several fine squares, and many beautiful public buildings. Among the principal edifices are the Cathedral of Notre Dame, the residence of the prefect, the town-hall, the theater, and the public library.

A. ranks as a fortified town of the third class, its fortifications being the first that were constructed by the celebrated Vauban, according to his own system. It has been the seat of a bishop since 390 A.D., and two ecclesiastical councils have been held here—one in 1025, the other in 1490.

The corn-market of A. is the most important in the north of France. Its principal manufactures are iron-ware, woollen and cotton goods, hosiery, lace, pottery, and leather. Its trade, which is considerable, is in corn and flour, oil, wine and brandy, with the industrial products of the city.

It appears from the writings of Jerome that A. was remarkable for its woollen manufactures in his time; and afterwards, during the middle ages, it was famed for its tapestry; indeed, the name of the town was transferred to this article of manufacture, and *arras* was the name given in England to the richly figured hangings that adorned the halls of the kings and the barons.

In 1482, A. with Artois was ceded by the states of the Netherlands to Louis XI. of France; but the inhabitants having revolted, the king laid siege to the town, stormed it, and slew or expelled the people, whom he replaced by others brought from all parts of his dominions, ordering the city to be thenceforward called *Franchise*, to obliterate the very name of A. Soon afterwards (1493) it was ceded to Maximilian of Austria, and was possessed by the Spanish branch of the House of Hapsburg till 1640, when Louise XIII. of France took it after a long siege. By the treaty of the Pyrenees, it was finally ceded to France. A. suffered much in the time of the first French revolution, especially in the year 1793. Robespierre, the Terrorist, was a native of the town.

ARRA'YER, a title given to certain military officers in England in the early part of the 15th c. There were two of them in each county, sometimes called Commissaries of Musters. Their duties were set forth in an ordinance of Henry V., from the terms of which it appears that the arrayers were army inspectors, or, rather, militia inspectors, and in some sense precursors to the modern lords-lieutenant of counties.

ARRE'ST is a legal term used both in criminal and civil process. Criminal A. has already been sufficiently considered under the word APPREHEND (q. v.); and in civil procedure it may be simply defined to be the execution of a judicial or prerogative order, by which the liberty of the person may be restrained, and obedience to the law compelled. In the practice of the Court of Chancery, a defendant may be arrested for his contempt in not putting in his answer to a bill filed against him; and persons in all the superior courts may be arrested or attached for contempt. But in its ordinary legal acceptation A. is used to signify the enforcement of the judgment or order of a court of law, in order to satisfy justice. In the execution of such judgment, the party against whom it has been given may be arrested by means of a writ of *capias ad satisfaciendum*, or a *ca. sa.*, the purpose of which is to imprison the body of the debtor till he pays the debt or damages and costs. It is directed to the sheriff, commanding him to take the body of the debtor, and have him at Westminster immediately after execution thereof, to make the plaintiff satisfaction for his demand. This writ might, at one time, issue for a judgment debt of any amount; but by very recent statutes it was provided that it shall not issue in the case of a debt not exceeding £50, exclusive of costs; subject, however, to this proviso, that where such debt should appear to the judge trying the case (being a judge of the superior courts, or a barrister or attorney) to have been incurred under false pretenses, or with a fraudulent intent, or without a reasonable assurance of being able to pay or discharge the same, it shall be lawful for such judge to order the defendant to be taken and detained in execution upon such judgment, as if the act had not passed. This has since been adopted as the general law applicable to debts of any amount, and the abolition of imprisonment for debt was effected by the Debtors Act, 32 and 33 Vict. c. 62. No person, since 1869, can be imprisoned in England for making default in payment of a sum of money except in a few rare cases; such as when a court has ordered a sum of money to be paid, and it is not paid, and the debtor has since acquired the means to pay it, but refuses. In such cases, the judge may order the debtor to be committed to prison for six weeks or less until the money is paid. So that under this statute of 1869 none can be imprisoned for debt except for some special cause resembling fraud; and even then the imprisonment is limited to one year.

A defendant may also be arrested under a writ of *capias ad respondendum*, which issues as follows—where a plaintiff swears by affidavit that he has a cause of action against a defendant to the amount of £50 or upwards, or has sustained damage to that amount, that there is reason for believing that the defendant is about to quit the country, and that his absence will be detrimental to the plaintiff's action. An order is made by a judge, when the writ in question issues, directing the sheriff to arrest the defendant, who remains in custody until he has given security in respect of the plaintiff's demand. But this imprisonment cannot exceed six months. This proceeding is now regulated by the Absconding Debtors Act, 33 and 34 Vict. c. 76. Formerly, a defendant might be arrested on what is called mesne process, that is, process issuing at the commencement and during the progress of a suit; but by recent statutes, such A. is abolished, excepting as above explained.

Under such and similar authority, A. may be made of the person. There are classes, however, who are exempted by privilege from A.—thus, ambassadors and other diplomatic representatives of foreign courts; all members of the peerage, Scotch and Irish as well as English; all members of parliament; all persons connected with a cause before a court of justice, and attending in the course of it, such as witnesses, attorneys, and barristers—although in regard to the latter (barristers), it may be more correctly stated that they are entitled to the privilege only when attending the *superior courts;* and Mr. Archibold, in his Practice of the Common Law, refers to a case where a barrister was discharged who was arrested on circuit. The Queen may also, by her writ of protection, privilege any person in her service from A. during a year and a day, a prerogative, however, which is seldom, and, at the present day, scarcely ever exercised. In regard to parliamentary exemption from liability to civil process, however, the privilege does not preclude the process from issuing, it only protects the *person* of the member himself; for by 10 Geo. III. c. 50, it is enacted that any action or suit may at any time be brought against any person entitled to privilege of parliament; and that no such process shall at any time be impeached or delayed by pretence of any such privilege, except that the person of a member of the House of Commons shall not thereby be subjected to any arrest

or imprisonment. It is likewise provided by the Bankruptcy Act, 1869 (32 and 33 Vict. c. 71, s. 120), that if a person having privilege of parliament commits an act of bankruptcy, he may be dealt with as if he had no privilege. When he is adjudged a bankrupt, he will for one year following be deemed incapable of sitting in parliament unless he satisfy the creditors, and if he do not, then his seat becomes vacant. But now, as all persons, including peers, may be made bankrupt, none is liable to arrest unless he in some way thwart the proceedings in bankruptcy or abscond.

In the Scotch law, the word A. is not a technical term for process against the person. But see ARRESTMENT, and ARRESTMENT FOR FOUNDING JURISDICTION.

ARREST OF JUDGMENT, in the practice of the English common law courts, was an expedient after verdict on the part of an unsuccessful defendant, who endeavored to get the judgment arrested or withheld, on the ground that there was some error which vitiated the proceedings; and if this objection succeeded, it was fatal, no amendment being allowed after trial. But as this rule was found to be productive of great inconvenience, expense, and injustice, it has been considerably modified by the Common Law Procedure Act of 1852 (the 15 and 16 Vict. c. 76), under which, omitted facts or other matter may, by leave of the court, be suggested, by which the error may be corrected. See JUDGMENT.

ARRE'STMENT, in the Scotch law, is the legal process or diligence, as it is called, by means of which a debtor, where the debt is of a personal nature, is prohibited from making payment or delivery to his creditor until another debt or claim due to the person making use of the arrestment by such creditor is secured or paid. Thus, if A owes £100 to B, but B, again, is indebted to C, arrestment may be used by C in the hands of A; the effect of which is to prevent A paying to B until C's claim has been satisfied. A, the party in whose hands the arrestment is laid, is called the arrestee; C, the user of the arrestment, is called the arrester; and B, the arrester's debtor, is called the common debtor. The arrestment, however, has not the effect of transferring the debt or subject arrested. For that purpose, a particular form of action, called *an action of furthcoming*, is necessary, decree in which operates as a complete transfer to the arrester. This process may be sued out either by authority of the Court of Session or by that of an inferior judge. The procedure is now regulated by the 1 and 2 Vict. c. 114, ss. from 16 to 22 inclusive.

The corresponding English term is ATTACHMENT OF DEBTS (q. v.).

ARRESTMENT FOR FOUNDING JURISDICTION. This is a form of proceeding in the practice of the Scotch law, and it is of an extremely important nature, for, by means of it, a foreigner, or one beyond the jurisdiction of the courts of Scotland, who happens to have any property in that country, may be sued in the Scotch tribunals. It is a personal remedy, and the mode of procedure is thus: The summons (or declaration, as it would be called in England), which is executed by leaving a copy in the proper office in Edinburgh, contains in express terms a warrant to arrest *ad fundandam jurisdictionem;* and when served on the party having possession of the foreigner's property, such warrant has the effect of attaching it, so as to give the court jurisdiction over the foreigner himself. This manner of founding jurisdiction is said to have been borrowed by the Scotch from the lawyers of the Netherlands, and it can be traced back in the practice of the Scotch courts for upwards of a century. In a case, however, brought by appeal to the House of Lords from Scotland, an attempt was made to show, that for this mode of A. there was no sufficient authority in the law of that country, and it was represented to the House as a barbarous contrivance of comparatively recent introduction. But their lordships had no hesitation in affirming the judgment of the Court of Session. A like practice exists in London, called foreign attachment, but is peculiar to the city.

ARRESTMENT OF WAGES is supposed to exercise a baneful influence on some of the working-classes in Scotland, by putting them in the power of greedy and oppressive dealers, who, in the knowledge of the power they thus possess, are too ready to give credit to working-people, and thus encourage them in extravagance. It was the object of so much complaint in Glasgow, that a government inquiry was instituted into its operation in 1853. That inquiry developed a sad amount of extravagance and folly, but did not afford a hope that any mere alteration in the machinery of the law would remedy a deep-rooted social evil. Its most alarming features were found in the female manufacturing population, the younger of whom especially, led by avidity for fine clothes, were the victims of a powerful organization of dealers, on what is called the club-ticket system. It is not, however, allowed to arrest wages in summonses for small debts, i. e., under £12 Moreover the wages of all laborers and workpeople were declared by statute 33 and 34 Vict. c. 63, to be exempt from arrestment for debt, except where there was a surplus earned beyond 20*s.* per week. In England, wages cannot be attached for debt except in one or two exceptional cases.

A'RRHENATHE'RUM, a genus of Grasses, allied to *Holcus* (see SOFT-GRASS) and *Avena* (see OAT), and distinguished by a lax panicle, 2-flowered spikelets with two glumes, the lower floret having stamens only, and a long twisted awn above the base; the upper floret perfect, with a short straight bristle below the point.—The name A. is from the Greek *arrhen*, male, and *ather*, an awn. *A. avenaceum* (*Avena elatior* of Linnæus, also known as *Holcus avenaceus*) is a common grass in Britain. It is sometimes called OATLIKE GRASS, from the resemblance to the coarser kinds of oats in the general appearance of the panicle. In France, it is very much cultivated for fodder, and is often called FRENCH RYE-GRASS. It has, however, no affinity to the true Rye-grass (*Lolium*). It is a tall perennial grass, 2—3 feet high, becomes luxuriant early in the season, and continues long productive. It is, however, a rather coarse grass, and has a somewhat bitter saline taste; it is not so acceptable to cattle as many other grasses, and is therefore generally regarded by British agriculturalists as unworthy of cultivation on the best soils; but it is found suitable for some comparatively arid situations, and to form a coarse herbage under trees in plantations.—A variety or distinct species, differing from it in having a knotted or bulbous base to the stem, instead of a simple fibrous root, is called by some botanists *A. bulbosum*. It is also common in Britain, but is a very inferior grass, and owing to the character of its roots, difficult of extirpation from lands in which it appears as a weed.

Arrhenatherum: *a*, panicle, reduced; *b*, root and lower part of culm, reduced; *c*, a single spikelet, natural size.

ARRIA'NUS, FLAVIUS, a native of Nicomedia, in Bithynia, born about 100 A.D. He became a disciple of Epictetus, the Stoic philosopher, and, under his instructions, a warm advocate of that system. On bringing before the public the earliest products of his pen, the learned men of Athens were highly pleased with them, and honored him with the freedom of their city. A. had chosen Xenophon as his model of composition, and hence the Athenians called him the young Xenophon. In 124 A.D. he was introduced to the Emperor Hadrian in Greece, who conferred on him the freedom of the eternal city. He was appointed prefect of Cappadocia in the year 136. Under Antoninus Pius, the successor of Hadrian, he was promoted to the consulship. But some four years afterwards, he appears to have retired from public life, and devoted himself to literature in his native place. As the pupil and friend of Epictetus, he edited the Manual of Ethics (*Encheiridion*) left by his master, and wrote the *Lectures of Epictetus*, in eight books, of which only four have been preserved—to be had in Schweighäuser's *Philosophiæ Epictetæ Monumenta*, vol. iii. (Paris 1827). He wrote also *The Conversations of Epictetus*, a work which has been lost, except a few fragments. The most important work by A. is the *Anabasis of Alexander*, or *History of the Campaigns of Alexander the Great*, which has come down to us entire, all but a gap in the 12th chapter of the 7th book. This book is our chief authority on the subject of which it treats, and is a work of great value. In close connection with it, A. wrote his *Indian History*, giving an account of the people of India. Other writings by A., his letter to Hadrian on *A Voyage round the Coasts of the Euxine Sea*, and another *A Voyage round the Coasts of the Red Sea*, are valuable with regard to ancient geography. There is still another work by our author—a Treatise on the Chase (*Kynegeticos*)—in which, as well as in the *Anabasis*, he has imitated Xenophon.

A. was one of the best writers of his day. His works bear the marks of care, honesty, and correctness; and they were numerous, though several have not been handed down to our time. All that we are possessed of appear to have had translations into

Latin. There is a good French translation of the *Anabasis* by Chaussard, with commentary, 3 vols. (1802), and also a good one of the *Lectures of Epictetus* by Thurot (1838). The best critical edition of A. is that of Müller (Paris, 1846).

ARRO'BA, a weight commonly used in Spain, Portugal, Brazil, and in the principle Spanish and Portuguese colonies. In the first of these countries, it is equivalent to the English quarter of a cwt., or 28 lbs.; it is nearly the same in Portugal, &c. In Spain, the A. is also a measure for wine, brandy, &c., and contains four of our quarts.

ARRONDISSEMENT (from the French *arrondir*, to make round), the subdivision of a French Department (q. v.).

ARROW. See BOW AND ARROW.

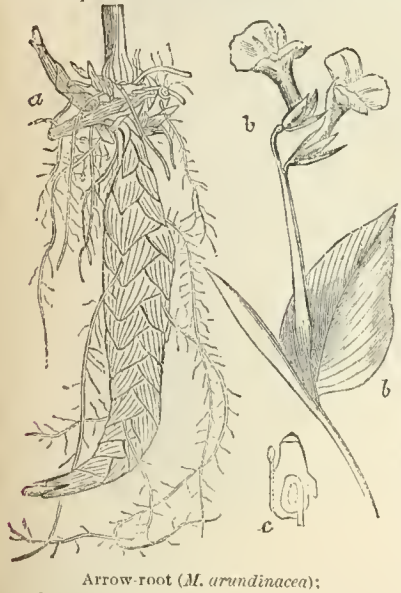
A'RROWHEAD (*Sagittaria*), a genus of plants of the natural order *Alismaceæ*, distinguished by unisexual flowers, having three herbaceous sepals and three colored petals, numerous stamens, and numerous carpels, which are compressed, one-seeded, and on a globose receptacle. They are aquatic, natives of very different climates, from the tropics to the cold regions of the world. The COMMON A. (*S. sagittifolia*) is a beautiful aquatic, a native of England, with arrow-shaped leaves which rise above the surface of the water. It is one of those plants which have enjoyed an undeserved reputation as cures for hydrophobia. The corms (or solid oulbs), dried and powdered, have sometimes been used for food, but have an acrid unpleasant taste.—The CHINESE A. (*S. Sinensis*) is a native of China, and has long been cultivated in that country and Japan for its eatable corms, which, in a fresh state, are somewhat acrid, but abound in starch. It has arrow-shaped acute leaves, and a branched polygonal scape (leafless stem). It is grown in ditches and ponds. It is one of the plants sometimes cultivated in tanks in the hot-houses of Britain.

ARROW-HEADED CHARACTERS. See CUNEIFORM.

ARROW-HEADS. See ELF-ARROW-HEADS.

A'RROW-ROOT is a variety of starch extracted from the roots of certain plants growing in tropical countries. It is a fine starchy farina, much valued as a delicacy, and as an easily digestible food for children and invalids. It is obtained from the tuberous roots —or more correctly, root-stock (*rhizomes*)—of different species of the genus, *Maranta*, belonging to the natural order *Marantaceæ*, and characterized by solitary ovules, a fleshy style curved downwards, branching stems, and white flowers. The species chiefly yielding it is *M. arundinacea*, a native of tropical America, cultivated in the West India Islands, and growing about two feet high, with ovato-lanceolate somewhat hairy leaves, clusters of small flowers on 2-flowered stalks, and a globular fruit about the size of currants. The roots (or rhizomes) contain a large proportion of farina. They are often more than a foot long, of the thickness of a finger, jointed, and almost white, covered with pretty large paper-like scales. They sometimes curve so that the points rise out of the earth, and form new plants. They are dug up when a year old, washed, carefully peeled, and reduced to a milky pulp. Mills for this purpose have been introduced; but in Jamaica the roots are usually reduced by beating in deep wooden mortars; in Bermuda, by means of a wheel-rasp.

The pulp is then mixed with much water, cleared of fibres, by means of a sieve of coarse cloth or hair, and the starch is allowed to settle to the bottom. The water dissolves, and so removes the greater part of the albumen and salts, the starch quickly settling down as an insoluble powder. Successive washings are employed for further purification. The A. is finally dried in the sun or in drying-houses, great care being taken by means of gauze, to exclude dust and insects. The careful peeling of the roots is of great importance, as the skin contains a resinous matter, which imparts a disagreeable flavor to A. with which it is allowed to mix. Great care is taken to preserve the A. from impurities; and the knives used in peeling the roots, and the shovels used in lifting the A., are made of German silver. The West Indian A., most esteemed in the market, is grown in Bermuda; the next, and almost equal to it, in Jamaica. The East Indian A. is not in general so highly valued, perhaps because substitutes for the genuine A. more frequently receive that name. The *Maranta arundinacea* is now, however, cultivated to some extent both in the East Indies and in Africa. *M. Indica*, which was supposed to be distinct from *M. arundinacea*, is now regarded as a mere variety of it, with perfectly smooth leaves. It is cultivated both in the East Indies and in Jamaica. A. is obtained also from *M. Allouyia* and *M. nobilis* in the West Indies, and from *M. ramosissima* in the East.



Arrow-root (*M. arundinacea*): *a*, tubers; *b*, leaf and flowers; *c*, stamen and style.

The amount of fecula or starch present in the roots of the *Maranta* varies according to age, and runs from 8 per cent., in those of the young plant, to 26 per cent, when full grown. The latter stage is reached when the plant is 10 to 12 months old; and the roots then present the following composition in 100 parts :

Starch, fecula, or arrow-root	26
Woody fibre	6
Albumen	1½
Gummy extract, volatile oil, and salts	1
Water	65½

A. is exported in tin cases, barrels, or boxes, carefully closed up. It is a light, opaque, white powder, which, when rubbed between the fingers, produces a slight crackling noise, like that heard when newly fallen snow is being made into a snow-ball. Through the microscope, the particles are seen to be convex, more or less elliptical, sometimes obscurely triangular, and not very different in size. The dry farina is quite inodorous, but when dissolved in boiling water, it has a slight peculiar smell, and swells up into a very perfect jelly. Potato-starch, with which it is often adulterated, may be distinguished by the greater size of its particles, their coarser and more distinct rings, and their more glistening appearance. Refined sago-flour is used for adulteration, many of the particles of which have a truncated extremity, and their surface is irregular or tuberculated. A is also sometimes adulterated with rice-starch and with the common starch of wheat-flour.

Not less than 800,000 lbs. of A. are annually imported into the British Isles. As an article of diet, it is often prepared for invalids and children by merely dissolving it in boiling-water and flavoring with sugar, lemon-juice, wine, &c. It is also often prepared with milk, made into puddings, &c. When most simply prepared, it forms a light meal, which, however, is not very nutritious. See NUTRITION.

A farina somewhat similar to A., and partly known by the distinct name of *Tous-les-mois*, is obtained from some species of the allied genus *Canna* (q. v.). But East India A. is in part obtained from the tubers of *Curcuma angustifolia*. Other species of *Curcuma* (see TURMERIC), as *C. Zerumbet*, *C. leucorhiza*, and *C. reubescens*, also yield a similar farina; the same tubers which, when young, yield a beautiful and pure starch, yielding turmeric when old. In Travancore, this starch is a principal part of the food of the inhabitants. The young tubers of the Galangal (q. v.) (*Alpinia Galanga*), another plant of the same natural order (*Scitamineæ*), are another source of this farina.—A farina somewhat resembling A., and often sold under that name, is obtained from different species of the natural order *Cycadaceæ*, as from the dwarf fleshy trunks of *Zamia tenuis*, *Z. furfuracea*, and *Z. pumila* in the West Indies, and from the large seeds of *Dion edule* in the lowlands of Mexico. —The starch of the Cassava, Manihot or Manioc (see MANIOC), is sometimes imported into Europe under the name of Brazilian A. Potato-starch, carefully prepared, is sometimes sold as English A.; and the farina obtained from the roots of the *Arum maculatum* (see ARUM), as Portland A. Otaheite A. is the starch of *Tacca* (q. v.) *pinnatifida*.—All these, as well as Oswego and Chicago corn-flour—the starch of maize or Indian corn—are so nearly allied to true A. as not to be certainly distinguishable by chemical tests; but the forms of the granules differ, so that they can be distinguished by the microscope.

The name A. is commonly said to have had its origin from the use of the fresh roots by the South American Indians as an application to wounds to counteract the effects of poisoned arrows; and the expressed juice has been recently recommended as an antidote to poisons, and a cure for the stings and bites of venomous insects and reptiles. But it is not improbable that the name is really another form of *Ara*, the Indian name.

ARRO'YO MOLI'NOS, a village in Estremadura, Spain, noted as the scene of General Girard's complete discomfiture by Lord Hill on the 28th October 1811. General Girard had been sent out by Soult on a plundering foray with 5000 men, when he was surprised early in the morning by Lord Hill, who had slept a league off at Alcuescar; the natives of which had the good sense not to betray the presence of their deliverers. With a couple of regiments, the 71st and 92d, the English general dashed through the rain upon the enemy, who fled in all directions, leaving behind everything, arms, packs, &c. 1300 prisoners were taken; the whole artillery, colors, baggage, &c. French historians (Thiers, &c.), however, maintain that the battle was 'undecided,' and that

their countrymen only retreated in good order, under the pressure of much larger forces.

ARRU' ISLANDS, a Dutch possession, south of New Guinea, between 5°—7° S. lat., and 134°—135° E. long.; area, 1365 sq. m.; pop. 13,819, of whom 300 are Christians, 180 Mohammedans, the remainder heathens. Principal islands are Meykor, Wammer, Udjier, Wokkam, and Babi. Dobo on Wammer is the chief mart. Sago and coco-nut palms are plentiful, and some tobacco, rice, sugar-cane, maize, and edible roots, &c. are cultivated. The forests yield timber, and the sea, fish. The rocks give edible nests, and the woods shelter wild swine, hares, parrots, pigeons, birds of paradise, &c. Cotton goods, iron and copper wares, Chinese pottery, beads, knives, rum, and arrack are imported, and bartered for mother-of-pearl, trepang, edible nests, pearls, tortoise-shell, birds of paradise, &c.

ARSA'CES, a name common to several Parthian and Armenian kings. The accounts concerning them which have been transmitted to us by the ancient historians are exceedingly vague, confused and contradictory; and modern criticism has found itself unable to reconcile or simplify the conflicting statements. The most important members of the dynasty of the Scythian Arsacidæ were A. I. and A. VI.

ARSACES I., the founder of the Parthian monarchy, flourished in the 3d c. B.C., under the reign of Antiochus-Theos. An atrocious insult offered to his brother Tiridates by Pherecles or Agathocles, Macedonian satrap of the country, is said to have fired his spirit, and driven him to rebel. The Macedonians were expelled, 256 B.C. Antiochus, embroiled in a war with Egypt, could not immediately find time to attempt the recovery of this portion of his dominions. Seleucus, the son of Antiochus, made two unsuccessful expeditions against the insurgent chief, in the last of which he was taken prisoner. A. I. now acquired regal power, built a city called Dara, on the mountain Zapaortenon, developed the internal resources of his new kingdom, and endeavored to organize it; and after the conquest of several countries, died at a great age. Such, at least, is the account given by Posidonius, &c.: but Arrian states that A. died after a reign of two years, and that his brother Tiridates succeeded him, under the name of A. II., and ruled for thirty-seven years, whence we may conclude that many of the acts attributed to the founder of the Parthian kingdom were the work of his successor.

ARSACES VI., or MITHRIDATES I., flourished about the middle of the 2d c. B.C. He enlarged the territories of the Parthians by the conquest of Bactria; and is even supposed to have penetrated into India, and subdued the nations between the Hydaspes and Indus. In the year 138 B.C., he defeated and took prisoner Demetrius Nicator, king of Syria, whom, however, he treated generously, bestowing on him his daughter in marriage. He was a just and merciful prince, and an enemy to luxury.

A'RSENAL is the name given to a great military or naval repository, where the munitions of war are to some extent manufactured, but more particularly stored until required for use. Every royal dockyard, every magazine, every armory, is to some extent an A.; and therefore the meaning of the word is not quite definite. In France, the chief arsenals are at Cherbourg, Brest, and Toulon. In England, although Deptford is a considerable storehouse for naval clothing and provisions, and Weedon and the Tower great repositories for military stores, the only establishment vast enough to deserve the name of A. is at Woolwich. This is truly a remarkable and important place. In the spring of 1859, when war was raging in Italy between the French and Sardinians on one side, and the Austrians on the other, and when an uneasy feeling pervaded our own country, there were for a short time more than 10,000 men employed in Woolwich A. There were at that time nearly 12,000 pieces of iron ordnance in store, of which 7000 were of modern make and of heavy calibre. This store was supplementary to that which is always kept at the dockyards of Woolwich, Chatham, Sheerness, Portsmouth, Plymouth, and Pembroke. There were resources at the A. for bringing forward, fitting, and issuing these reserve guns at the rate of 200 per week, or double this number on an emergency; and many hundreds were within a brief period shipped thence, to strengthen our forts in the Mediterranean, in the colonies, and around the coasts. All the shot and shell used down to the period of the Crimean war, were ordered of private makers; but the charge was so enormous during the early months of that war, that the government resolved to try the manufacture at Woolwich; this was done, with a very manifest saving of expense. It has been calculated that the A., when at full work, could produce large shot and shell with six times the rapidity with which those missiles were used by the British outside Sebastopol during the eleven months' siege. These observations do not apply to rifles or muskets; none of these weapons are made at Woolwich. There have been times in the history of this country when nearly a *hundred million* rifle-bullets were in store at the A. The Arsenal is divided into two great sections, of which the one is the depot for the storage of arms and all military equipments, whether for land or naval service; the other being occupied by the manufacturing departments. The latter comprise the gun factories, where all cannon are made; the carriage department, for gun-carriages and all means of transport; and the laboratory, whence come all cartridges, shot, shell, bullets, and warlike weapons. See ARSENAL in AM. SUPP.

A'RSENIC is the name applied in popular language to a well-known poisonous substance, Arsenious Acid (q. v.), but, strictly speaking, the term is restricted to the metal, of which the symbol is As and the equivalent is 75·0. The metal A. is rarely found free in nature, but in a state of combination it occurs largely (see ARSENICAL MINERALS). The metal is generally prepared from arsenious acid (AsO_3) by mixing it with its own weight of charcoal, placing the mixture in a well-covered crucible, and subjecting the whole to heat, when the metal set free by the charcoal rises, and condenses in the upper part or cover of the crucible. Metallic A. is very brittle, can easily be reduced to powder by hammering, or even pounding in a mortar; and when a freshly cut surface is examined, it presents a brilliant dark steel-gray lustre, which, however, readily tarnishes on exposure to the air. The metal, as such, is not considered poisonous, but when introduced into the animal system, it is there faintly acted upon by the juices, and in part dissolved, at the same time, exhibiting poisonous properties. When heated in the open air, it burns with a peculiar bluish flame, and emits a characteristic alliaceous odor. The only use to which the metal A. is applied in the arts is in the manufacture of leaden shot of various sizes, when its presence in small quantity in the lead renders the latter much more brittle than it ordinarily is. Of all the compounds of A. the most important is the one already alluded to—namely, Arsenious Acid, which is an oxide of A. With sulphur, A. forms two important compounds: *Realgar* (AsS_2), a red, transparent, and brittle substance, which is employed in the manufacture of the signal-light called *White Indian Fire;* and *Orpiment* (AsS_3) or *King's Yellow*, a cheap pigment of a yellow color. With hydrogen, A. forms arseniuretted hydrogen (AsH_3), a very poisonous gas, and one which has been fatal to several chemists.

Native Arsenic.

ARSE'NICAL MINERALS occur chiefly in primitive rocks, and frequently associated with other metalliferous minerals.—*Native Arsenic*, although nowhere very abundant, is not unfrequently found in mines in Europe, Asia, and America, generally along with sulphur and metallic sulphurets. In Britain, it occurs at Tyndrum in Perthshire. It has usually a fine granular character. It is very seldom, if ever, quite pure, usually containing a little antimony and iron, and not unfrequently a very little silver or gold.—A very similar, and still rarer metal, found in similar situations, is known as *Arsenic-antimony*, and consists of about two parts of metallic arsenic, and one of metallic antimony.—*Arsenic-silver*, or *Arsenical Silver*, is another very rare mineral, consisting chiefly of arsenic and iron, but containing also about 13 per cent. of silver and a little antimony.—*Arsenic-glance*, found at Marienberg in Saxony, and containing about 3 per cent. of bismuth, has the remarkable property of taking fire at the flame of a candle.—*Arsenious Acid* occurs native in a few localities in Germany and France, and as a mineral species, has received the name of *Arsenite*, which perhaps too closely resembles the chemical designation of its salts.—*Arsenic Acid*, another compound of arsenic and oxygen (AsO_5), containing more oxygen than arsenious acid, although it does not itself occur native, is not unfrequent in the form of compounds with copper and lead (*Arseniates* of copper and lead), which enter into the composition of a number of minerals, none of them so abundant as to be of any importance.—Among A. M. are also to be ranked the compounds of arsenic with sulphur, particularly *Orpiment* (q. v.), *Realgar* (q. v.), and *Dimorphine*, a rarer mineral than the other two, and therefore less important.—But the most important of all A. M., because of their use as ores of arsenic, for the preparation of white arsenic, or arsenious acid, are those in which arsenic is combined with nickel and cobalt. One of these is *Arsenical Pyrites*, or *Leucopyrite*, found in various mines of the continent of Europe, and containing arsenic, iron, sulphur, nickel, and cobalt, in somewhat various proportions—the arsenic, however, always the principal constituent. It generally occurs massive.—*Mispickel*, which frequently occurs in rhombic crystals, but often also massive, differs from it in containing a considerable quantity of silver, so that it is used both as an ore of arsenic and of silver. It is found in many of the tin-mines of Cornwall, and is pretty frequent in different parts of the world.—*Nickeline* consists of nickel and arsenic, and is used as an ore of nickel, and also

for the preparation of white arsenic.—*Cobaltine* and *Smaltine*—the former consisting of cobalt, sulphur, and arsenic; the latter, of cobalt and arsenic—are used for the preparation of blue colors for porcelain and stoneware. Both are found in Cornwall; they occur also in some of the mines of the continent of Europe, and in other parts of the world.—The presence of arsenic in a mineral may commonly be detected by the alliaceous odor which it emits before the blow-pipe.

ARSE'NIOUS ACID is the arsenical compound most familiarly known. It is obtained principally during the roasting of the arsenical nickel ores in Germany in furnaces communicating with flues. When the arsenic of the ore burns, it passes into the condition of A. A. (AsO_3), and rising as vapor into the somewhat cool flue, is there deposited as a grayish powder, known by the names of *Smelting-house Smoke, Flowers of Arsenic, Poison-flour*, or *Rough A. A.* In this condition, the A. A. is contaminated with some impurities, from which it may be separated by introducing the gray powder into an egg-shaped vessel, and applying heat at the lower end, when the A. A. rises in vapor, and condenses in the cool end as a transparent glassy or vitreous substance. Ordinary A. A. of the shops (which is what is popularly known as *arsenic*) is a white crystalline powder, which feels decidedly gritty, like fine sand, when placed between the teeth, and has no well-marked taste. It is very heavy, so much so as at once to be noticable when a paper or bottle containing it is lifted by the hand. It is soluble in water to the extent of 1 part of A. A. in about 100 parts of cold water, and 1 part of A. A. in about 10 parts of boiling water. As ordinarily sold in quantities under 10 lbs. in weight, the A. A. is required by law to be colored with $\frac{1}{320}$ of its weight of indigo, or $\frac{1}{16}$ of its weight of soot; the object of the admixture being to render any liquid to which the A. A. might be added, with a murderous intent, of a black or bluish-black hue, and thus indicate the presence of something unusual. In packages of 10 lbs. and upwards, A. A. is allowed to be sold in the pure white crystalline form without coloration. When placed in a spoon, or other vessel, and heated, the A. A. volatilizes, and condenses in crystals on any cool vessel held above. By this means, it can be distinguished from ordinary flour, which, when heated, would char, and leave a coal behind; and from chalk, stucco, baking-soda, tooth-powder, and other white substances, which, when heated, remain in the vessel as a non-volatile white residue. Again, when A. A. is placed on a red-hot cinder, and the escaping vapors cautiously brought under the nostrils, the strong alliaceous odor characteristic of arsenic is given off. The mode in which A. A. comports itself, when thrown upon water, is likewise peculiar. Instead of at once descending through the water like sand, the A. A., notwithstanding its great density (sp. gr. 3·70), partially floats on the surface, as wheat-flour does; and that portion which sinks in the water, rolls itself into little round pellets, which are wetted only on the outside, and contain much dry A. A. within. The solution of A. A. in water is recognized by three tests:

1. Hydrosulphuric acid and hydrochloric acid produce a *yellow precipitate* of sulphuret of arsenic (AsS_3), soluble in ammonia.

2. Ammonio-sulphate of copper, an *apple-green precipitate* of arsenite of copper ($2CuO,AsO_3$).

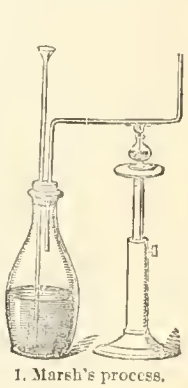
3. Ammonio-nitrate of silver, a *yellow precipitate* of arsenite of silver ($2AgO,AsO_3$).

In many cases, A. A. is used as a means of destroying animal life, but, happily, the processes for the detection of the poison in organic mixtures and in the animal tissues are so unerring and trustworthy, that it is hardly within the range of possibility that an animal can be destroyed by the administration of A. A. without very decided evidence of the existence of the poison being obtained on examination of the various parts of the animal structure; indeed, it may be safely said that there is no limit to the detection of the poison, as even after the animal structure has been so far decomposed that little remains, yet still the poison, from its indestructibility, survives, and will indicate itself clearly, on the application of the several tests.

For the isolation and recognition of A. A. in organic mixtures, such as the contents of a stomach, three processes may be followed. The method generally pursued, and that upon which greatest dependence is placed, is called Reinsch's process, from the name of its discoverer. The manner of its application is to treat the organic mixture with water sufficient to render it thin, then add hydrochloric acid to the extent of one-eighth of the volume of the liquid; apply heat, and when the whole has been raised to near the boiling-point, introduce clean, newly burnished pieces of copper in the form of wire, gauze, or foil. If A. A. be present in the mixture, a steel gray coating of metallic arsenic will form on the surface of the copper. This apparent tarnishing of the copper may take place when no A. A. is in the mixture, and may be produced by salts of mercury, antimony, &c., as well as by sulphur compounds, and even occasionally by fatty matters. To distinguish between the coating formed by A. A. and that produced by other substances, the copper is taken out of the mixture, washed with water, to remove acid; immersed in ether, to dissolve off any adherent fatty matter; dried between folds of blotting-paper; introduced into the lower end of a dry glass test-tube, and there cautiously heated. The metallic arsenic (As) is driven off by the heat from the surface of the copper, rises in vapor into the upper portions of the test-tube; there meets the oxygen of the air, with which it combines, forming A. A. (AsO_3), and thereafter deposits itself on the inner surface of the cool part of the tube in little glistening crystals. On allowing the tube to cool, adding water thereto, and applying heat, the water dissolves the crystals of A. A., yielding a solution, to separate portions of which, the liquid tests mentioned above may be successfully applied. This process may likewise be employed in the detection of A. A. in animal tissue, as in the liver, spleen, kidneys, &c., by first dividing the animal matter into small pieces, and thereafter treating with water, hydrochloric acid, and copper. The precautions which require to be exercised in trying this process are, that the hydrochloric acid and copper are themselves free from A. A. Hydrochloric acid has long been known to be liable to contain at times a very sensible proportion of the poison, and it is therefore necessary, before using the acid in any experiment, to make a preliminary trial with dilute hydrochloric acid, into which, when heated, a piece of copper is immersed; and if no tarnishing occurs after a quarter of an hour's trial, the acid may be declared free from contamination with arsenical compounds.

The liability of copper to contain arsenic some years ago (August 1859) assumed importance in connection with a trial for murder by slow poisoning with arsenic which took place in Britain. In this case, a considerable amount of copper was dissolved during the testing, and supplied the poison in quantity enough to produce a faint coating on a piece of copper which was subsequently introduced into the liquid. The result was that A. A. was at first declared to be present in the material under examination; but further experiments demonstrated that the copper itself had afforded the arsenic. To free copper from any arsenic which it may contain originally, it is only necessary to heat the copper over a gas or spirit-lamp flame, when the arsenic volatilizes, and leaves the copper uncontaminated therewith.

The other two processes for the detection of A. A. in organic mixtures are—1. That recommended by Marsh, in which the material is treated with dilute sulphuric acid and metallic zinc in a gas-generating apparatus, when the arsenic combining with hydrogen, forms arseniuretted hydrogen (AsH_3), from which, in the act of escaping, the metallic arsenic, and subsequently A. A., can be obtained; and 2. That known as Berzelius's process, in which dry arsenical compounds are mixed with a reducing flux, and heated in a constricted tube, when the metal arsenic is produced, which in its turn is converted into A. A. by heating in a wide test-tube. The processes of Marsh and Berzelius are not so generally followed as that of Reinsch; but in each and all it is absolutely necessary, in order to avoid the possibility of mistake, (1), that metallic arsenic be obtained from the organic mixture; (2), that the metallic arsenic be converted into A. A.; and (3), that this A. A. treated with water, should yield a solution which will give the three liquid tests mentioned previously.



1. Marsh's process.

2. Berzelius's process.

A. A. forms compounds (salts) with alkalies and other bases, which are called Arsenites. Some of these are employed in commerce and medicine. A. A., boiled with a solution of potash, or carbonate of potash, forms an arsenite of potash, used in medicine, and known as *Fowler's Solution*. The more largely used sheep-dipping mixtures are composed of A. A., soda, sulphur, and soap, which, when used, are dissolved in a large quantity of water, and thus constitute essentially dilute solutions of arsenite of soda. A compound of A. A. and the oxide of copper, called the arsenite of copper or *Scheele's Green*, is a pigment largely used by painters as a pretty and cheap green paint. The same substance is extensively employed in the manufacture of common green paper-hangings for the walls of rooms; and recent inquiries would lead to the belief that rooms covered with paper coated with this green arsenite of copper are detrimental to the health of the human beings residing therein, from the readiness with which minute particles of the poisonous pigment are detached from the walls by the slightest friction, are diffused through the room, and ultimately pass into the animal system. Another green pigment is named *Schweinfurth Green*, and contains A. A., oxide of copper, and acetic acid, and is a double arsenite and acetate of copper.

ARSENIC (ARSENIOUS ACID). *Properties of, as a Drug.*—A. has long been used as a medicine. When taken into the stomach, it is soon absorbed into the blood, and circulates with that fluid, exhibiting great power over certain diseases, especially skin diseases, as psoriasis, lepra, eczema (q. v.), &c. It is also classed among the tonic minerals, and given for nervous disorders, especially those that are periodic. Of late it has been much recommended for rheumatism; and Dr. Begbie, of Edinburgh, considered that among the remedies for chorea (St. Vitus' dance) it holds the foremost place. In ague, also, and remittent fever, as well as in other disorders originating from the same source, A. and quinine are our chief remedies. They are considered to act as alteratives of the blood. The usual method of administering A. is in small doses (from three to five drops) of the liquor arsenicalis, largely diluted with water, twice or thrice in the day. Arsenic is sometimes given combined with iodine and mercury (Donovan's solution).

When given in the doses above mentioned, for eight or ten days, symptoms of poisoning begin to appear; the skin becomes hot, the pulse quick, the eyelids hot and itchy; the tongue has a silvery appearance; the throat is dry and sore, the gums swollen and tender; and if the treatment is persisted in, salivation ensues, and then come nausea, vomiting, diarrhœa, nervous depression and faintness (Begbie). The quantity necessary to destroy life, of course, varies. Dr. Christison records the case of a man who died in six days, after taking thirty grains of the powdered white A.; but a much smaller dose will prove fatal; a girl was killed with two grains and a half of A. contained in two ounces of tly-water. According to Dr. Swaine Taylor, a medical witness is justified in stating, that under circumstances favorable for its operation the fatal dose for an adult is from *two* to *three grains*. Death from a poisonous dose of A. may occur in a few hours, or after the lapse of days. A woman, aged 56, used a solution of A. in water to cure the itch; she experienced severe suffering, and died after two years, having had symptoms of arsenical poisoning all that time.

A. has been used frequently as a slow poison, the symptoms being attributed to inflammation of the bowels from natural causes. Fortunately, in most cases its detection is easy. Orfila found A. in the soil of cemeteries, a fact which has created some discussion among toxicologists. A. is used by anatomists as an antiseptic, but is dangerous, as it is apt to get into cuts on the hands, and under the finger nails, and cause disagreeable symptons. It is stated that in some countries, especially in Styria, A. is taken by the young female peasants to increase their personal attractions; a statement which probably amounts to this, that experience of its tonic and other qualities induces some individuals to prescribe for themselves a medicine which ought only to be administered by a skilful and cautious hand. That A. can be taken habitually for any length of time, would seem a physiological impossibility; and yet such statements are made on what appears to be unquestionable authority. See *Chambers's Journal*, Vol. V. p. 90, and VI., p. 46; also Johnston's *Chemistry of Common Life*.

No effective chemical *antidote* for A. has yet been discovered. In case of an overdose, or of intentional poisoning, the following treatment is recommended: Evacuate the stomach with the stomach-pump, using lime-water; administer large draughts of tepid sugar and water, chalk and water, or lime-water; avoid the use of alkalies, but administer charcoal and hydrated sesquioxide of iron; bleed freely; take a tepid bath, and use narcotics. If the fatal symptons be averted, let the patient for a long time subsist wholly on farinaceous food, milk, and demulcents.

ARSI'NOE. the daughter of Ptolemy I., king of Egypt, and of Berenice, was born about 316 B.C., and married in her sixteenth year to the aged Lysimachus, king of Thrace, whose eldest son, Agathocles, had already wedded Lysandra, the half-sister of A. Desirious of securing the throne for her own children, A. prevailed on her husband to put Agathocles to death; the consequences of which crime, however, were fatal to the Thracian monarch; for Lysandra, having fled with her children to Seleucus in Asia, managed to induce him to declare war against her unnatural father-in-law. Lysimachus was slain, and Seleucus seized the kingdom. A. now sought refuge in Macedonia, which, however, was also taken possession of by Seleucus; but on the assassination of the latter, after a few months, by Ptolemy Ceraunus, the half-brother of A., she received a hypocritical offer of marriage from Ptolemy, who wanted to destroy her two sons, lest they should prove formidable rivals to his ambition. She consented to the union, and opened the gates of the town in which she had taken refuge, but her children were butchered before her eyes. She then fled to Egypt (279 B.C.), where she married her own brother, Ptolemy II. Philadelphus. These unnatural unions subsequently became common among the Greek kings of Egypt. It does not appear that A. had any children by her brother, though she was regarded by him with the deepest affection. He named several cities, and also an entire district, by her name. After her death, he ordered Dinochares, the architect, to build a temple to her memory, and roof the edifice with loadstones, so that her iron statue might seem to float in the air.

A'RSIS AND THE'SIS (Gr. raising up, and laying down), a term in music applied to the rising and falling of the hand in beating time. It is also applied to the elevation and depression of the voice in speaking.

A'RSON, or, as it is called in Scotland, *wilful fire-raising*, is according to the laws of all civilized countries, a crime of the deepest atrocity; for it involves in its consequences not only the destruction of property, but also the destruction of, or at least an indifference to, the life or lives of others, which can only be imputed to the most wicked and malignant spirit. In the criminal law of England, it is a felony, and has been described as the malicious and wilful burning of the house or building of another man. It is essential to the offence that the house or building burned should be that of *another;* for although it is a misdemeanor to destroy one's own house by fire, especially in a town, or where other buildings are contiguous, which are thereby put in danger, such an offence does not amount to a felony, strictly so called. To constitute such felony, there must be an *actual* burning; for no intent, however clear, would suffice at common law to support a charge of A. This crime is the subject of express statute (the Consolidation Act, 24 and 25 Vict. c. 97), the provision of which considerably modify and enlarge the doctrines of the common law on the subject. The chief of the enactments of this, the Malicious Injuries to Property Act, enacts that whoever shall unlawfully and maliciously set fire to any dwelling-house, any person being therein, shall be guilty of felony, and liable to penal servitude. Also that whoever shall unlawfully and maliciously set fire to any church or chapel; or to any chapel for the religious worship of persons dissenting from the United Church of England and Ireland; or to any house, stable, coach-house, out-house, warehouse, office, shop, mill, malt-house, hop-oast, barn, or granary; or to any erection used in carrying on any trade or manufacture, or any branch thereof, whether in possession of the offender or any other person—with intent, in the latter cases, to injure or defraud any person, shall be guilty of felony; and he is liable to penal servitude for life, or not less than three years, or to imprisonment not exceeding two years. Doubts having arisen on a former act, whether its provisions extended to the setting fire to a hovel or shed not appendant to any house, it was expressly provided, by the above act, that whoever should unlawfully and maliciously set fire to any hovel, shed, or fold; or to any farm-building; or any building or erection used in farming land—whether the same, or any of them respectively, shall then be in the possession of the offender, or the possession of any other person—with intent thereby to defraud any person, shall be guilty of felony, and he is liable to a like punishment.

Moreover, that whoever shall unlawfully and maliciously set fire to any hay, straw, wood, or other vegetable produce, being in any farmhouse or farm-building; or to any implement of husbandry, being in any farmhouse or farm-building; with intent to set fire to such farmhouse or farm-building, and to injure or defraud any person—shall be liable to the same punishment as for setting fire to the farmhouse or farm-building itself; and every male so offending, under sixteen, shall be also liable, at the discretion of the court, in addition to any other sentence, to be whipped. Again, unlawfully and maliciously, by any overt act, to attempt to set fire to any building, stack, or steer, or vegetable produce, of such kind and with such intent that if the offence were complete, the offender would be guilty of felony, and liable to penal servitude for life (though such building, stack, steer, or vegetable produce be not actually set on fire), is deemed felony and is punishable with penal servitude above three years; or imprisonment for two years, with the same addition in respect to whipping, if the offender be a male under sixteen. And lastly, if any person shall maliciously set fire to any station or other building belonging to any railway, dock, canal, or other navigation, he is guilty of felony; and he is liable to penal servitude for life, or any term not less than three years; or to be imprisoned, with or without hard labor, for any term not exceeding two years; and if any person maliciously set fire to any *goods* or *chattels* being in any building, the setting fire to which is felony by act of parliament, he is guilty of felony; and he is liable to penal servitude for any term not exceeding 14 years, nor less than three years, or to be imprisoned, with or without hard labor, for any term not exceeding two years.

Servants convicted of negligently setting fire to houses and buildings, shall, by 14 Geo. III. c. 78, s. 84, forfeit £100, to be distributed among the sufferers, by the churchwardens, in such proportions as to such churchwardens shall seem just; and in case of default, shall be committed to jail or the house of correction for eighteen months, to be kept to hard labor.

It has been laid down in Scotland, that if the fire has been wilfully kindled, it matters not how circuitous may have been the mode of operation selected, although the injury intended to have been done was not the actual burning of the house, but some inferior mischief. And it is the law of both countries, that if the

proprietor of a house set fire to it while in possession of a tenant holding under a lease, the crime of A. is completed; and in Scotland, the same has been ruled where the house was occupied by a party having a life-interest in it.

By the 29 Geo. III. c. 46, an act which applies to Scotland as well as England, it is enacted, that if any person shall maliciously and unlawfully set fire to, or in any wise destroy, any ship or vessel, whether the same be complete or in an unfinished state, or shall maliciously and unlawfully set fire to, cast away, or in anywise destroy any ship or vessel, with intent thereby to prejudice any owner or part owner of such ship or vessel, or of any goods on board the same, or any person that hath underwritten, or shall underwrite any policy of insurance upon such ship or vessel, or on the freight thereof, or upon any goods on board the same; every such offender shall suffer death as a felon.*

Both in England and Scotland, it is a considerable aggravation of the offence where the burning is to defraud insurers.

ART. The word A. is here meant as designating what is more specifically termed Fine A., being opposed to the useful arts, or the industrial operations for supplying the common necessities of life. Painting and Poetry are fine arts; Agriculture, Navigation, and Medicine are useful arts.

The great end of A. is to give pleasure, but the kind of pleasure is peculiar and circumscribed. There are many of our enjoyments that no artist would ever think of attempting to provide. The gratifications of eating and drinking, of exercise and repose, warmth and coolness, form a class in contrast with the pleasures of music, sculpture, or the drama. It is a matter of some nicety to draw the line between these two regions of our pleasurable susceptibility; indeed, it is not clear that a precise line can be drawn. Certain peculiarities can be assigned as disqualifying circumstances, such that any mode of pleasure laboring under them is debarred from entering into A.; but after we have allowed for these, there will remain a disputed border-land, on which no general criterion will hold.

The various indulgences called sensual are the best examples of contrast to the pleasures of A. In the first place, as our frame is constituted, these bodily functions, while incidentally ministering to our pleasure, are in the main subservient to maintaining our existence, and being in the first instance guided for that special end, they do do not necessarily rank among our gratifications as such; in the second place, they are connected with the production of what is repulsive and loathsome, which mars their purity as sources of pleasure; and in the third place, they are essentially confined in their influence to the single individual; for the sociability of the table is an element superadded. Now, a mode of pleasure, subject to one or more of these three conditions may belong in an eminent degree to the list of utilities, and constitute an end of industry, but does not come under the class we are now considering. Wealth is disqualified by the third condition, inasmuch as, while in the shape of money, it is confined to some single proprietor. The same may be said of the pleasures of Power and Dignity. Even Affection is too exclusive to come under the artistic head. Anything so restricted in its sphere of action as to constitute individual property, and give occasion to envy and jealousy, is not a pleasure aimed at by the producer of Fine A.; for there do exist objects that can give us delight as their primary end, that have no disagreeable or revolting accompaniments, and whose enjoyment is not restricted to a single mind; all of which considerations obviously elevate the rank of such objects in the scale of our enjoyments. The landscapes, the glowing sunset, the song of the lark, the flowers of the field and the yard, yield unalloyed pleasure, and create no monopoly. The painter, sculptor, and musician aim at corresponding effects.

The eye and the ear are the chief avenues of artistic delight; the other senses are more or less in the monopolist interest. Moreover, one important feature in the somewhat capricious attribute termed *refinement*, attaches more particularly to the objects of these two senses; namely, the power of protracted enjoyment without fatigue. A *coarse* effect is one that is intense and pungent, but too exhausting to be kept up; such is a noisy clash of loud instruments in a musical performance, or a tale of overdone marvels. To remove all the fatiguing accompaniments, and thereby tone down the exciting influence, while retaining as much as possible the really pleasurable part, is to refine upon the effect, and produce a higher work of art. Now, in the sensation of taste and smell generally, the stimulus is apt to be of short duration; the pleasure is said to pall soon. Yet there are degrees in the case; some of the choicer odors can effect us for hours together with a gentle and pleasing sensation. But it is the ear, and perhaps still more the eye, that can remain open to agreeable stimulation for the greatest length of time; and taking this fact along with the unconsuming nature of their objects, we see good reasons for the artist striving so earnestly towards the gratification of those two senses.

* The statute 29 Geo. III., c. 46, has not been repealed, though there are similar enactments in the English Malicious Injuries to Property Act, but omitting the punishment of death.

The sensual elements can be brought into A. by being contemplated in the *idea*, in place of being enjoyed in the reality. A painter or poet may depict a feast to our minds, and impart a pleasure that differs essentially from the delights of eating and drinking. The imagined repast has nothing to do with our bodily necessities; the disagreeable accompaniments can be kept out of view; and any number of persons may share in the effect. So with the elements of wealth, power, dignity, and affection, which in their actuality want the liberal character of the true artistic delight; if we can only derive pleasure from the spectacle of them in the hands of the select number of their possessors, they become to us an enjoyment that can be shared by the general multitude, like the blue sky, or the towering peak. It is the fact that mankind find a charm in contemplating the wealthy, the powerful, the elevated, the illustrious, the beloved; and accordingly such elements are freely adopted into artistic compositions.

If all the sensual gratifications could become artistic by being contemplated in idea, or merely thought of, as in the above case of imagining a rich feast, we should have the means of distinctly circumscribing the select region of the beautiful or artistic, and of resolving a difficult problem. It would be admissible for the poet or painter to suggest any of those inferior pleasures to the mind by descriptive touches, and he would thereby elevate them into the region of art. But we find that every mode of sensual gratification is not open to this ideal presentation. Even as regards eating and drinking, exception is taken against the too free allusion to those pleasures; while the sensuality of love is hardly to be suggested through the most distant allusion. We may revel in tales of mere tender emotion—of parental love and of pure affection—but those other subjects are kept at the utmost distance; and we should be said to be reveling in sensuality, if we were merely to indulge in the imagination of those species of delight. There is no help, therefore, but to consider that there are *conventional* and arbitrary limitation of the sphere of the artist, rendering it quite impossible to draw any clear and universal boundary-line between the beautiful and the agreeable generally.

Sublimity, Beauty, Grace, Harmony, Melody, Pathos, Ideality, Picturesqueness, Proportion, Order, Fitness, Keeping, and the Ludicrous—though they do not all relate to the so-called *beautiful*, are all involved in the circle of pleasures now before us; and it is quite obvious that no one fact can run through this variety of designations. There must be a great multitude of agents operating to produce these different impressions, which are related to one another only by attaching in common to the æsthetic class of compositions. Doubtless, several of these names may be employed to mean the same thing, in fact, partially synonymous terms; as Beauty and Grace—Proportion, Fitness, and Keeping; but hardly any two terms are synonymous throughout, and there are distinct conceptions implied in Sublimity, Beauty, Picturesqueness, Fitness, and the Ludicrous.

Among the elementary sensations and emotions of the human mind that are of a pleasurable kind, a certain number may enter at once into the composition of A.; such are the pleasures of sound and sight, the emotion of surprise, and plot-interest. Others may enter by ideal presentation; as the gratifications of the remaining senses, and the emotions of fear, tenderness, irascibility, power. The feelings more specific to A. are those produced by Harmony under its various aspects. When sweet sounds are harmoniously combined, we have the musical art; the painter has a similar aim in reference to colors and forms; and so through all the Fine Arts, this quality is found recurring as the crowning work of the artistic hand. Nothing is so indisputably included within the circle of the æsthetical or beautiful as finely struck harmonies, melodies, or concords. Whatever else may be included in a composition, it is the admission of these that gives the specific charm, although it would be a mistake to dispense with other elements of interest common to art and to every-day life. Story is essential to Romance and Poetry; sweetness in the separate sounds is requisite for good Music; and color in itself imparts æsthetic pleasure apart from harmonious union.

The agreeable effect designated by Fitness takes rank with the artistic pleasures; we may call it the æsthetic of the useful. When a work is not only done effectually, but done with the appearance of ease, or the total absence of restraint, difficulty, and pain, we experience a delight quite different from the satisfaction growing out of the end attained. Much of the pleasure of architectural support is referrible to this source.

Among the susceptibilities touched by artistic arrangements may be noticed the sense of Unity in multitude, arising when a great number of things are brought under a comprehensive design, as when a row of pillars is crowned by a pediment. The use of simple figures—the triangle, circle, square, &c.—for enclosing and arranging a host of individuals, has the tendency to make an easily apprehended whole out of a numerous host of particulars. In all large works abounding in detail, we crave for some such comprehensive plan, whereby we may retain the total, while surveying the parts. A building, an oratorio, a poem, a history, a dissertation

a speech, should have a discernible principle of order throughout; the discernment of which gives an artistic pleasure, even in works of pure utility.

The craving for Variety and Novelty is a powerful impulse of the human mind, and makes itself especially apparent in the appreciation of works of A. The greatest works cease to please after a time, and temporary fashion may occasionally lord it over the perennial in taste. In looking at the Fine Arts individually, we may divide them into two classes, by drawing a distinction of some importance as regards the question of an artistic *standard*. The one class contains the *effusive* arts, or those which consist of mere outbursts of the inward spontaneity, regulated by the effects of the display on the sense of the beholder or listener. Music is a good example. The spontaneous effusions of the human voice, and those prompted by the various emotions, are corrected and tuned by the ear into melody and harmony, and after this process has been often repeated, pleasing airs and compositions are the result. It is the same with the Dance, considered as a fine art. In like manner, dramatic gesture and display, and the graces of elocution and fine address, are the natural promptings rendered pleasing by being changed and modified for that express end. The first movements are mere random, but the delicate sensibility of the beholder causes some to be suppressed, and others brought out, until a really pleasing combination is attained. Contrasted with the purely effusive, are the so-called *imitative* arts, or those that involve the representation of some of the appearances of the outer world. Such are Painting, Sculpture, and Poetry. In these, the artist, while still aiming at pleasing effects, is trammelled with a new condition—namely, a certain amount of fidelity to his original. In the others, there are no originals. The musician imitates nothing, and is bound by the sole condition of gratifying the ear; but a painter chooses his subject from nature, and although he must contrive to yield the pleasures of color, outline, and grouping, he must do so with a certain respect to the object copied. The poet, in depicting the life of men, comes under the rule of fidelity to this extent, that an obvious misrepresentation is apt to give a painful shock, and mar the pleasure that would otherwise be derived from the poetry itself. It is not so much that truth is a part of the artistic pleasure, as that falsehood is a stumbling-block in the way; for even the imitative arts are only so in part. There is no imitation in the meter and cadence of a song, and yet these often constitute the main charm. So a certain license of fantastic effusion is allowed to poets, subject to no rules but the giving of pleasure. The creation of imaginary worlds, when avowed, is not objected to; and the criterion of fidelity to the actual is accordingly laid aside for the time. The various arts of Decoration and Design are for the most part effusive, although occasionally imitative. Architecture is not in any way imitative; the coincidence between the Gothic roof and the intermingling foliage of a double row of trees, is a mere accident.

These observations are necessary in order to qualify the current maxim, that Nature is the artist's standard, and Truth his chief end; conditions that, in their strictness, apply only to science. It is the scientific man that should never deviate from nature, and should care for truth above every other consideration. The artist's standard is *feeling*, his end is refined pleasure; he may go to nature, but it is to select what chimes in with his feelings of artistic effect, and pass by the rest. He is not bound to adhere to nature even in her choicest displays; his own taste being the touchstone, he alters the originals at his will. The student of science, on the other hand, must embrace every fact with open arms. If a nauseous fungus or loathsome rat meet the eye of a naturalist, he is bound to record it as faithfully and minutely as he would dilate on the violet or the nightingale. When a painter adopts the human figure as a basis for setting forth harmonies of color, beauties, and form, and picturesqueness of grouping, he ought not to jar our sense of consistency by a wide departure from the usual proportions of humanity. Still, we do not look for anatomical exactness; we know that the studies of an artist do not imply the knowledge of a professor of anatomy; but we expect the main features of the reality to be adhered to. In like manner, a poet is not great because he exhibits human nature with literal fidelity; to do that makes the reputation of a historian or mental philosopher. The poet works by his metres, his cadences, his touching similes, his graceful narrative, and his exaltation of reality into the region of ideality; and if in all this he avoids serious mistakes and gross exaggerations, he succeeds in his real vocation.

The attempt to reconcile the artistic with the true—art with nature—has given birth to a peculiar school, in whose productions a restraint is put upon the flights of pure imagination, and which claims the merit of informing the mind as to the realities of the world, while gratifying the various emotions of taste. Instead of the tales of Fairyland, the Arabian Nights, and the Romances of Chivalry, we have the modern novelist, with his pictures of living men and manners. In painting, we have natural scenery, buildings, men, and animals represented with scrupulous exactness. The sculptor and the painter exercise the vocation of producing portraits that shall hand down to future ages the precise lineaments of the men and women of their generation; hence, the study of nature has become an element in artistic education; and the artist often speaks as if the exhibition of truth were his leading purpose. It is probably this endeavor to subject the imagination more strictly to the conditions of truth and reality, that has caused the singular inversion whereby the definition of science is made the definition of art.

But while fidelity, in the imitative class of arts, is to be looked upon, in the first instance, as avoiding a stumbling-block rather than constituting a charm, there are still certain ways wherein we derive from it a sort of pleasure that may be called æsthetic. We feel drawn by fellow-feeling towards one who has attended to the same objects as ourselves, or who has seized and put into vivid prominence what we have felt, without ever having expressed. The coincidence of mind with mind is always productive of the agreeable effect of mutual sympathy, and, in some circumstances, there is an additional effect of pleasing surprise.

Thus, when an artist not merely produces in his picture those features of the original that strike every one, but includes all the minuter objects that escape the notice of the generality, we sympathize with his attention, we admire his powers of observation, and become, as it were, his pupils, in extending our study and knowledge of nature and life. We feel a pungent surprise at discovering, for the first time, what has been long before our eyes; and so the minute school of artists labor at this species of effects. Moreover, we are brought forward as judges of the execution of a distinct purpose; we have to see whether he that is bent on imitation does his work well or ill; and if our verdict is favorable, our admiration is excited accordingly. There is, too, a certain exciting effect in the reproduction of some appearance in a foreign material, as when a plain surface is made to yield the impression of solid effect, and canvas or stone imitates living humanity. Finally, the sentiment of reality and truth, as opposed to fiction or falsehood, appealing to our practical urgencies, disposes us to assign a value to every work in which truth is strongly aimed at, and to derive an additional satisfaction when fidelity of rendering is induced upon the charms peculiar to A. Thus imitation—which, properly speaking, is a mere accident attaching to Sculpture, Painting, and Poetry, and has no place in Music or Architecture—may become the center of a small group of agreeable or acceptable effects. These effects are the more prized, that we have been surfeited with the purely æsthetic ideals. We turn refreshed from the middle-age romance to the graphic novel of our own time.

Besides being a source of pleasure, art is frequently spoken of as having an elevating and refining influence on the mind and character; for which reason it is considered a proper object of public encouragement in civilized communities. This circumstance is owing to the higher nature of artistic pleasure as above described, the taste for which helps to rescue mankind from the exclusive dominion of sensual and selfish enjoyments. At the same time, we must admit that the devotion to art may be itself excessive, and have the effect of withdrawing men too much from the urgency of practical life, rendering them a prey to political despotism, as well as indifferent to moral principle. Instances are not wanting to justify this remark.

See Dugald Stewart's *Philosophical Essays*, Part II., and Bain on the *Emotions and the Will*, p. 247.

ART, HISTORY OF. The history of the origin and development, growth and decline of beautiful artistic forms, constitutes a portion of the history of civilization. As regards each particular people, the history of their efforts to conceive and express absolute perfection, or what is commonly called ideal beauty, in form and color, is, with the single exception of the history of their speculative opinions, the most reliable test of the stage of progress which they have attained. Nor is it as an indication of their command over physical nature, of the abundance of their external resources, or even of their intellectual activity alone, that the history of the art of a people is thus important. It determines their moral, and even, in a certain sense, their religious position, for the inseparable connection between the beautiful and the good is in no way more clearly manifested than in the fact, that the first inroads of demoralization and social disorder are invariably indicated by a diminution in the strength and purity of artistic forms. It has been usual to include under the term history of art merely the history of the arts of form, including architecture, but excluding, of course, poetry and music, though these latter, again, are generally included when we speak of the fine arts. See ART.

The classical nations of antiquity were not insensible to the importance of tracing the development of that rich artistical life which they had originated, and we accordingly find the germs of artistic history in Pliny, Quintilian, Pausanias, and others. In the middle ages, every trace of a general historical treatment of art disappears, though casual remarks and incidental notices on the subject of artists and the arts are abundant, particularly in such works as the *Liber Pontificalis* of Abbot Anastasius, who is commonly known as 'the Librarian,' in consequence of his having

filled that office at the Vatican in the 9th c. But a history of art, in the sense which we have here assigned to the term, made its appearance in the world for the first time on the revival of letters, in the 15th and 16th centuries; when the artistic treasures of the heathen world, which had come upon mankind as novelties, fell to be contrasted with that peculiar type which art had assumed under Christian influences during the middle ages, on the one hand (see BYZANTINE ART), and on the other with that rich harvest of fresh invention which ripened during the long lives of Leonardo da Vinci (q. v.) and Michael Angelo (q. v.), in the period of which Raphael's (q. v.) short career may be regarded as the noon-day. Whilst Vasari (q. v.) traced the great epochs of Italian art, from a biographical point of view only it is true, in his celebrated work; the students of classical literature collected such expressions of opinion on artistic subjects as the writings of the ancients contained, and Palladio, Ligorio, Vignola, and others measured ancient buildings and their constituent members. In this way a vast mass of information on artistic subjects was brought together. But though the materials which might have served for a history of art were thus supplied, it was a long time afterwards before anything like proper historical treatment arose; and the knowledge of ancient art which had been gained, was applied to their respective purposes by artists on the one hand and philologists on the other. As regarded modern art, the biographical method of Vasari was adhered to, and to this circumstance we are indebted for the innumerable artistic anecdotes which have been preserved. The remarkable variations in style which exhibited themselves between the 16th and 18th centuries, gave rise to a species of historical treatment which had for its object the discovery of the common features by which the artists of the respective periods were distinguished. But the history of style, strictly speaking, begins with Winckelmann (q. v.), who was the first to divide ancient art into epochs, and to trace its connection with the general history of human progress. It was from this period that the history of art came to be regarded as a branch of the history of civilization. Even where the biographical method continued to be followed, it was henceforth with this difference that the division into schools took the place of mere chronological arrangement.

The strongly classical tendency which exhibited itself towards the end of last century, and the romantic reaction and consequent admiration for the middle age which succeeded, though both must be regarded as one-sided influences, had an unquestionable effect in calling attention to what was really great in the artistic productions of these respective periods; and during the present century, the history of art has gradually assumed a more important place as a department of general history. It was only in very recent times, however, that a complete artistic history appeared in Kugler's *Handbook of the History of Art*, which has been partially translated into English, and edited by Sir Charles Eastlake. In the original work, which is very excellent, the immense mass of material which the subject offered has been arranged in periods, and treated in such a manner as to present a sketch which is complete in itself, whilst at the same time its connection with and dependence on general history, social, political, and philosophical, are carefully indicated throughout. Alongside of Kugler's history, that of Schnaase falls to be mentioned—a work giving a philosophical and historical account of the origin of the various styles, and their connection with each other; as also the works of Lübke, Springer, and Carriere. Kinkel's history of Christian art has unhappily remained incomplete. Waagen's works on art and artists in England, France, and the other countries by which Germany is surrounded, are the best artistic hand-books for the traveler. Those which have reference to England have been translated. There are many other historical works of importance on special departments and separate schools of art, monographs and the like, but, with the exception of Stirling's *Annals of the Artists of Spain*, and *Velusquez and his Works*, very few belong to our own literature.

ART EXHIBITIONS. Public displays of the works of living artists, with the view of affording gratification and instruction to the community on the one hand, and on the other, of procuring purchasers for the works exhibited, have taken place in most of the principal towns of Europe, for more than a century and a half. Though sometimes connected with Art Unions (q. v.), A. E. are in reality much older institutions. Still, as the offspring of a necessity which did not exist in earlier times, they are essentially modern. So long as artists were chiefly patronized either by the church, by their respective governments, or by individuals of sovereign rank, their works were placed either in churches, in public buildings, or in palaces, and were thus continually exhibited to the public; but when private patronage came to be their chief support, and their works, if sold at all, were certain to be buried in private houses, the necessity for making arrangements by which they could be displayed to the public either before they were disposed of, or afterwards with the consent of their owners, became apparent. We have mentioned under Art Unions that, till aided by these latter institutions, A. E. for the most part did not succeed in effecting the objects which their promoters had in view.

The earliest collective art exhibition was probably that of the members of the Academy of the Fine Arts at Rome; anything of the kind which had previously existed being confined to the works of a particular artist and his pupils, enriched perhaps by a few contributions from his friends. Something of this earlier character probably attached to these Roman exhibitions; and the first art exhibition, in the sense in which we now understand it, seems to have been that of the French Academy in 1673. From 1745, down to the period of the Revolution, this exhibition, which from its commencement had been confined to the works of members of the Academy, took place biennially. During the Revolution it was thrown open to foreign artists, and in 1796 it was again made annual. An exhibition was attempted in England in 1760, but it was not till 1769 that the regular exhibitions of the Royal Academy commenced. They have since gone on, not only without interruption, but with increasing energy. The works exhibited in 1760 were only 130, the number of exhibitors being 69; in that of 1880 there were exhibited 1650 works by about 850 artists. The annual revenue which the Academy derives from the fee of one shilling paid by each visitor has also been steadily increasing. The exhibition of the Scottish Academy, which is the second in importance in this country, has existed since 1826. To the first exhibition, 178 works were sent by 27 contributors; the exhibition of 1880 consisted of 1120 works, which were contributed by 502 artists. The annual revenue of the Scottish Academy derived from this source exceeds £2500. The only other exhibition of the same class in the United Kingdom is that of Dublin, which is supported by an annual grant from government—the exhibitions of London and Edinburgh being merely furnished with rooms erected at government expense. Several private societies in London and the provinces, however, have exhibitions for similar objects, and conducted on similar principles. Of these we may mention the British Institution, the Society of British Artists, the National Institution, the Society of Painters in Water-colors, and its rival, the New Society of Painters in Water-colors. There are also exhibitions in several of the large provincial towns, such as Manchester, Liverpool, Glasgow, &c. On the continent, wherever an academy of art exists, there is now an exhibition, which takes place for the most part annually, but sometimes biennially. In New York there is a permanent exhibition of the works of Düsseldorf artists; and from thence they are frequently carried for exhibition to the provincial towns of the Union.

The London Exhibition of 1851, commonly known as the *Great Exhibition*, was not only on a larger scale, but introduced new features into these displays. Though confined to industrial objects and works of plastic art, it gave an impulse to A. E. strictly so called, which showed itself almost simultaneously in the great international artistic exhibition of Brussels; and even those exhibitions which have been formed more closely on its model—those of Dublin and New York in 1853, London in 1862, Paris 1867, Vienna 1873, Philadelphia 1876, and Paris 1878—have all included the fine arts.

ART UNIONS. These institutions, which have for their object the promotion of a livelier interest in, and more liberal patronage of, the fine arts on the part of the general public, have gone far in modern times to supply the place of that encouragement which, at an earlier period, they received from princes and prelates.

The origin of A. U., though claimed by the Germans, seems really to belong to the French, and to be traceable to the stirring days of the first Napoleon. From France they passed over into Belgium, where they at once took root, and established themselves even in the less important towns, ten years before they were introduced into Germany. The Art Union of Malines dates from 1812, which is eleven years anterior to that of Munich. But it was in Germany that the importance of the results which A. U. were capable of producing first became apparent, and it was from Germany that they were carried into England. The Art Union (*Kunstverein*) of Munich was established in 1823, and became the model of most of those which afterwards arose. The example of Munich was speedily followed (at the suggestion, we believe, of no less distinguished a personage than Alexander von Humboldt) by Berlin, and shortly thereafter by Dresden, Leipsic, Breslau, Halberstadt, &c.; and in less than ten years there were few of the larger towns of Germany in which A. U. were not to be found. But the most important of all the A. U. of Germany is that which was established at Düsseldorf in 1829, for the Rhine provinces and Westphalia. The Düsseldorf Association has aimed at higher objects than A. U. have usually had in view, either in Germany or in England, and has been instrumental in promoting the execution of monumental works of art of the highest class. In the space of twenty years from its institution (1849), it had expended on works of art what in Germany was regarded as the enormous sum of 268,000 thalers, equivalent to about £40,200 sterling; and had been

the means of placing 24 altar-pieces in churches, eleven paintings on a large scale in public buildings, of which the frescoes in the council chambers at Elberfeld and at Aix-la-Chapelle may be mentioned as examples. The Association of Düsseldorf also publishes an artistic periodical (*Correspondenzblatt*). Other associations have imitated, not without success, the Association of Düsseldorf in directing their attention to the promotion of great works. The Bohemian Association at Prague has been peculiarly meritorious in this respect; and those of Berlin and of Cologne deserve the highest commendation for the zeal with which the first promoted the erection of Kiss's magnificent group of the Amazon on the steps of the Museum at Berlin, and the second urged on the completion of what already, in its still unfinished condition, is one of the greatest architectural monuments of Northern Europe—the cathedral of Cologne. The establishment of permanent galleries of art in the cities to which they respectively belong, is also regarded in Germany as one of the higher objects of A. U.; and in this they have been recently followed in this country, as, for example, in Edinburgh. In Munich there is already a very noble collection of modern works of art, which have been brought together in this manner; and another of the same description is in course of formation in Berlin. Association galleries also exist in Dresden, Leipsic, Breslau, Stettin, &c. Groups of associations have also been formed in Germany for the promotion and encouragement of extensive works. The western group, or cycle, as it is called, includes Hanover, Halberstadt, Magdeburg, Halle, Gotha, Brunswick, and Cassel; the eastern, Danzig, Königsberg, Stettin, &c. This arrangement, by which the influence of these associations on the highest class of art must be vastly augmented, seems worthy of imitation in this country.

Scotland, as is not unusual where the suggestion comes from a continental source, preceded England in the establishment of A. U.; the first that was formed in Britain being that of Edinburgh in 1834. The cause of its introduction was not so much the hope of bettering the condition, as to the necessity of preventing the utter extinction of everything beyond mere imitative art. Portrait-painting continued to furnish the means of living to those who practised it with success; and those who represented familiar occupations or popular customs, obtained a more limited encouragement; but it was found that precisely as the artist rose in the scale of artistic endeavor, and tended in the direction of ideal art, the sympathy and interest of his countrymen, and consequently his own remuneration, declined. The Royal Academy of London, and the academies which had been formed after the same model in Edinburgh and in Dublin, notwithstanding the annual exhibitions which they had instituted, had entirely failed to remove this evil. Private purchasers were not to be found; and in Edinburgh it was calculated that never more than £300, and sometimes as little as £35, were expended in the purchase of pictures exhibited by the Academy, and even these insignificant sums were usually paid for pictures of the very lowest class. Elsewhere, matters were even worse. Mr. Cash, a witness examined before the select committee of the House of Commons on A. U. in 1845, stated that previous to the establishment of the art union in Dublin; 'in four years, during the exhibition of the works of the Royal Hibernian Academy, 30*s.* only were expended on the patronage of art. 'Thirty shillings annually?' asked the chairman. 'No,' replied the witness; 'thirty shillings was the entire sum expended in the four years.' The success of the Scottish Association was immediate; and to its founders the public are in no small degree indebted for the rapid progress which art has made in this country during the last twenty years. 'A large annual fund,' says the secretary, in his statement to the above-mentioned committee, 'exclusively devoted to the purchase of paintings and sculpture, and to the dissemination of engravings, was speedily realized, which in the course of nine years amounted to not less than £36,900. During the same period, 771 paintings, 40 pieces of sculpture, and about 30,000 impressions from engraved plates, were distributed among the members of the Association.' Since this period, the annual funds of the Edinburgh Association have continued steadily to increase; and its promoters, as the results of their disinterested labors, have had the satisfaction to see a school of art spring up around them which is probably second to those of Munich and Düsseldorf alone. Our limits preclude us from entering into the history of the other societies in Britain which have been formed after the model of the parent institution of Edinburgh; but some conception of the success which has attended them may be gathered from the fact, that in 1856 it was calculated that they had expended not less than the enormous some of a million sterling on the encouragement of art. In addition to this direct expenditure, what is a very remarkable, and was to most persons probably an unexpected result, was that the patronage of private individuals, in place of diminishing, greatly increased, both in Edinburgh and London, during the period in question. Before concluding our sketch of the rise of these very remarkable institutions, it is proper to mention the art union of New York, established in 1838, which now supports two galleries with works of art in that city, and the members of which have had the wisdom to establish an intimate relation and lively interchange of works between their own institution and that of Düsseldorf.

As regards the constitution of A. U., the following arrangements may be stated to be common to them all. Each member, in return for an annual contribution (in Britain, usually a guinea), receives an acknowledgment, which acts as his ticket in the lottery by which the works of art, purchased with the sum thus contributed, are distributed amongst the members. Generally, a fixed proportion of the contributions is retained and devoted to the preparation of an engraving, which is presented to those who have drawn blanks in the lottery. The engraving is usually executed by a local engraver, after a work of the local school intended to be patronized. The association further makes provision for an exhibition, either permanent, as at Munich, or annual, as in London and Edinburgh, consisting mainly of the works of local artists, though most associations now admit those of strangers. A diversity of practice has existed as to the mode of distributing the funds of the unions, and much controversy has taken place between their respective partisans. The first, common on the continent, and adopted in Edinburgh, consists in putting the whole sum collected for each year into the hands of a committee of gentlemen, who are chosen for their supposed æsthetic acquirements and impartiality, and requesting them to select the pictures and other works of art afterwards to be distributed to the subscribers by lot; the second is the London plan of distributing the money itself by lot, and then permitting, or rather compelling, the prize-holders to expend it on the pictures exhibited, the selection of the pictures, however, being left to their own taste and judgment. If the object of these institutions be to cultivate an artistic taste *higher* than that which exists in the general community for the time being, the advantages of the first over the second of these modes of distribution seem scarcely to admit of question. The subject was eagerly canvassed before the select committee, and their report was that the constitution of the Edinburgh Association was preferable to that of the London Union. The principle of the A. U., under some modifications, has been extended to the patronage of art manufactures. The difficulty in distinguishing between the lottery as part of the Art Union and lotteries of an unquestionably illegal kind led in 1846 to the passing a special act for legalizing *bonâ-fide* A. U. maintained solely for the encouragement of art. See EXHIBITIONS.

A'RTA, or NARDA, the ancient *Ambracia*, is a town in Epirus, ceded by Turkey to Greece in 1881. It is situated on the western line of the new frontier, about seven miles from the gulf to which it gives name, and thirty-nine miles south from Janina. It stands on the left of the river Arta, the ancient *Aracthus*, whence the modern name. It is the see of a Greek bishop. Pop. 8000. It has a considerable trade, and manufactures, chiefly of cloths and leather; but suffers greatly from malaria. The town has never recovered from the disasters of 1828, when it was stormed by the Greek patriots under Marco Botzaris. Portions of the old walls, and the foundations of the Acropolis, are the only relics of Hellenic times. Remains of the lower empire exist in a convent founded 845 A.D. by the Empress Theodosia.

The ancient city of Ambracia, founded by a Corinthian colony about 635 B.C., was at one time a flourishing independent state, with a considerable territory. It was ruined by the Amphilochians, and became subject to Philip of Macedon. Pyrrhus made it the capital of Epirus; afterwards it fell into the hands of the Ætolians, and then of the Romans.

A'RTA, GULF OF, an arm of the Ionian Sea, 25 miles long and 10 wide, between Greece and Turkey. Until 1881 the whole of the northern coast was Turkish; but in that year the portion east of the river Arta was ceded to Greece. It was arranged that the gulf should be neutral, the fortress commanding the entrance to the gulf on either side being disarmed. Under its ancient name of the Ambraciot Gulf, it separated Epirus and Acarnania.

ARTABA'ZUS, the name of several distinguished Persians in the times of the Achæmenidæ. When Xerxes advanced against Greece, A. led the Parthians and Chorasmi. At a later period he warned Mardonius, but in vain, against engaging in battle at Platæa; and on the first indications of defeat, he withdrew his own division, amounting to 40,000 men, from the field, and succeeded, though with great difficulty, in forcing his way through the wilds of Thessaly, Macedonia, and Thrace to Byzantium, where he crossed to Asia. Subsequently, he acted as negotiator between the Spartan Pausanias and Xerxes.—Another A. was general under the Persian king, Artaxerxes Mnemon, and revolted against Artaxerxes Ochus in 356 B.C. For this offence he appears to have been forgiven; and subsequently we find him accompanying King Darius after the battle of Arbela. Alexander rewarded his fidelity by appointing him satrap of Bactria.

ARTANTHE. See MATICO.

ARTAXE'RXES, the name of several Persian kings. A. I., surnamed *Longimanus*, the second son of Xerxes, escaped from the

conspiracy of Artaban and others, and ascended the throne in 465 B.C. His long reign, extending to 425, was marked by a decline of power.—A. II., surnamed *Mnemon*, succeeded his father, Darius II., in 405 B.C. After gaining the victory over his brother Cyrus, he became involved in war with Sparta, which ended with the Antalcidean Treaty of Peace. He died in 361.—A. III., surnamed *Ochus*, was the son and successor of the former, and reigned in the true style of oriental despotism until 338 B.C. One of his most daring exploits took place in Egypt, where he caused the divine bull Apis to be slaughtered and cooked as ordinary beef. A. III. was poisoned in 338 by his eunuch Bagoas. It is said that his flesh was eaten by cats, and that hilts for scimitars were made of his bones.—The founder of the new Persian dynasty of the Sassanidæ (which ruled from A.D. 226 to 651, was named A.

ARTEDI, Peter, a celebrated naturalist, was born on the 22d of February 1705, at Anund, in the province of Angermannland, Sweden. He was at first designed for the church, and entered the university of Upsala, intending to pursue the usual course of philosophy and theology; but he soon abandoned all thought of the ministry, and betook himself to medicine. In 1728, Linnæus went to Upsala, to study the same science, and a close intimacy sprung up between the young men. They worked together, and to a certain extent, on the principle of a division of labor. Physiology, chemistry, and mineralogy they pursued in common; but to this A. added ichthyology, and Linnæus ornithology and entomology. In 1734, A. sailed for England, and Linnæus went to Lapland, each having made the other his heir and executor of all his scientific documents. While in London, A. wrote the preface to his *Ichthyologia*. Next year he went to Leyden in Holland, where he found Linnæus just arrived from the north. Each showed the other the results of his labors. A.'s useful career was abruptly ended, on the 21st of September 1735, by his falling into one of the canals near Amsterdam.

A.'s only complete work is the *Philosophia Ichthyologica*. The *Synonymologica* is described as a work of extraordinary labor, but somewhat confused. Linnæus faithfully performed his duty as his friend's executor. He arranged, corrected, and completed his manuscripts, and published the whole, together with a life of the author, in 1738. According to Cuvier, the great work of A. is the first named, which gave a truly scientific character to the study of fishes. The only error of any magnitude which occurs in it is including the Cetaceæ among fishes. A. was also a distinguished botanist. He was the first to indicate, as a special characteristic, the presence or absence of involucra in the umbelliferous plants, whose species are so difficult to distinguish from each other. Linnæus has called a genus of these, in memory of his friend, *Artedia*.

ARTEMI'SIA, a genus of plants of the natural order *Compositæ*, sub-order *Corymbiferæ*, in which the flowers of the disk are hermaphrodite, those of the ray in one row, the bracts forming a roundish imbricated head, the receptacle naked or hairy, the achœnia obovate, and destitute of pappus. The heads of flowers are numerous and small; the leaves generally much divided. There are many species, herbaceous plants and shrubs, natives chiefly of the more temperate regions of the eastern hemisphere. They have generally an aromatic smell, more or less agreeable, and a warm, sometimes rather acrid and bitterish taste. —To this genus belongs Wormwood (*A. Absinthium*), the *Apsinthion* of the ancient Greeks, to whom its medicinal properties were well known. It is a native of Britain, the continent of Europe, and the northern parts of Asia, growing in waste places, by waysides, &c. It is a perennial, 2—4 feet high; its leaves bipinnatifid and clothed with a silky down, and its small hemispherical drooping heads of flowers are of a dingy yellow color, and are produced in axillary panicles. It is aromatic and bitter, containing a bitter principle and an essential oil, both of great strength, upon account of which it is used in medicine in various forms (oil, extract, tincture, &c.), as a stomachic and anthelmintic or vermifuge. It was formerly in much use as a febrifuge. It is a plant very frequently to be found in cottagers' gardens, occupying an important place in their domestic pharmacopœia. It is an essential ingredient in a number of compound medicines. Its roots, and those of some other species of this genus, have been recommended in epilepsy.—Sea Wormwood (*A. maritima*, including a variety which has been called *A. Gallica*), a native of salt-marshes in Britain and other parts of Europe, possesses similar properties, and is occasionally used for the same purpose; as also Roman Wormwood (*A. Pontica*) a native of the middle and south of Europe, but not of Britain—Tartarian Wormwood (*A. Santonica*), a native of Tartary, Persia, and other parts of the East; and Indian Wormwood (*A. Indica*), a native of the Himalaya, abounding at elevations of 2000—6000 feet.

Wormwood (*Artemisia Absinthium*).

Indian wormwood grows to the height of 12 feet. It is considered in India a powerful deobstruent and antispasmodic. Tree Wormwood (*A. arborescens*), a native of the south of Europe and the Levant, is also larger and more shrubby than the common wormwood, which, in characters and qualities, it much resembles. —The dried flower-buds of a number of species of A. are sold under the names of Wormseed and of *Semen Contra*, *Semen Cinæ*, *Semencine*, &c., and have long been in much repute as an anthelmintic. *A. Santonica*, and *A. Sieberi* (or *A. Contra*), a native of Palestine, are believed to yield much of the wormseed which is brought from the Levant, also *A. Judaica*, a native of the East and of Barbary, which is regarded as the principal source of the Barbary wormseed. The flower-buds of *A. glomerata*, *A. Lerchiana*, and *A. pauciflora*, natives of the banks of the Volga, are also said to form part of the wormseed of the shops; and those of *A. Vahliana* are collected in the north-east of Persia, and form the *Semen Cinæ Levanticum* or *Semen Cinæ in grains*. The flower-buds of *A. cærulescens*, a Mediterranean plant, which is said to have been found on the sea-coast of England, form the anthelmintic called *Semen Seriphii* or *Barbotine*. Those of *A. camphorata*, another native of the south of Europe, are used in the same way. Even those of *A. Absinthium* and *A. vulgaris* are used under the name of wormseed.—The plants from which the bitter aromatic liquor called *Extrait*, *Eau*, or *Crême d'absinthe* is prepared, are small, low-growing species of A. (*A. mutellina*, *A. glacialis*, *A. rupestris*, *A. spicata*, &c.), found on the Alps, and known to the inhabitants of the Alps by the name of *Genipi*. This liquor was first introduced as a febrifuge during the French campaign in Algeria in 1844, and was mixed by the French soldiers with their wine. They acquired a habit of drinking it diluted with water as a beverage; and its use rapidly extended, with very evil consequences. See Absinthe.—Mugwort (*A. vulgaris*), a common native of Britain and of the continent of Europe, often found about ruins and in waste places, grows to the height of 3—4 feet, with pinnatifid leaves and somewhat racemed small flowers, which have each five florets of the ray. It emits, when rubbed, an agreeable smell, and has a bitter taste. In Germany the young shoots and leaves are used in cookery for seasoning. It is used also for the same medicinal purposes as wormwood, but is weaker. Its leaves, and those of some of the other species, are used as fomentations for cleansing and healing wounds.—Southernwood (*A. Abrotanum*) is a shrubby plant with long straight stems, 3—4 feet high, the lower leaves bipinnate, upper leaves pinnate, their segments hair-like. It is a native of the south of Europe and middle parts of Asia, and has long been a favorite plant in cottage-gardens in Britain. It has an aromatic and pleasant odor. The leaves are used to drive away moths from linen; and in some parts of the continent of Europe, as an ingredient in the manufacture of beer. The smell of this plant appears to be peculiarly disagreeable to bees, which retreat from it; and a little branch of southernwood is sometimes efficaciously used when they are swarming, to promote their ascent into the new hive placed over them.—Tarragon (*A. Dracunculus*) is a perennial plant, a native of Siberia, and long cultivated in gardens in Britain. It has a branching stem 1—1½ ft. high, with narrow leaves. It is fragrant, and has an aromatic smell and taste. The leaves and tender tips are a favorite ingredient in pickles. An infusion of the plant in vinegar is used as a fish sauce.—The leaves of *A. Maderaspatana* are regarded in India as a valuable stomachic, and are also used in anodyne fomentations.—Moxa (q. v.) is prepared by the Chinese from the leaves of *A. Moxa* and other species, the whole surface of whose leaves is covered with a thick down.—*A. acetica*, a Persian species, is said to have a strong odor of vinegar.

ARTEMI'SIA, queen of Caria (352—350 B.C.), was the wife of Mausolus, and is celebrated for the magnificent mausoleum which she caused to be erected to her husband's memory. See Mausoleum.—Another A., queen of Halicarnassus, accompanied Xerxes in his expedition against Greece, and distinguished herself at the battle of Salamis (480 B.C.); she ended her life, in consequence of an unfortunate attachment, by leaping from a rock.

ARTEREO'TOMY, or the opening of an artery, is an operation that has been strongly advocated in those cases in which it is de-

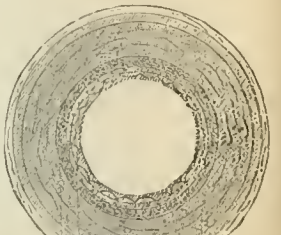
sirable to produce a more decided and immediate effect upon the cerebral circulation (as in severe forms of sanguineous apoplexy) than could be produced by ordinary venesection. It is supposed by some surgeons to relieve pressure on the brain more efficiently than opening the jugular vein could do; and whether this is the case or not, it is a simpler and less dangerous operation. The only vessel operated on is either the temporal artery itself or one of its main branches. The operation is a simple one, but should, of course, only be undertaken by a surgeon. To arrest the flow of blood when sufficient has been taken, the artery should be completely divided, and after the parts have been sponged, a compress, or small pad, should be applied to the wound, and secured by a bandage, which must be carefully adjusted, so as, if possible, to remain undisturbed for four or five days, when it may be removed, and the wound covered with a strip of plaster.

A'RTERIES, Diseases of. Most of the important morbid conditions of the arteries are those which are occasioned by the deposition of *atheroma* (a Greek word signifying a tumor or deposit containing matter like *adhere*, meal or groats) on the free surface of the inner coat of the vessel; a new inner lining to the artery being thus furnished. As atheroma has the effect of weakening, enlarging, and occluding arteries, according to the extent and period of the deposition, it is expedient briefly to notice the most important stages of its progress. In the earliest stage, atheroma consists of a thin, soft, and clear membrane, lining a part of the whole of the tube. It seems to be a mere addition to the artery, in whose original coats there is no apperance of disease. It is most probable a deposit on the inner surface from the blood. On the inner surface of the new coat, a similar layer gradually forms, and in course of time, becomes the foundation of subsequent formations; and when many strata have thus been deposited, the collective mass ceases to be transparent, and becomes converted into an opaque material similar to hardened albumen, and finally to ligament. Until this consolidation occurs, the coats of the artery are not much affected; but by their adhesion to the hardened deposit, they lose their strength, elasticity, and natural color, and their functions are destroyed. The indurated deposit may now undergo one or other of these changes: it may either soften in its interior, in which case it degenerates into a pulpy mass of cholesterine, oil-globules, albuminous and chalky molecules; or it may be converted into a layer of hard, chalky, bone-like matter. This latter change (cretefaction or ossification) takes place only in the external oldest layers of thick deposits; and nothing intervenes between the bony plate and the middle coat of the artery, for the inner or lining coat partakes in the morbid change. It is obvious that either of these changes (softening or hardening) must gradually lead to disease of the arterial coats generally. The process of change is slow, and the change itself can only be detected in the living subject when it is in an advanced stage. In the radial artery and others which lie superficially, the finger can often detect rings or tubes of chalky matter. Most commonly, however, the state of the arteries is detected by some secondary symptom.

Athermatous deposit is at first attended with a narrowing of the calibre of the vessel, varying with the thickness of the deposit, and most marked at the points of bifurcation. Smaller arteries may be completely obliterated, whilst the larger arteries may be very much contracted. Thus, the common iliac has been found to have its canal diminished by about one half, and the great ascending branches of the arch of the aorta, the subclavian and carotid arteries, have been found very nearly closed. A later consequence of the same disease is dilatation of the vessel. The power of the outer coats being insufficient to compress the deposit and to close in upon the blood, by which each contraction of the left ventricle of the heart distends them, they remain wide and distended during the relaxation of the ventricle, and the artery thus slowly expands; the enlargement being most marked at parts where there is most obstruction to the blood-current, as, for example, in curved arteries. These dilatations are apt to terminate in regular aneurism. The changes which we have already described have an effect on the retractile power of the arteries. A healthy artery, if cut across, may shorten to the extent of an inch and a half, as has been actually measured by Mr. Moore ('Diseases of the Arteries,' in Holme's *System of Surgery*, vol. iii. p. 329); but the retractile power is destroyed by the deposition of bony rings or plates. But although incapable of shortening, the arteries sometimes become abnormally lengthened, and consequently become not only dilated, but also tortuous. If the outline of superficial arteries thus affected be watched, each pulsation of the heart is seen to increase their curvature; and the deep-seated arteries (as the iliac) are thus often forced from their normal positions. Another condition involving much danger is this: an ossified artery loses the smoothness which the interior of the vessel ought to present, and from the displacement or cracking of a bony plate, there may be sharp rough projections exposed, to which the fibrin of the circulating blood may adhere. These little clots becoming detached, may be carried with the blood till they become arrested, and plug up an artery, thus presenting cases of embolism or Thrombosis (q. v.). Again, the relation of this disease to accidents and surgical operations on arteries is obvious. A blow may crush a diseased artery, when a healthy elastic vessel might have escaped injury. Such a slight movement as suddenly lifting the arm to the head, for the purpose of securing the hat in a sharp gale, has been known to have been followed by aneurism of the axillary artery. A ligature applied to any ossified artery, is very apt to cause it to break, and the difficulty of securing such vessels is often very great. It is to this form of disease that most of the failures of operations for aneurism are due. Having thus noticed the most important changes which are induced in the arteries by atheroma, and the evil consequences to which they may give rise, we shall now direct attention to an important cause of occlusion—that, namely, in which the canal is closed by an imported foreign body, and especially by fibrinous plugs originally formed in the heart, and transported to other parts in the stream of the blood.

When a large artery, as, for example, the principal artery of one of the limbs, is 'suddenly plugged in its higher part, a sensation of severe pain is commonly the immediate result of the accident. In some cases, the pain extends along the course of the vessel, which, though pulseless, is extremely tender; in others, the suffering is referred to some distant part of the limb, as, for instance, to the calf. Signs of a deficient circulation succeed, and they may amount to pallor, loss of temperature, numbness of the surface, or even to that "torpor" which is observed to precede the total death of a limb in certain cases of injuries of vessels. Such torpor implies not only a loss of circulating blood, but also a cessation of all feeling and motor power in the limb.'—Moore, *op. cit.*, p. 335. Although Gangrene (q. v.) is always to be feared as the result of an obstructed artery of large size, it does not invariably follow; as a collateral circulation may be established, and the life of the limb may be thus saved. Very young persons will endure the obliteration of very large vessels without gangrene; and a case is on record (*Med. Chir. Trans.*, vol. xxix. p. 214) in which 'all the main arteries of both upper extremities and of the left side of the neck were reduced to solid cords,' and yet no gangrene ensued. From the description of the symptoms, the nature of a case of sudden occlusion of a large artery by a plug may possibly be recognized, or, at all events, suspected even by a non-professional observer. Medical aid must at once be sought. The early indications of treatment are to preserve the temperature of the part, to favor the establishment of a collateral circulation, to protect the limb from irritation or injury, to give nourishing blood-making food, and to relieve pain by the judicious use of opiates. The later treatment, if the affection is not checked, is that which is described in the article Gangrene.—*Arteritis*, or *Inflammation of the Arteries*, was a disease which was formerly recognized by physicians. No such specific general disease is now believed in; but the changes which have been already described as occurring in consolidated atheromatous deposits—either softening or ossification—are accompanied by an unnaturally vascular condition of the attenuated arterial walls, extending to true local inflammation, and even to suppuration.—*Aneurism* (a tumor containing blood, and communicating with the cavity of an artery) has been considered in a special article.

A'RTERY (Greek *arteria*), named from the old idea that these tubes were air-carriers. Arteries are the vessels through which the blood passes from the left side of the heart to the tissues. The structure of an arterial tube is very complex, and a section of it may be roughly subdivided into three layers, called the coats of the artery: an external, which is elastic and distensible; a middle, which is muscular, contractile, and brittle; an internal, also brittle, smooth and transparent, being lined with epithelium on the side washed by the blood. The tube is also enveloped in cellular tissue, termed the *sheath* of the A. When an A. is wounded by a sharp instrument, the effect varies with the direction of the cut. Thus, if longitudinal, the edges may not separate, and the wound may heal without much bleeding; if oblique or transverse, the edges gape, and a nearly circular orifice allows of a profuse hemorrhage. If the A. be completely divided, its walls do not collapse like those of a vein, but pass through certain changes provided by nature to prevent fatal bleeding. The cut orifice contracts, and also retracts into its cellular sheath; this checks the flow of blood, a clot of which shortly forms on the outer side; then another forms inside the vessel; and together, they stem the flow, till the cut edges of the A. have time to throw out lymph (see Adhesion), and heal as wounds of other tissues. When an A. is compressed by a ligature.



Subdivisions of Arterial Wall.

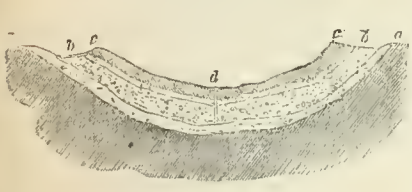
1. Epithelial, } internal
2. Fenestrated, }
3. Muscular, } middle.
4. Elastic, }
5. Fibrous, } external.
6. Areolar, }

the brittle inner and middle coats crack, curl inwards, and heal. See BLEEDING.

The arteries of the human body are all offsets, more or less direct, of the aorta. As each main trunk passes into a portion of the body, it divides into two principal divisions: one, which breaks up into branches for the supply of the tissues in the vicinity—the A. of *supply;* and another, which passes almost branchless to supply the parts beyond—the A. of *transmission.* These, however, anastomose (q. v.) freely, so that the distant tissues are not solely dependent for their supply on only one arterial trunk. Thus, the femoral A. divides in the groin into the profunda, or *deep* femoral, to supply the thigh, and the *superficial* femoral, to supply the leg below the knee. Again, the common carotid divides into *external* carotid, to supply the neck and head, and the *internal* carotid, to supply the brain. Although arteries have generally the same distribution or arrangement of branches, they occasionally vary, and thereby are apt to puzzle a superficial anatomist. Mr. Thomas Nunn of London, an excellent human anatomist, has clearly shown that these anomalies in arterial distribution are all governed by the law of arterial distribution just mentioned, a fact which not only simplifies the study of arterial anatomy, but assists the operative surgeon out of perplexing positions. The principal arteries will be considered under their distinctive names. The best authority on arteries is the splendid work of R. Quain. See ARTERIES, DISEASES OF.

ARTE'SIAN WELLS are perpendicular borings into the ground, through which water rises, from various depths, according to circumstances, above the surface of the soil. The possibility of obtaining water in this way in a particular district depends on its geological structure. All rocks contain more or less water. Arenaceous rocks receive water mechanically, and according to their compactness and purity, part with a larger or smaller proportion of it. A cubic yard of pure sea-sand can contain, in addition to the quantity of dry sand which occupies that space, about one-third of its bulk of water. It would part with nearly the whole of this into a well sunk in it, and regularly pumped from. Chalk and other rocks, composed of fine particles, closely compacted together, contain as large a proportion of water; but from the power of capillary attraction, little or none of this water would be drained into a well sunk in such rock. From the existence, however, of numerous crevices in chalk through which the water freely flows, and from the general presence of a larger quantity of water than the porous rock is able to retain, wells sunk in chalk often yield water. There is yet a third class of rocks, which are perfectly impervious to water: such are clays, which are absolutely retentive, neither allowing water to be obtained from them nor to pass through them. When such rocks occur in basins (q. v.) in alternating layers, and in such order that pervious beds are inserted between impervious ones, it is evident that if a perforation is made through the retentive barrier-bed in the lower portion of the basin, the water contained in the water-logged strata will rise through the bore to a height depending upon the pressure of water which has accumulated in the confined sloping space between the two impervious beds.

The explanation will be more evident by a reference to the accompanying figure, which may be considered as a diagrammatic section of the London basin. There is here a number of porous beds, *b, b,* composing the cretaceous measures, resting on the impervious gault, *a a,* and these, again, are covered by the equally impervious series of the London clay, *c c,* which form the strata on the surface, and extend to a considerable depth. The edges of the chalk-beds are largely exposed in the higher grounds around London; the water falling on the whole area of these exposed edges, sinks into the more or less porous cretaceous beds, and would, in course of time, by continued accessions, fill up the basin, were it not prevented by the clay above. By driving a bore, *d,* through this superior bed, the inferior water-logged strata are reached, and the subterranean water rises to the surface, and flows continuously, by means of hydrostatic pressure.



Section of the London Basin.

Many such wells exist in London and its vicinity; those which form the ornamental fountains in Trafalgar Square descend into the upper chalk to a depth of 393 feet. The most famous artesian well perhaps is that of Grenelle, in the outskirts of Paris, where the water is brought from the gault at a depth of 1798 feet. It yields 516½ gallons of water in a minute, propelled 32 feet above the surface; temperature, 81°·7 F. An artesian well in course of construction at Pesth, yielded, at a depth of 3100 ft., 175,000 galls. of water per day, of a temperature of 161° F., projected 35 ft. above the surface. It is to be sunk till the water reach 178° F.

It is believed that the Chinese have been long acquainted with artesian wells. They have been in use for centuries in Austria, especially in the neighborhood of Vienna, where they are very abundant. No knowledge existed as to their source, and consequently the boring for them was engaged in and conducted in a rude and empirical manner. An excavation was made till a bed of clay was reached; on this a perforated mill-stone was laid, and through the hole the clay was bored until water rose. As soon as geology took the position of a science, and the theory of A. W. was propounded, the engineer was able, after the geological survey of a district, to discover whether a supply of water could there be obtained in this way. Already, districts formerly dry and arid have received a plentiful supply of water by means of such wells, and many more applications have yet to be made. (Tchihatchef, at the British Association in 1882, affirmed that A. W. were made in old Greek times in the Sahara, at Baalbek, &c.; and that crabs are found at the bottom of recent ones.) Artesian borings have been executed in the Sahara of the province of Constantine with remarkable success. The first attempt, after a few weeks' labor, produced a constant stream, forming a perfect river, and yielding 4010 quarts of water per minute, at a temperature of 78° F. In 1880, there were above 150 such borings in the province. The result is proving beneficial not only to the country materially, but also to the character and habits of its nomadic Arab inhabitants. Several tribes have already settled down around these wells, and forming thus the centers of settlements, have constructed villages, planted date-palms, and entirely renounced their previous wandering existence.

A. W. have supplied a portion of the data upon which the internal temperature of the earth has been calculated. They have their origin below that zone which is affected by the changing superficial temperature of the seasons, and consequently the water is of a constant temperature. Thus the Grenelle artesian well has a temperature of 81°·7 F., while the mean temperature of the air in the cellar of the Paris Observatory is only 53°. MM. Arago and Walferdin observed the temperature as the work proceeded, and found that there was a gradual and regular increase downwards. The latter gentleman made a series of very accurate and careful observations on the temperature of two borings at Creuzot, within a mile of each other, commencing at a height of 1030 feet above the sea, and going down to a depth, the one of 2678 feet, the other about 1900 feet. The results, after every possible caution had been taken to insure correctness, gave a rise of 1° F. for every 55 feet down to a depth of 1800 feet, beyond which the rise was more rapid, being 1° for every 44 feet of descent. There are several very deep borings in the United States.

ARTEVELDE, JACOB, a brewer of Ghent, celebrated as a popular leader in the 14th c. In the war between England and France, he gave his aid to the former, while the counts of Flanders supported the latter. A., after gaining great advantages over the party of the nobles, went too far when he proposed that the son of Edward III. of England should be elected Count of Flanders. For this the Flemings were not prepared, and, in consequence, A. was killed in a popular insurrection, August 19, 1345. His son Philip, in 1381, was leader of the people of Ghent in their civil war against Bruges, and gained a victory over Count Louis. The latter was afterwards assisted by Charles VI. of France, and Philip was defeated and slain at Rosbeke, 1382.

ARTHRITIS, inflammation of the joints. See JOINTS, RHEUMATISM, GOUT.

ARTHROPODA. See ARTICULATA.

A'RTHUR, king of a tribe of ancient Britons, is supposed to have flourished in the 6th century. He is usually represented as a Christian prince who struggles bravely to maintain the liberty and faith of his country against the pagan Saxons, but there is no evidence for the statement that he fought against the Saxon Cerdic. Neither the Welsh bards nor Nennius assert this; in fact, it would seem to be merely an inference drawn from the supposition that the scene of A.'s exploits was the west and south-west of England. But Mr. Skene (*The Four Ancient Books of Wales,* vol. i., pp. 50—60) seeks to prove from an examination of Nennius (*Historia Britonum,* cap. 50), that the localities of the twelve great battles which A. fought are in Strathclyde, and therefore that he belongs to the region now called Scotland rather than to England. If there is any reality in his history at all, this is probably the correct view of it, but the influence of Geoffrey of Monmouth's fictions, and of the French romances, succeeded in fixing the Cumbrian prince in the more important part of the island. It is a curious fact that no mention whatever is made of A. by the venerable Bede, the oldest of our historians, or by the annalists of the *Saxon Chronicle;* and Mr. Skene's explanation, that these authorities only 'record the struggle between the Britons and the Saxons south of the Humber,' is hardly satisfactory.

In the lays of the Welsh bards, supposed to be as early as the 6th and 7th centuries (although no manuscript is extant of older date than the 12th c.), A. and his brave companions are celebrated,

but modestly and without miracle. It is in Nennius that the legendary additions begin to develop themselves, though Mr. Skene does 'not hesitate to receive the Arthur of Nennius as the historic Arthur.' Then follow at a distance of three or four centuries the so-called Armoric collections of Walter, archdeacon of Oxford, from whom Geoffrey of Monmouth (q. v.) professes to translate, and in which the marvelous and supernatural elements largely prevail.

Here for the first time the magician Merlin comes into association with A. According to Geoffrey, A.'s father, Uther, conceiving a passion for Igerna, wife of Gorlois, Duke of Cornwall, is changed by Merlin into the likeness of Gorlois, and A. was the result. After his father's death, A. becomes paramount leader of the British, and makes victorious expeditions to Scotland, Ireland, Denmark, Norway, and even to France, where he defeats a great Roman army. During his absence, his nephew, Modred, revolts, and seduces Prince A.'s wife, Guanhumara. A. returning, falls in a battle with his nephew, and is carried to the Isle of Avallon to be cured of his wounds. Geoffrey's work apparently gave birth to a multitude of fictions which came to be considered as quasi-historical traditions. From these, exaggerated by each succeeding age, and recast by each narrator, sprung the famous metrical romances of the 12th and 13th centuries, first in French and afterwards in English, from which modern notions of A. are derived. In these his habitual residence is at Caerleon, on the Usk, in Wales, where, with his beautiful wife Guinevere, he lives in splendid state, surrounded by hundreds of knights and beautiful ladies, who serve as patterns of valor, breeding, and grace to all the world. Twelve knights, the bravest of the throng form the center of this retinue, and sit with the king at a round table, the 'Knights of the Round Table.' From the court of King A., knights go forth to all countries in search of adventures—to protect women, chastise oppressors, liberate the enchanted, enchain giants and malicious dwarfs, is their knightly mission. A Welsh collection of stories called the *Mabinogion*, of the 14th and 15th centuries, and translated into English by Lady Charlotte Guest in 1849, gives an idea of the Arthurian legends. Some of the stories 'have the character of chivalric romances,' and are therefore probably of French origin; while others 'bear the impress of a far higher antiquity, both as regards the manners they depict, and the style of language in which they are composed.' These latter rarely mention A., but the former belong, as Mr. Skene puts it, to the 'full-blown Arthurian romance.' Early in the 12th c., the Arthurian metrical romance became known in Germany, and there assumed a more animated and artistic form in the *Parzival* of Wolfram of Eschenbach, *Tristan and Isolt* of Gottfried of Strasburg, *Erec* and *Iwein* of Hartmann, and *Wigalois* of Wirnt. The most renowned of the heroes of the Arthurian school are Peredur (Parzival or Perceval), Tristan or Tristram, Iwein, Erec, Gawein, Wigalois, Wigamur, Gauriel, and Lancelot. From France, the Arthurian romance spread also to Spain, Provence, Italy, and the Netherlands, and was again retransplanted into England. One of the publications that issued from the press of Caxton (1485), was a collection of stories by Sir Thomas Malory, either compiled by him in English, from various of the later French prose romances, or translated directly from an already existing French compendium. Copland reprinted the work in 1557, and in 1634 the last of the black-letter editions appeared.

A reprint of Caxton's *Kynge Arthur*, with an introduction and notes, by Robert Southey, was issued in 1817 (*The Byrth, Lyfe, and Actes of Kyng Arthur*, &c., 2 vols. 4to). The best edition is that by Thomas Wright (Lond. 3 vols., 1866) from the text of 1634. The name of King A. was given during the middle ages to many places and monuments supposed to have been in some way associated with his exploits, such as 'Arthur's Seat' near Edinburgh, 'Arthur's Oven' on the Carron near Falkirk, &c. What was called the sepulchre of his queen was shown at Meigle, in Strathmore, in the 16th c. The interest of the legends about King A. and his knights has been revived by Tennyson's *Idylls of the King* (1859 *et seq.*); and some of Wagner's operas. See Turner's *History of the Anglo-Saxons;* Ritson's *King Arthur;* Villemarqué, *Contes Populaires des Anciens Bretons* (1842); Grässe, *Sagenkreise des Mittelalters* (1842); Skene's *Four Ancient Books of Wales* (1868); Glennie's *Arthurian Localities* (1869); Cox's *Popular Romances of the Middle Ages* (1871); Fontan, *Arthus, ou le Roi-chasseur* (1874).

ARTHUR, prince of Brittany. See King JOHN.

ARTHUR, CHESTER ALLAN, twenty-first president of the United States, was born in Franklin County, Vermont, on the 5th October 1830. He distinguished himself as a student at Union College, New York; and devoting himself to law studies, was admitted to the bar at an early age. After having practised for some years, he was made a Judge-advocate; at the outbreak of the great civil war he held the post of Inspector-general; and during the war was Quartermaster-general for the New York forces. He subsequently returned to law practice, and became the head of a very eminent law firm. A., who is of Scoto-Irish extraction, took a prominent share in politics, on the Republican side; and in 1871 President Grant appointed him Collector of Customs at the port of New York. As being hostile to the reform in the civil service aimed at by President Hayes, he was removed from this post in 1878, and again returned to the practice of law. He was a leader of the Republican party in the State; and though belonging to the section of the Republicans opposed on the question of civil service reform to that represented by General Garfield, was made Vice-president of the United States when Garfield became President in 1881. The death of Garfield, caused by the effects of an assassin's pistol-shot, called the Vice-president to the supreme magistracy of the union; and A. was installed as president on the 22d September 1881. See ARTHUR, CHESTER A., in AM. SUPP.

ARTHUR'S SEAT, a hill in the immediate vicinity of Edinburgh, which rises to the height of 822 feet above the level of the sea. The ascent is easy, and the prospect from the top unrivalled. A. S. is supposed to derive its name from the British king. When the hill received this appellation is not known; but at the close of the 15th c., the poet Kennedy mentions 'Arthur Sate or ony hicher hill.'

The hill is formed of a mass of trap of various species, upheaved through the carboniferous strata of Central Scotland, and presenting on the west and south sides, at the height of 570 feet, a perpendicular range of precipices, called Salisbury Crags, 60 to 80 feet high. The trap is in tabular masses, and has elevated and hardened the carboniferous sandstone, shale, and limestone beds, which dip east, and crop out on the west, besides being broken through and overflowed by the trap-rocks. In the center of the hill, the trap often encloses fragments of sandstone, and divides it by veins. The central and upper part of the hill, and the remarkable columns called 'Samson's Ribs,' consist of basalt.

A'RTICHOKE (*Cynara Scolymus*), a thistle-like perennial plant, now growing wild in the south of Europe, but probably a native of Asia. The genus *Cynara* belongs to the natural order *Compositæ*, sub-order *Cynarocephalæ*, and is distinguished by the bracts of the involucre being fleshy at the base, and emarginate, with a hard point and the receptacle fringed. *C. Scolymus* has the radical leaves 3—4 feet long, somewhat spiny, some of them pinnatifid, some undivided. The stem is two or three feet high, branched, with large heads of violet-colored (sometimes white) thistle-like flowers at the summits of the branches. The involucre is tumid, and consists of fleshy, roundish-ovate, crenate, acuminate, imbricated scales. The seeds are elongated and quadrangular, with smooth and firmly attached pappus. The plant has been long cultivated for the sake of the delicate succulent *receptacles* of the heads of flowers, taken before the flowers expand, which are boiled and eaten, or, on the continent of Europe, eaten raw with salt and pepper. The part used is the same which is called the *cheese* in thistles by children, and is sometimes eaten by them. The tender central leaf-stalk is also occasionally used in the same way as that of the Cardoon. Several varieties are in cultivation, differing in the more or less spiny leaves, and the more or less globose form of the head. Artichokes are generally propagated by rooted slips or suckers in spring. These are planted in rows about four feet asunder, and two feet apart in the row. The A. bed continues productive for several years. Seaweed is an excellent manure.—The CARDOON (q. v.) belongs to the same genus.—The JERUSALEM A. (q. v.) is a totally different plant.

A'RTICLE (Lat. *articulus*, a joint) signifies in general a part of a systematic whole. Thus, we speak of the several articles of a confession; the articles of war; a leading article, &c.

The use of A. as a grammatical term arose as follows. In such a sentence as, 'He found *that* (or *the*) man *that* he was looking for,' the Greeks considered the defining particles as connecting the two parts of the sentence, and called them joints (Gr. *arthra*, Lat. *articuli*); the name was subsequently confined to the first of the two, the other being called the relative.

In English, there are two articles—the definite *the*, and the indefinite *a* or *an;* and other modern languages have corresponding words. But articles are not essential to language. The Latin had no articles, and the Greek, as well as the older Germanic languages, the Mœso-Gothic and Old Norse, e.g., had only the definite A. 'In no language,' says Dr. Latham, 'in its oldest stage, is there ever a word giving, in its primary sense, the idea of *an* or of *the*. As tongues become modern, some word with a *similar* sense is used to express the relation. In the course of time, a change of form takes place, corresponding to the change of meaning.'

The definite articles originate uniformly in demonstrative pronouns. Eng. *the* is only a weakened form of *that* (Anglo-Sax. *thæt*). The same is the case with Ger. *der;* and Fr. *le*, Ital. *il* and *lo*, and Sp. *el*, are all from the Lat. *ille*, 'that.' In like manner, *an* or *a* is from the old form of *one* (ane); Ger. *ein* is both *one* and *a;* and so are Fr. *un*, Ital. and Sp. *uno*, both from Lat. *unus=one*.

In the Scandinavian tongues, the article is attached to the end of the word; the Danish, for example, writes *kong-en*, the king; *huset*, the house.

A'RTICLES OF WAR are regulations made for the government of the military and naval forces of the country. They are of three classes—1. Those relating to the army, including therein the forces in India, according to the provisions of the 21 and 22 Vict. c. 106; 2. Those relating to the marine forces; and 3. Those relating to the navy.

1. *A. of W. for the Army.*—These regulations were formerly issued under the authority of the annual MUTINY ACT (q.v.). By the 68th sect. of the Army Discipline and Regulation Act, 1879, Articles of War can be made by the Queen for the better government of the forces, other than the marines, to whom that Act relates. The Admiralty enjoys like power in the case of marines. The Articles are to be judicially taken notice of by all judges and in all courts whatsoever; provided that no person shall by such A. of W. be subject to be kept in penal servitude, or to suffer any punishment extending to life or limb, except for crimes which the Act declares shall be so punishable. And for the enforcement of such A. of W., a power is given to the Crown to erect, or grant authority to convene, *courts-martial* to try and punish offences according to the Articles. In order, however, to limit the power conceded to the Crown in this matter, it is enacted that nothing therein contained shall be construed to exempt any officer or soldier from being proceeded against by the ordinary course of law; and that when he is accused of any offence against a subject of the realm, punishable by the laws of the land, he shall be delivered to the civil magistrate. The offences against which these A. of W. are directed, relate to the soldier's duties and obligations; to crimes and offences and their punishments; to courts-martial; and to rank. The crimes and offences referred to are those against divine worship, perjury, mutiny and insubordination, desertion and absence without leave; offences in the field, camp, garrison, or quarters; drunkenness, disgraceful conduct, false returns, billets and carriages, recruiting and miscellaneous offences. By the third Article it is ordered that every recruit shall, within ninety-six hours, have the 40th and 46th Articles read to him, and shall within ninety-six hours, but not sooner than twenty-four, make the following oath before some qualified authority: '*I do make oath, That I will be faithful and bear true allegiance to Her Majesty, her heirs and successors, and that I will, as in duty bound, honestly and faithfully defend Her Majesty, her heirs and successors, in person, crown, and dignity, against all enemies, and will observe and obey all orders of Her Majesty, her heirs and successors, and of the generals and officers set over me. So help me God.*' The 191st Article is to the effect, that whenever any forces shall have embarked on board ships of war or transports, the officers and soldiers shall, from the time of embarkation, strictly conform themselves to the laws and regulations established for the government and discipline of the ship; and shall consider themselves, for these purposes, under the command of the senior officer of the particular ship, as well as under the superior officer of the fleet (if any), to which such ship belongs. See A. of W. for the Marine Forces.

2. *A. of W. for the Marine Forces*, till 1879 made under the authority of another annual Mutiny Act, are now regulated by the Army Discipline Act. Unlike the A. of W. for the army, they do not issue directly from the Crown, but are made by the Lord High Admiral, or by the commissioners for executing that office, and they are authorized so to be made by the last-mentioned Mutiny Act. With this exception, they are much the same as the A. of W. for the army. They relate exclusively, however, to the marine forces *while on shore*, and this specialty is expressed in the preamble of the Act, which recites that 'the said forces may frequently be quartered, or be on shore, or sent to do duty, or be on board transport-ships, or merchant-ships, or vessels, or they may be under other circumstances in which they will not be subject to the laws relating to the government of Her Majesty's forces by sea.' While doing duty in any of Her Majesty's ships or vessels in commission, the marines, like other naval forces, are subject to the A. of W. for the government of the navy.

3. *A. of W. for the Navy.*—In regard to such regulations, the navy is differently situated. It is not governed by any annual Mutiny Act, but the A. of W. relating to it are contained in the Naval Discipline Act, 29 and 30 Vict. c. 109 (1866), which supplies the law of the sea-service. The Naval A. of W. were eminently Draconian, but by the Naval Courts vastly mitigated in practice. The first Naval A. of W. authorized by parliament were contained in the 13 Chas. II. c. 9, said to have been drawn up by Admiral Montague, afterwards Earl of Sandwich, with the approbation of Lord Chancellor Clarendon and other members of the privy council. But the statute and subsequent supplementary Acts were repealed by the 22 Geo. II. c. 33, the forerunner of the later Naval Discipline Act. See Mr. Prendergast's *Law of the Navy*, 1852, Part I. p. 15.

The Mutiny Act and the Marine Mutiny Act, both now superseded by the above Act of 1879, vested power to make Articles of War in the Crown and Admiralty respectively. These were very voluminous, and often merely a repetition of the clauses of the Mutiny Act, while including others relating to lesser crimes and punishments than there mentioned, as also more details as to the constitution and procedure of courts-martial. The Army Discipline and Regulation Act has so far incorporated the Mutiny Acts and the Articles published with them, that there seems but little necessity for further A. of W. to issue; while rules of procedure, issued by the Crown, under the authority of the Act, and concurred in by the Admiralty, are now published with the Act.

A'RTICLES, THE SIX, often mentioned in the ecclesiastical history of England in the 16th c., were articles imposed by act of parliament in 1539, when Henry VIII. being displeased with some of the bishops most favorable to the Reformation, their opponents for a time regained the ascendency. These A. asserted the doctrine of transubstantiation, declared communion in both kinds not to be necessary, condemned the marriage of priests, enjoined the continued observance of vows of chastity, and sanctioned private masses and auricular confession. The act imposing them was popularly called 'the six-stringed whip.' Severe penalties were appointed for writing or speaking against them, and for abstaining from confession or the sacrament at the accustomed times, for priests failing to put away their wives, and for persons writing or speaking against the doctrine of transubstantiation. Archbishop Cranmer vainly opposed the act in the House of Lords: the king was resolute to have it passed. Its severity was mitigated by a subsequent act of his reign (1544), and although it continued substantially unrepealed, it was transgressed with impunity even by ecclesiastical dignitaries.

A'RTICLES, THE THIRTY-NINE, of the Church of England, are the articles of religion which were agreed upon by the archbishops and bishops of both provinces and the whole clergy in the convocation held at London in the 4th year of Elizabeth, 1562, under Archbishop Parker. To have a clear view of the history of these important articles, we must go back to the promulgation of the original ones, forty-two in number, in the reign of Edward VI. The council appointed by the will of Henry VIII. to conduct the government during the king's minority, was for the most part favorably disposed towards the Reformed opinions, and the management of church affairs devolved almost entirely upon Archbishop Cranmer. In the year 1549, an act of parliament was passed, empowering the king to appoint a commission of 32 persons, to make ecclesiastical laws. Under this act, a commission of 8 bishops, 8 divines, 8 civilians, and 8 lawyers (amongst whom were Cranmer, Ridley, Hooper, Coverdale, Scory, Peter Martyr, Justice Hales, &c.) was appointed in 1551, and one of its first acts was to draw up a code of articles of faith. These were forty-two in number, and were set forth by the king's authority in 1553. Strype and Burnet make it appear that these forty-two articles were agreed upon in the convocation that was sitting in 1552, but this was not the case. Fuller, speaking in his quaint way of this convocation, declares that it had 'no commission from the king to meddle with church business, and,' he adds, 'every convocation in itself is born deaf and dumb, so that it can neither hear nor speak concerning complaints in religion till first *Ephphatha*, "Be thou opened," be pronounced unto it by royal authority.'

'However,' he continues, 'this barren convocation is entitled the parent of those forty-two articles which are printed with this title, *Articuli de quibus in Synodo Londinensi* 1552 A. D. *inter Episcopos et alios concenerat.*' To these articles was prefixed the Catechism, and there is no doubt of Cranmer having had the principal hand in their composition; for he owned before Queen Mary's commission that they were his doing. But immediately after their publication, Edward died, and one of the first acts of the convocation summoned with the parliament in the first year of Queen Mary, was to declare that these forty-two articles had not been set forth by the agreement of that House, and that they did not agree thereto. In 1558, Elizabeth succeeded her sister. In 1559, Parker was installed in the see of Canterbury, and immediately the other vacant sees were filled up. And now came a fresh opportunity of drawing up some articles of faith which might serve as a test of orthodoxy in the Reformed Church. Parker applied himself to this work, and for the purpose, revised the forty-two articles of King Edward, rejecting four of them entirely, and introducing four new ones, viz., the 5th, 12th, 29th, and 30th as they now stand, and altering more or less seventeen others. This draft Parker laid before the convocation which met in 1562, where further alterations were made; and the 39th, 40th, and 42d of King Edward's, which treated of the resurrection, the intermediate state, and the doctrine of the final salvation of all men, were finally rejected. The 41st of King Edward's, which condemned the Millenarians, was one of the four which Parker omitted. Thus the articles were reduced to thirty-nine. They were drawn up and ratified in Latin, but when they were printed, as was done both in Latin and English, the 29th was omitted, and so the number was further reduced to thirty-eight. From these thirty-eight there was a further omission, viz., of the first half of the 20th article, which declares that 'the church hath power to decree rites and ceremonies, and hath authority in controversies of faith.' As all the records of

convocation perished in the great fire of 1666, it is very difficult to ascertain how these omissions arose. However, in 1571. the articles once more underwent revision. Archbishop Parker and Bishop Jewel made a few trifling alterations, and the 29th being restored, the convocation which was then sitting ratified them both in Latin and English, and an act of parliament was passed in that year compelling the clergy to subscribe 'such of them as only concern the confession of the true Christian faith, and the doctrine of the Sacraments. There still, however, remained some difficulty as to which was the authorized copy, some of the copies being printed with, and others without, the disputed clause of the 20th; but this was finally settled by the canons passed in the convocation of 1604, which left the thirty-nine articles as they now stand. 'His Majesty's Declaration,' which precedes them, and directs that they shall be interpreted 'in their literal and grammatical sense,' was prefixed by Charles I. in 1628.

It may be interesting to know from what other sources the thirty-nine articles are derived. Some of them, as the 1st, 2d, 25th, and 31st, agree not only in their doctrine, but in most of their wording, with the Confession of Augsburg. The 9th and 16th are clearly due to the same source. Some of them, as the 19th, 20th, 25th, and 34th, resemble, both in doctrine and verbally, certain articles drawn up by a commission appointed by Henry VIII., and annotated by the king's own hand. The 11th article, on justification, is ascribed to Cranmer, but the latter part of it only existed in the articles of 1552. The 17th, on predestination, may be traced to the writings of Luther and Melanchthon.

The thirty-nine articles have been described as 'containing a whole body of divinity.' This can hardly be maintained. They contain, however, what the Church of England holds to be a fair scriptural account of the leading doctrines of Christianity, together with a condemnation of what she considers to be the principal errors of the Church of Rome, and of certain Protestant sects. As far as they go (and there are many things unnoticed by them) they are a legal definition of the doctrines of the Church of England and Ireland; though it is to the *Book of Common Prayer* that members of that communion look for the genuine expression of her faith. They were adopted by the convocation of the Irish Church in 1635, and by the Scotch Episcopal Church at the close of the 18th century. Corpus Christi College, Cambridge, contains the only copies of the A. in manuscript or print that are of any authority. Amongst them are the Latin manuscript of the A. of 1562, and the English manuscript of the A. of 1571, each with the signatures of the archbishops and bishops who subscribed them. See *An Account of the Thirty-nine A.*, by Dr. Lamb.

For other 'Articles,' see LAMBETH, PERTH, and SCHMALKALD.

ARTICULA'TA (or ARTICULATED ANIMALS), one of the great primary divisions of the Animal Kingdom, according to the system of Cuvier (see ZOOLOGY), and including those animals of which the body is distinctly segmented—the higher worms, as well as Insects, Crustaceans, Arachnids and Myriapods. The four latter groups were separated from the Annelida (q. v., and see also the article WORMS) by Von Siebold, on account of their possession of hollow jointed limbs, into a separate subkingdom, Arthropoda.

ARTHROPODA.—In this great division of the Animal Kingdom, the body consists of a usually definite number of segments, each bearing a pair of hollow and almost always jointed limbs, into which the body muscles proceed.

In all cases, the epidermis gives rise to an external horny layer of *Chitine* (q. v.) which usually attains considerable strength and thickness, and in Crustaceans is further strengthened by impregnation with salts of lime. The segments of the body and their corresponding appendages exhibit a considerable degree of differentiation, especially in the anterior region of the body, where also some or many segments may completely coalesce, their appendages also becoming extraordinarily modified for various functions; so that it requires the combined research of both the embryologist and the comparative anatomist, to analyze the organism into its constituent parts. The nervous system is a ventral chain of ganglia united by longitudinal and transverse commissures, and one pair of ganglia is developed for each segment, although some of these also coalesce more or less completely in the adult.

The A. divide naturally into two great alliances—the water-breathers, or *Branchiata* (see GILLS), and the air-breathers, or *Tracheata* (see RESPIRATION); the former including the *Crustacea*, and the latter the *Prototracheata* or *Peripatidea*, the *Myriapoda*, the *Arachnida*, and the *Insecta*. The relation of the Arthropoda to other groups will best be understood from the article ZOOLOGY. Separate articles will be found on the CRUSTACEA, MYRIAPODA, ARACHNIDA, and INSECTS; the group *Peripatidea* having been most recently established as a distinct class.

The *Peripatidea* are represented by a single genus, *Peripatus*, which appears, both from its extreme simplicity of structure and its wide distribution (S. America and the Antilles, S. Africa, New Zealand) to be of very remote antiquity. At first supposed to belong to a mere subclass of Annelids, its arthropod character was only established during the voyage of the *Challenger*, by the discovery of distinct tracheæ, which open irregularly over the surface of the body, instead of being disposed in regular relation to the segments. Its segments and their appended limbs, its visceral anatomy, and its development are all distinctly arthropodan, and show that we have here almost the most primitive imaginable form of the Tracheate Arthropoda. *Peripatus* is about 1½ inches long, inhabits decayed wood, and has the curious and suggestive habit of spinning a web over itself when alarmed. (See Moseley. *Notes of a Naturalist in the Challenger.*)

ARTICULATE SOUNDS. See LETTERS.

ARTICULATION. See JOINTS.

ARTIFI'CIAL LIMBS. With the exception of the celebrated artificial hand of the German knight, Götz von Berlichingen*—who flourished in the early part of the 16th c. (1513), and who was named *The Iron-handed*—which weighed 3 pounds, was so constructed as to grasp a sword or lance, and was invented by a mechanic of Nuremberg, our knowledge of artificial limbs dates from the time of Ambrose Paré whose *Œuvres de Chirurgie* were published in 1575. The twelfth chapter of that volume, as translated by Thomas Johnson in 1605, shows 'by what means arms, legs, and hands may be made by art, and placed instead of the natural arms, legs, and hands that are cut off or lost.

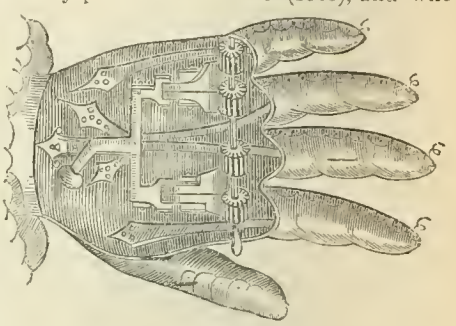


Fig. 1.

The accompanying figures are copies of his drawing of 'an hand made artificially of iron (fig. 1),' and of 'the form of an arm made of iron verie artificially (fig. 2).' He also gives a drawing of 'a wooden leg made for a poor man' (fig. 3), which is simply the common wooden leg with bucket receptacle still in use. No improvements worthy of record were made from the time of Abrose Pare to the beginning of the present century, when Baillif of Berlin constructed a hand which did not exceed a pound in weight, and in which the fingers, without the aid of the natural hand, not only exercised the movements of flexion and extension, but could be closed upon and retain light objects, such as a hat and even a pen. 'Artificial hands,' says Mr. Heather Bigg, 'are now constructed, by means of which a pin may be picked up from the ground, a glass raised to the lips, food carried to the mouth, and a sword drawn from its scabbard, and held with considerable firmness; while a combined arm and hand is fabricated, which is equal to the ordinary requirements of histrionic declamation.'—*Orthopraxy*, 1865. p. 157. The utility of an artificial arm depends much on the nature of the stump. A stump above the elbow is best suited for an arm when it gradually tapers to its lowest end, and terminates in a rounded surface. When an arm is removed at the shoulder-joint, and there is no stump, an artificial arm can still be fixed in its proper place by means of a corset. In amputation below the elbow joint, the best stump is one which includes about two-thirds of the fore-arm; while a stump formed by amputation at the wrist is very unsatisfactory. The simplest form of artificial arm intended to be attached to a stump terminating above the elbow, 'consists of a leathern sheath accurately fitted to the upper part of the stump. The lower end of the sheath is furnished with a wooden block and metal screw-plate, to which can be attached a fork for holding meat, a knife for cutting food, or a hook for carrying a weight.'—*Op. cit.* p. 160. The arm should be so carried as to represent the position of the natural arm when at rest. It is

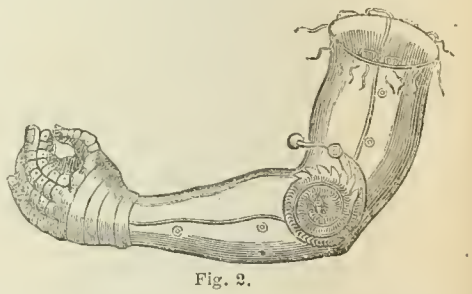


Fig. 2.

* The iron hand of this knight, who has been immortalized by Goethe, is preserved at Jaxthausen, near Heilbronn, and a duplicate of it is in the Schloss at Erbach, in the Odenwald. It is stated in Scott's *Border Antiquities*, vol. ii., p. 206, that the family of Clephane of Carslogie 'have been in possession from time immemorial of a hand made in the exact representation of that of a man, curiously formed of steel,' which was conferred by one of the kings of Scotland on a laird of Carslogie, who had lost his hand in the service of his country.—See *Notes and Queries* for July 17, 1867, p. 35.

retained in its position by shoulder and breast straps, and forms a light, useful, and inexpensive substitute for the lost member. More complicated, and therefore more expensive pieces of apparatus are made, in which motion is given to the fingers, a lateral action of the thumb is obtained, and the wrist-movements are partially imitated; and a degree of natural softness is given to the hand by a covering of gutta-percha and India-rubber. Such a hand, says Mr. Bigg, is often more symmetrical in aspect than the natural hand, but it possesses no efficient grasping power. Hence provision has to be made for attaching various instruments to its palm, such as special hooks, which can be removed at pleasure, for driving, shooting, &c.; apparatus for using the knife and the fork, for grasping the pen, &c.: indeed, the number and variety of instruments capable of being applied to an artificial hand are extremely great. Nothing has tended so much to the very highest development of artificial arms and hands, as an accident which happened more than a quarter of a century ago to the celebrated French tenor, M. Roger, who lost his right arm above the elbow.

It was necessary, for his future appearance on the stage, that he should have an artificial limb, which would serve the purposes of histrionic action, and permit him to grab a sword and draw it from its scabbard. Such a contrivance was invented in 1845 by Van Petersen, a Prussian mechanician, and the French Academy of Sciences commissioned MM. Gambey, Rayer, Valpeau, and Magendie to report upon it. For a history of the nature of the limb, the reader is referred to the report which appeared in the *Comptes Rendus* for that date, or to Mr. Bigg's *Orthopraxy*, pp. 176—181. The apparatus, which weighs less than 18 ounces, was tested upon a soldier who had lost both arms. By its aid he was enabled to pick up a pen, take hold of a leaf of paper, &c.; and the old man's joy during the experiment was so great, that the Academy presented him with a pair of these arms. Van Petersen's conceptions have been extended and improved by Messr. Charriere, the celebrated surgical mechanics of Paris, aided by M. Huguier, the well-known surgeon. A very marvelous arm has also been almost simultaneously constructed by M. Bechard, which, 'by means of a single point of traction, placed in pronation, executes first the movement of supination, next in succession the extension of the fingers and abduction of the thumb: the hand is then wide open.' —Bigg, *op. cit.* p. 190.

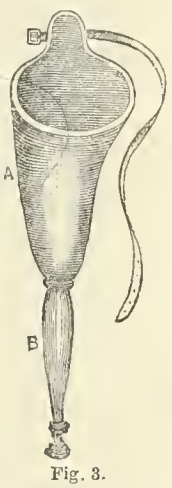


Fig. 3.

Artificial legs having fewer requirements to perform than artificial arms, are comparatively simple in structure. We borrow the description of our figure of the ordinary bucket leg in common use amongst the poorer classes from Mr. Bigg's *Orthopraxy*. 'It consists of a hollow sheath or bucket, A, accurately conformed to the shape of the stump, and having—in lieu of the more symmetric proportions of the artificial leg—a 'pin,' B, placed at its lower end to insure connection between it and the ground. This form of leg is strongly to be recommended when expense is an object, as it really fulfils all the conditions excepting external similitude embraced by a better piece of mechanism. It is likewise occasionally employed with benefit by those patients who, from lack of confidence, prefer learning the use of an artificial leg, by first practicing with the commonest substitute.' As, when the body rests on a single leg, the center of gravity passes through the tuberosity of the ischium, it is essential that the bucket should be so made as to have its sole point of bearing against this part of the pelvis.

Of the more complicated forms of artificial leg three are especially popular. The first of these is of English origin, and owing to its having been adopted by the late Marquis of Anglesea, is known as the *Anglesea leg*. For a description of it, the reader is referred to Gray's work on *Artificial Limbs*, one of the firm of Grays having been the constructor of the legs used by the marquis. This was for a long time *the* fashionable artificial leg. The second leg worthy of notice is that invented by an American named Palmer, and called the *Palmer leg*. From its lightness and the greater ease of walking with it, it has long superseded the Anglesea leg in America. In the third of these legs, also invented in America, and known as *Dr. Bly's leg*, the principal faults of the two other legs have been completely overcome. The advantages of this leg are thus summed up by Mr. Brigg, who has fully described and figured its mechanism: (1.) Adaptation to all amputations either above or below the knee. (2.) Rotation and lateral action of the ankle-joint. (3.) Power on the part of the patient to walk with ease on any surface, however irregular, as, owing to the motion of the ankle-joint, the sole of the foot readily accommodates itself to the unevenness of the ground, which is an advantage never before possessed by any artificial limb. (4.) The ankle-joint is rendered perfectly indestructible by ordinary wear, owing to its center being composed of a glass ball resting in a cup of vulcanite; thus it never gets out of repair, as the Anglesea leg but too frequently does, and the original cost is almost the only one the patient incurs. (5.) The action of the ankle-joint is created by five tendons, arranged in accordance with the position assigned to them in a natural leg. These tendons are capable of being rendered tight or loose in a few instants, so that the wearer of the leg has the the power of adjusting with precision the exact degree of tension from which he finds the greatest comfort in walking, and also of giving the foot any position most pleasing to the eye. (6.) There is a self-acting spring in the knee-joint, urging the leg forward in walking, and imparting automatic motion, thus avoiding the least trouble to the patient, who finds the leg literally and not metaphorically walk by itself. (7.) The whole is covered by a beautiful flesh-colored enamel, thus avoiding the clumsy appearance of the wood, as is always found in an Anglesea leg, admitting of its being washed with soap and water like the human skin. (8). At the knee-joint there is a mechanical arrangement representing the crucial ligaments, and affording natural action to that articulation by which all shock to the stump in walking is avoided. This leg is patented, and as might be expected, is somewhat expensive.

In cases of arrested development of the lower limbs, short-legged persons may be made of the ordinary height by the use of two artificial feet placed twelve or more inches below the true feet, and attached to the legs by means of metallic rods, jointed at the knee and ankle.

Other parts not entitled to be called limbs, can also be replaced by mechanical art—such as the nose, lips, ears, palate, cheek, and eye. In the present advanced state of plastic surgery, deficiencies of the nose, lips, and palate can usually be remedied by an operation; cases, however, may occur where an artificial organ is required. Artificial ears are molded of silver, painted the natural color, and fixed in their place by a spring over the vertex of the head. Loss of an eye causes sad disfigurement; but the artificial eyes of Boissonneau (see his *Renseigements Généraux sur les Yeux Artificiels, leur Adoption et leur Usage*), which have been shown in all the recent public exhibitions, completely throw all others in the shade, and cannot be detected without the closest inspection. For further details on all these subjects we must refer to Mr. Bigg's volume, which is a complete encyclopædia on these and allied topics.

ARTILLERY sometimes means large cannon or ordnance of every kind; sometimes it includes the shot and shell; sometimes it applies to the soldiers who manage the cannon. In the present work, the large pieces of ordnance, as a class, are described under CANNON; specialties are noticed at CARRONADE, HOWITZER, GUN, MORTAR, &c.; and in some cases under the names of the inventors, as ARMSTRONG GUN, LANCASTER GUN, &c. See also FIREARMS, RIFLED ARMS, GUNNERY, SHELLS, SHOT. It may, however, be well here to explain that the term *Equipment of A.* is applied to a combination of men, material, and horses, suitable for coast-defences, sieges, or the arming of fortified posts. There are several kinds of equipments of *light* A., under the names of horse, field, rocket, mountain, and reserve; and others of *heavy* A., for the attack and defence of coasts and fortified places. These various equipments are generally divided into smaller collections called *Batteries* (q. v.), for more easy control and manœuvring. *Park of A.* is a collective name given to the whole of the guns, carriages, ammunition, and other appurtenances essential to the working of field or siege A.

Artillery Corps.—Before the invention of gunpowder, the larger projectile weapons, sometimes called *engines of war*, sometimes *artillery*, were worked by rough soldiers, who needed no particular apprenticeship to that art. When, however, large balls of iron came to be propelled by the irresistible force of gunpowder, a great revolution gradually took place, though garrison-guns and siege-guns were improved more rapidly than field-guns. Nevertheless, field-guns changed the whole aspect of military tactics; for it became necessary that an army should form in order of battle at a much greater distance from the enemy than in older times. And when the cannon were made more rapidly movable, so did tactics vary. Gradually, a body of men were set apart to study the force and action of gunpowder, the flight and range of projectiles, the weight and strength of cannon, and the manœuvring of heavy masses. The French were the first to make these researches; after them, the English; and still later, the Germans. During the Thirty Years' War, an important step was taken in Germany—that of including the artillerymen, who were till then a sort of guild, as a component in the regular army. Gustavus Adolphus in Sweden, Frederick II. in Prussia and Napoleon I. in France, all attached a very high degree of importance to the A. as an arm of the service. After the great wars in the beginning of the present century, nearly all the states of Europe formally recognized the A. as the third great branch of military service (next after the infantry and cavalry); indeed, in almost all present armies, it takes practically the first place.

A. corps, or artillerymen, are divided into land-A. and marine-A. The land-A. is divided into field, coast, garrison, and siege A. The field-A. is sub-divided into horse and foot. There are also the special appellation of reserve, light and heavy A. In most European states, the artillerymen are divided into regiments, battalions, brigades, and companies; but in Britain the whole form one enormous regiment, which is expanded or contracted according to the exigencies of the service. See below.

When military men speak of *the* field-A., they usually include cannon, carriages, horses, ammunition, and stores of every description, as well as the artillerymen. The distinction between heavy and light A. depends on the size of the cannon, and the weight of the shot and shell propelled from them. For obvious reasons the construction of very large field-guns is avoided. Military men are not quite agreed as to the precise figures; but there was in the time of Napoleon I. a general concurrence in opinion that a well-appointed field-force should have two or three A. guns to every 1000 infantry, and five or six horse A.-guns to every 1000 cavalry. The proportion is necessarily affected by the kind of country and the amount of available transport. During the Peninsular War, Wellington had seldom more than 1 gun to every 1000 soldiers; when he entered France, he had 3 to the 1000. Napoleon preferred 2 per thousand, with a larger supply of ammunition than had before been deemed necessary; and many foreign governments followed his example. Since the Franco-German war, it is held that there should be always with the army 3 guns per 1000 infantry.

The Royal Regiment of Artillery is the collective name for the whole of the A. belonging to the British army. Under *Artillery Corps*, the origin of similar bodies on the continent of Europe is briefly noticed. There was no regular regiment or corps of A. soldiers in the English army till the time of Queen Anne, when the present Royal Regiment was formed. Since that period, from some anomaly difficult to explain, all the additions have been made to the same regiment, instead of forming new regiments, to be combined into a division or corps. The regiment is now almost an army in itself; and to increase the anomaly, it comprises horse as well as foot. The foot-A., with medium guns, attend infantry in the battle-field; and with heavier guns, besiege and defend fortified places; while the horse-A., with lighter guns, accompany the cavalry. The mounted artillerymen were organized long after those who manœuvre on foot. Though both corps form one regiment, they have distinct designations—the *Royal A.*, and the *Royal Horse-A.* Besides these two corps, the regiment is considered to include the *Master Gunners* and the *Coast Brigade*.

The regiment has varied from 18,000 to 36,000 strong (including those placed upon the East India establishment), during the last 20 years. Formerly, the foot were divided into *battalions*, and the horse into *troops*. Each company, with its quota of guns and stores, constituted a *field-battery;* and each troop, with its quota, constituted a *horse-battery*. The terms 'company' and 'troop' are now altogether abandoned as being properly applicable to infantry and cavalry, and both foot and horse are divided into *brigades* and *batteries*. Under the old organization, there was no major among the working officers, the designations being captain, second-captain, and lieutenants. The grades now are major, captain, and three lieutenants per battery. A battalion in former times usually comprised eight companies. When the number of the regiment was 18,000, it comprised 119 companies and troops, averaging somewhat over 150 men each; at other times, the companies varied from 130 to 200 men each. At present, a brigade usually comprises 8 batteries of horse, or 10 of field, or 7 of garrison A. A horse-battery has 5 officers and 151 men; a field-battery (at home), 5 officers and 152 men; and a garrison-battery, 4 officers and from 100 to 150 men, according to the guns of position in its charge. The brigades of foot-A. are designated by ordinal numbers; the brigades of horse-A. are designated by letters, from A to F (omitting E). In the old nomenclature, the companies and battalions of foot-A. had numbers—i.é., 6th company, 12th battalion; and the troops of horse-A. were designated by letters.

The following table, from the Army Estimates of 1882—1883, shows the numbers of the force:

ROYAL ARTILLERY.		
Commissioned officers	1,072	
Non-commissioned officers	1,807	
Rank and file	25,470	
Horses		7,576
ROYAL HORSE-ARTILLERY.		
Commissioned officers	181	
Non-commissioned officers	271	
Rank and file	3,978	
Horses		3,344
Total men	32,779	
Total horses		10,920

Of this number of men 12,065 are placed at the disposal of the East Indies, to be paid for out of Indian revenues. A general order was issued in April, 1882, giving details of the new organization of the Royal A. The former divisions of this regiment (which is the largest in the world, numbering some 21,000 men) were 3 brigades of horse, 6 of field, and 5 of garrison A. The new organization provides for 2 horse brigades, 4 field brigades, and 11 divisions of garrison A., in each of which the first brigade consists of regulars, while the Militia Artillery regiments in each district are formed into the junior brigades of their divisions, to each of which a territorial designation is given. The first, or Northern Division, has its headquarters at Newcastle, and the Durham, Northumberland, and Yorkshire Artillery are attached to it. The second, or Lancashire Division, includes the Lancashire Militia, and is domiciled at Liverpool. The third, or Eastern Division, hails from Yarmouth, and its second and third brigades are furnished by the Norfolk and Suffolk Artillery Militia. The fourth is the Cinque Ports Division, stationed at Dover, and embracing the Kent and Sussex Militia. The fifth, or Woodwick Division, is formed entirely of regulars, and contains only one brigade. The Southern Division has its depot at Portsmouth, and takes in the Hants and Isle of Wight regiments; and the Western Division at Plymouth takes charge of the Devon and Cornwall regiments. A Scottish and a Welsh Division absorb the militia regiments at each of their districts, their headquarters being at Leith and Pembroke Dock respectively; and the North and South Irish Divisions, with depôts at Carrickfergus and Cork, account for the militia of the sister isle. Recruiting for the Royal A. will be carried on by the infantry regimental district officers. See also the articles BATTERY, ARMY ORGANIZATION, AND MARINES.

The Honorable Company of Artillery is the oldest volunteer corps in Britain. Four military bodies—the *Artillery Company*, the *Sergeants-at-Arms*, the *Yeomen of the Guard*, and the *Gentlemen Pensioners*, were established as far back as the time of the Tudors; they all still exist, but under greatly altered circumstances. In 1537, Henry VIII. granted a patent creating a guild ultimately known as 'The Masters, Rulers, and Commonalty of the Fraternity or Guild of Artillery of Long-bows Cross-bows, and Hand-guns.' Its members were empowered to keep arms and to exercise themselves in shooting. In 1638 the corporation of the city of London presented to the Company the plot of ground ever since called the Artillery Grounds, near Moorfields, as a field for military exercise. Royal princes frequently enrolled themselves as members of the Company, usually as 'captain-general.'

In 1719, George I. issued an order that all the commission and staff officers of the City Train-bands (a metropolitan militia) should become members of the Company, and exercise with the other members at all convenient times. The word 'artillery' had heretofore been considered as applying to bows and arrows as well as to firearms; but the members of the Company, like other marksmen, had almost abandoned archery, without, however, making any change in their designation. The Company, like many other city guilds, has nearly outlived its original purpose. In 1780, when the 'Lord George Gordon riots' afflicted the metropolis, the members of the Company effectually protected the Bank of England; in 1848 and again in 1859, the Company was on the alert to render good service if needed; but it has never been engaged in actual warfare with an enemy.

The Company consists of members elected by the ballot of a Court of Assistance, consisting of officers and others *ex officio*, and twenty-four annually elected. The members pay two guineas annual subscription, and £5 entrance fee, and supply themselves with uniforms, but not with arms and accoutrements. These payments, together with the rental received from some real property, constitute the fund out of which the expenses are defrayed. The members learn rifle-shooting as well as artillery practice; there are meetings twice a week at Moorfields; and every summer there are certain days of camping at some country place. The corps comprises six infantry companies, a troop of light cavalry, who furnish their own horses; and a battery of A., as well as a company of veterans. Until 1849, the members elected their own officers; but since that year the crown has appointed them. The lieutenant-colonel appoints the non-commissioned officers. The total number of all arms, is about 600. The regiment has of late years taken a very good position in shooting at Wimbledon. Martini-Henry rifles were lately served out to them, instead of Sniders, a privilege not accorded to the same extent, as yet, to other volunteer regiments. The Company is also the only volunteer body allowed to march through the streets with bayonets fixed. Compare G. H. Raikes *History of the Hon. Artillery Company*, 2 vols.

Artillery Schools.—The first school for A. instruction was established by the Venetians in the beginning of the 16th century. Soon afterwards, Charles V. established similar schools at Burgos and in Sicily. The French founded a school of practical A. in 1675; and in 1679, they added to it a theoretical school at Douai. At present, France has no fewer than seven such establishments. Saxony had an A. school in 1766; but the other German states were more tardy in this work. In Prussia, the A. and engineer schools are combined; but in others of the European states, a

separation between these two arms of the science is made. In most schools of A., the officers' studies comprise mathematics, as much of physics and chemistry as is necessary to the duties of an artillerist, field and permanent fortification, garrison-warfare, field-tactics, military history and topography, military surveying and sketching, drawing from the model, &c. The practical exercises include the serving and firing of guns and mortars, the laying out and constructing of field-batteries, and the operations of the laboratory and A. workshop.

The headquarters for A. instruction in England are at Woolwich. A *Royal Military Academy* was established there in 1741, to impart professional instruction to the artillerists and engineers belonging to the royal army. The East India Company sent their A. cadets to this Academy from the year 1798 to 1810; but afterwards, until 1861, they maintained a separate establishment at Addiscombe (which, however, was not wholly for artillery). At the present day, the students in the Academy are recruited by fair open competition. They enter between the ages of seventeen and twenty; and they remain two years, or such longer time as may fit them to pass an examination for the Royal A. or Engineers. The sons of military officers are admitted on lower terms than those of other persons. The financial control is under the Secretary of State for War; but the Commander-in-chief regulates the discipline and internal arrangements. There are 22 professors and instructors of various kinds. Besides this Royal Military Academy, there is at Woolwich a *Department of A. Studies*, for the instruction of junior officers of A., and for facilitating their visits to the fortifications and public works of foreign countries. There is also a *Select Committee*, whose duties are not so much educational as experimental; it is a small establishment for examining and reporting on the numerous inventions relating to artillery, brought before the War Office. The School of Gunnery at *Shoebury Ness*, subordinate to the headquarters of the A. at Woolwich, is for experiments upon ordnance, gunpowder, and projectiles, and to exercise young A. officers in the practical and mechanical duties of their profession. See ARTILLERY in AM. SUPP.

ARTIODACTYLA. The great mammalian order Ungulata (see MAMMALIA; UNGULATA) is divided into two groups; first, the *Perissodactyla*, including the horse, tapir and rhinoceros, besides a multitude of extinct forms, and distinguished by the third digit of each limb being symmetrical in itself, by the presence of an odd number of digits on the hind-foot, by the number of dorso-lumbar vertebræ being at least twenty-two, and so on; while the second sub-order, the *Artiodactyla*, possess the third digit, unsymmetrical in itself, but forming a symmetrical pair with the fourth digit. While the hind-foot bears an even number of digits, the number of dorso-lumbar vertebræ never reaches twenty-two, and rarely exceeds nineteen. Numerous minor osteological differences exist between the two sub-orders, which broadly correspond to the ancient divisions of solid-hoofed and cloven-hoofed respectively. In the article FOOT will be found some details as to the differences in the feet of various animals of the ungulate order.

The A. again divide into two groups—the *Non-Ruminantia* and the *Ruminantia*. The former have usually more than one pair of upper incisors, and the molars have a more or less tuberculated pattern, whence they are frequently called *Bunodonta*. The metacarpal and metatarsal bones remain separate, and there are no horns. The stomach has rarely more than two divisions. The *Non-Ruminantia* include two existing families, *Suidæ* and *Hippopotamidæ*. The *Suidæ* (pigs) have the skin moderately thick and hairy; the third and fourth toes are much longer than the second and fifth. The teeth are frequently as many as forty-four, and the molars are multituberculate. The *Hippopotamidæ* have the skin extremely thick, with scanty hairs; the head, body, and limbs extremely massive; and the four toes all resting on the ground. The *Ruminantia* have never more than one pair of upper incisors. In the lower jaw, the canines closely resemble and are situated beside the six incisors, which thus seem to have increased to eight. The molars bear a double series of crescentic ridges, whence the name *Selenodonta* is frequently applied to the ruminant group. The stomach has at fewest three, and usually four divisions. Thus in the sheep or ox, the cardiac portion of the stomach is differentiated into the enormous *rumen*, or paunch, and the *reticulum*, or honey-comb stomach, with which it communicates. After the fodder has been chewed again, it passes readily into the third division, the *psalterium*, or manyplies, which acts as a filter, and only allows the finely-comminuted portions of the food to enter the highly glandular *abomasum*, or rennet stomach, in which gastric juice is secreted, and proteid digestion goes on.

The existing groups of ruminants are the *Tragulidæ*, the *Cotylophora*, and the *Camelidæ*. The *Tragulidæ* (sometimes erroneously termed musk-deer) are the least differentiated forms, and show interesting affinities to the non-ruminants. The *Cotylophora*, including the ox and deer tribes (Bovidæ and Cervidæ), are the central family, which are broadly distinguished by the cotyledonary placenta and the structure of their horns; those of the Cervidæ being naked, deciduous, and annually renewed processes of the frontal bones; while those of most Bovidæ (sheep, antelopes, oxen, buffaloes) are non-deciduous processes of the frontal bones, covered by the thickened and hardened epidermis known as horn. But in one sub-family, the giraffes, the horns arise as separate ossifications, and are covered by hairy skin.

The third family, the *Camelidæ*, are aberrant ruminants. They walk on broad integumentary cushions, developed below the phalanges of the third and fourth toes, which are alone developed, the nails not forming hoofs. Large pointed canines are present in each jaw. The stomach has a characteristic structure. The placenta is diffused. There are only two existing groups—the Camels of the Old World, and the Llamas of the New.

See RUMINANTIA, BOVIDÆ, DEER: also HOG, HIPPOPOTAMUS; ANTELOPE, SHEEP, OX, BUFFALO, GIRAFFE, CAMEL, LLAMA, ALPACA, &c.

ARTOCARPA'CEÆ, a natural order of Monochlamydeous exogens, of which the Bread-fruit (*Artocarpus incisa*) is the type; very nearly allied to that of *Moraceæ* (Mulberries, Figs, &c.), and, like it, by many botanists regarded as a sub-order of *Urticaceæ* (Nettles, &c.). The distinction between Artocarpaceæ and Moraceæ lies chiefly in the straight embryo and large cotyledons of the former. The fruit is often a *sorosis* (a single succulent fruit formed of the aggregated ovaries of a whole head of flowers) as in Bread-fruit (q. v.). There are upwards of fifty known species, natives exclusively of the tropics. The milky juice of some yields CAOUTCHOUC (q. v.); and that of a few species is so bland as to be used as a substitute for milk (see COW-TREE). The juice of others is, however, very poisonous, as that of *Antiaris toxicaria*, the Antjar poison, one of the poisons called Upas by the Javanese. The fruits are wholesome; the importance of Bread-fruit in the South Sea Islands is well known; and the seeds of the *Musanga* of the Gold Coast of Africa, and of *Brosimum alicastrum* in the West Indies, are eaten as nuts. The fibrous bark of the Bread-fruit Tree is made into cloth; its wood is used for building, its male catkins for tinder; its leaves serve as substitutes for table-cloths and wrapping-papers, and its milky juice for birdlime. The bark of *Antiaris saccidora* is used in Western India for making sacks, which are formed by cutting a branch of the dimensions of the sack wanted, and simply turning back and drawing off the bark after it has been soaked and beaten, the wood being sawn off so as to leave a little portion to form the bottom of the sack. The fibrous bark of *Cecropia peltata*, or Trumpetwood, is used for cordage. The stem and branches are hollow, and are used for wind instruments. The wood of some species is valuable, such as *Letter-wood* (q. v.).

Bread-fruit (*A. incisa*).

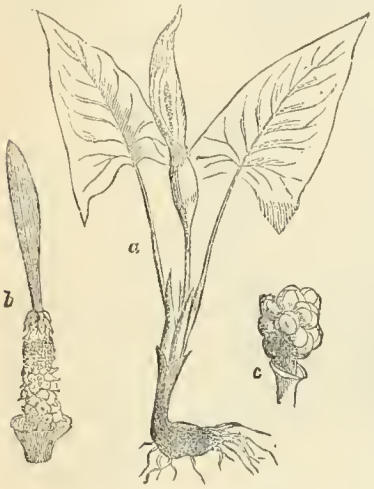
ARTOIS was formerly a province of France, bounded by Flanders and Picardy, and almost corresponding with the modern department of *Pas-de-Calais* (q. v.). The capital of A. was Arras. Louis IX., in 1239, made A. a county, and gave it to his brother Robert, who was succeeded by his son, Robert II., surnamed Posthumous, who died in 1302. Afterwards it passed into the hands of Flanders and Burgundy, but was ceded to France by treaties in 1659 and 1678. Charles X., in his early life, and also after his abdication, was known by the title of Count d'Artois.

ARTS, DEGREES IN. The term 'Arts,' or 'Liberal Arts,' as technically applied to certain studies, came into use during the middle ages, and on the establishment of universities, the term 'Faculty of Arts' denoted those who devoted themselves to Science and Philosophy, as distinguished from the faculty of Theology, and afterwards of Medicine and Law. The number of 'Arts' embraced in the full medieval course of learning was seven: Grammar, Logic, Rhetoric (constituting the *Trivium*), Music, Arithmetic, Geometry, and Rhetoric (the *Quadrivium*). The terms Master and Doctor were originally applied synonymously to any person engaged in teaching. In process of time, the one was restricted to the liberal arts, the other to Divinity, Law, and Medicine. When regulations were established to prevent unqualified persons from teaching, and an initiatory stage of discipline was prescribed, these terms became significant of a certain rank, and of the possession of certain powers, and were called *gradus*, 'steps' or 'degrees.' The

passing of the initiatory stage, said to have been first instituted by Gregory IX. (1227—41), conferred the title of *bachelor* (q. v.), and an additional course of discipline and examination was necessary to obtaining that of *master*. The title of Master of Arts originally implied the right, and even the duty of publicly teaching some of the branches included in the faculty of Arts; a custom which is still retained, to some extent, in the German universities, but has fallen into disuse in Britain and France, where the title is nearly honorary. The subject will be more fully considered under the general head of DEGREE. LL.A. (Literate in Arts) is a minor degree, recently instituted at some of the Scottish universities, and at St. Andrews is open to women. The degrees of Bachelor and Doctor of Science are granted for eminence in subjects some of which belong to the Faculty of Arts.

ARTVI'N, a town of Asiatic Turkey, in the vilayet of Trebizond, 100 miles east from the town of Trebizond. The inhabitants, about 6500 in number, mostly belong to the Roman Catholic Church.

A'RUM, a genus of Spadicifloral endogens, belonging to the natural order *Araceæ* or *Aroideæ*. This order comprises herbaceous plants, some of which are stemless; shrubby plants, some of which are arborescent; and plants which climb by aërial roots, clinging to the trees of tropical forests. The leaves are sheathing at the base, convolute in bud, usually with branching veins. The flowers are male and female, naked, arranged upon a *spadix*, which is generally enclosed in a *spathe* (q. v.); the male flowers at the upper part of the spadix, and the female flowers at its base. The ovary is free. The fruit is succulent, the seeds pulpy, the embryo in the axis of fleshy or mealy albumen, with a lateral cleft in which the plumule lies; the albumen, however, is wanting in some plants of the order.—As thus defined, this order contains almost 200 known species, natives chiefly of tropical countries, but some of the herbaceous kinds belong to colder climates.—The limits of the order are, however, sometimes extended, so that it includes as suborders *Typhaceæ*, *Pistiaceæ*, &c.—The genus *A.* has a convolute spathe; the spadix naked at the point. In some species, a stench like that of carrion is produced during flowering, as well as a remarkable degree of heat. Plants are of course slightly warmer than the air around them, the heat being produced by the breaking up and oxidation of their protoplasm, and by the true respiration, in short, which goes on in all living tissues (see ANIMAL HEAT; but flowers, in general, are only 1°, or 1½°, warmer than the air, whereas the flowers of some of the Arums and nearly allied plants are sensibly warm to the touch, and that of *A. cordifolium* has been found to have a heat of 120° F., while that of the air was only 66° F.



Arum maculatum.
a, leaves and root; *b*, spathe, with base of spadix exposed; *c*, fruit.

The only British species is *A. maculatum*, CUCKOW-PINT or WAKE-ROBIN, which is abundant in England and most parts of Europe, growing chiefly in moist shady woods and under hedges. It has a tuberous perennial root; its leaves are all radical, on long stalks, strongly arrow-shaped, often spotted; the spathe greenish yellow, enclosing a rather short violet or brownish red spadix. It produces scarlet berries, 1—2 seeded, about the size of peas, clustered upon the spadix. The root has a burning acrid taste, which however, it loses in drying or boiling. In a fresh state, it is a drastic purgative, too violent for medicinal use; and, indeed, it, as well as the leaves, is an active poison; yet a nourishing farina is prepared from it, after the acrid juice has been removed. This farina, is a pure starch, and is known in England by the name of Portland Sago or Portland Arrow-root. It was formerly prepared to a considerable extent in the isle of Portland, where also the tubers (corms) themselves are eaten by the country-people. A cosmetic, called Cypress Powder, is made from them in France, and they are used in Switzerland as a substitute for soap. They contain, indeed, a quantity of *Saponine*, to which their acridity is supposed to be owing. They lose great part of their acridity in drying and were formerly used in medicine as a stimulant in impaired digestion, a diuretic in dropsies, and an expectorant in chest complaints. The plant is extensively cultivated in India for food—*A. Indicum* is also much cultivated in Bengal for its esculent stems and small pendulous tubers.—Acridity in the juice, and the presence of an amylaceous substance of very nutritious quality, from which the acrid juice is easily separated, are characteristics of many plants of this order, particularly species of *Caladium* and *Colocasia*, much used for food in warm countries, under the names COCCO (q. v.), EDDOES, &c.—*Amorphophallus campanulatus* (*A. campanulatum*), called OL by the Bengalese, is very much cultivated in some parts of India for its roots (flat underground corms), which form a very important article of food; yet in a fresh state it is so acrid that it is employed as an external stimulant, and is also used as an emmenagogue. Other species of *Amorphophallus* are still more powerfully stimulant.—Two large species of *Arisæma*, another genus very closely allied to *A.*, were found by Dr. Hooker to afford food to the inhabitants of the Sikkim Himalaya at an elevation of upwards of 10,000 feet. Their tuberous roots are bruised by means of wooden pestles, and thrown into small pits with water, until the commencement of acetous fermentation, when the acridity is mostly dissipated; but the process is so imperfect that cases of injury from the poisonous juice are frequent. The tubers of *Arisæma atrorubens* (*A. triphyllum* of Linnæus), a native of the United States, and there known as Dragon-root and Indian Turnip, yield a pure white starch like that of *A. maculatum*. Their medicinal uses are also similar; they are employed as a stimulant of the secretions.—The DRAGON-PLANT, *A. Dracunculus*, a native of the south of Europe, is not uncommon in gardens in Britain, although it has a carrion-like smell, and its emanations are apt to produce headache and other disagreeable effects. It has a singular appearance—straight stalks, three feet high, curiously spotted like the belly of a snake.—The peculiar acridity of the *Araceæ* is most remarkably displayed in the DUMB CANE (q.v.).

A'RUN, a river rising in St. Leonard's Forest in the middle of North Sussex, and after a course of 35 miles, falling into the English channel. A canal unites it with the Wey, a feeder of the Thames.

A'RUNDEL, a small town 5 miles inland from the mouth of the Arun, in a tertiary and chalk district, on the south side of the South Downs, in the S. W. of Sussex. It consists mainly of a very steep street rising from the right bank of the Arun to the summit of a hill crowned by a castle. The Arun is navigable for vessels of 150 tons up to the town. Bark and timber are the chief exports. Pop. in 1871, 2956. A was disfranchized by the Reform Bill of 1867. It is governed by a mayor, four aldermen, and twelve councillors. The castle, from its site, is a striking object, and was built soon after the Norman conquest. It is an oblong, including 5½ acres within its walls. It was laid in ruins during the civil wars of Charles I., but, being the baronial residence of the Dukes of Norfolk, the late duke restored it to its former Gothic magnificence. The keep, containing the dungeon, is a circular Norman tower of imposing strength.

A'RUNDEL MARBLES, part of a collection of ancient sculptures, formed about the beginning of the 17th c. by Thomas Howard, Earl of Arundel, and presented in 1667 to the university of Oxford, by his grandson, Henry Howard, afterward Duke of Norfolk. The principal portion of it is the 'Parian Chronicle,' consisting of the fragments of an inscription in marble, supposed to have been executed in the island of Paros, about 263 B.C. In its perfect state, this inscription contained a chronological table of the principal events in Grecian history from the time of Cecrops (1582 B.C.) to the archonship of Diognetus (264 B.C.). The chronicle of the last ninety years is lost, and the extant portion of the inscription is much corroded and defaced. This curious and interesting monument, the authenticity of which has been questioned and vindicated with almost equal ingenuity and learning, was purchased for the Earl of Arundel, along with many other relics of antiquity, at Smyrna, by Mr. (afterwards Sir William) Petty. The inscription, and all the other principal sculptures in the Oxford Collection, are to be found fully illustrated in the relative publications of Selden, Prideaux, Maittaire, and Chandler, under the various titles of *Marmora*, *Arundelliana* and *M. Oxoniensia*.

The nobleman whose name is associated with these ancient marbles is worthy of remembrance, independently of his general merits, as the first of his order in England who liberally encouraged the fine arts, and communicated the influence of his own taste and enthusiasm in their cultivation to a wide circle of imitators and successors. Among the scholars and artists on whom his liberal patronage was specially bestowed, were Francis Junius the Younger (his librarian), and Oughtred the mathematician, Wenceslaus Hollar the engraver, whom he brought over to England, Vandyck and Inigo Jones, and the sculptors Stone, Le Sœur, and Fanelli. His collection of works of art, for the supply of which, from the treasures of antiquity, he engaged the service of two distinguished men of letters, Evelyn and Petty, rivalled the galleries of princes. After his death, it was unfortunately dispersed, and many of its choicest treasures were for ever lost sight of. His collection of sculpture alone, when entire, numbered 37 statues, 128

busts, and 250 inscribed marbles, besides altars, sarcophagi, fragments, and gems.

A'RUNDEL, Thomas, Archbishop of Canterbury in the reigns of Richard II., Henry IV., and Henry V., born in 1353, was the second son of Robert Fitz-Alan, Earl of Arundel and Warren. He was first Archdeacon of Taunton, and at the early age of twenty-one, he was, by the pope's appointment, consecrated Bishop of Ely. In 1388, he was, by the same authority, transferred to the archiepiscopal see of York. He was also for some years Lord High Chancellor of England. Having been banished from the kingdom for taking a leading part in the first attempt which was made to deliver the nation from the oppression of Richard II., he was honorably received at Rome, and by Pope Boniface IX. nominated Archbishop of St. Andrews, with a promise of future preferment in England. In 1396 he was enthroned, with great pomp, as Archbishop of Canterbury. He was a bitter persecutor of the Lollards and followers of Wickliffe, and a chief instrument for procuring the horrible act for the burning of heretics (*De Heretico Comburendo*), passed in the reign of Henry IV. He even carried his bigotry so far as to solicit from the pope a bull for digging up Wickliffe's bones, which, however, was wisely refused him. He also procured a synodal constitution, which forbade the translation of the Scriptures into the vulgar tongue. Amongst others whom he caused to be convicted of heresy, and sentenced to the flames, was Lord Cobham, one of the principal patrons of the new sect, at the commencement of the reign of Henry V. Soon after, A. was seized with an inflammation in the throat, which proved fatal. He died 20th February, 1413.

ARU'NDO. See Reed.

ARVI'COLA. See Vole.

A'RYAN RACE, A'RYAN LANGUAGES. The name Aryan (less properly, Arian) Race or Aryan Family of Nations is now generally used to designate that ethnological division of mankind otherwise called Indo-European or Indo-Germanic. It consists of two branches, geographically separated, an eastern and a western. The western branch comprehends the inhabitants of Europe, with the exception of the Turks, the Magyars of Hungary, and the Finns of Lapland (see Europe); the eastern comprehends the inhabitants of Armenia, of Persia, of Afghanistan, and of Northern Hindustan (see Hindustan). The evidence on which a family relation has been established among these nations is that of language. Between Sanscrit (the mother of the modern Hindu dialects of Hindustan), Zend (the language of the ancient Persians), Greek (which is yet the language of Greece), Latin (the language of the Romans, and the mother of the modern Romanic languages, i. e., Italian, French, Spanish, Portuguese, Wallachian), Celtic (once the language of great part of Europe, now confined to Wales and parts of France, Ireland and Scotland), Gothic (which may be taken as the ancient type of the Teutonic or Germanic languages—including English—and of the Scandinavian), and Slavonic (spoken in a variety of dialects all over European Russia and a great part of Austria), the researches of philology have within the present century established such affinities as can be accounted for only by supposing that the nations speaking them had a common origin.

No one of these nations, whether existing or historical, can claim to be the parent nation of which the others are colonies. The relation among the languages mentioned is that of sisters—daughters of one mother, which perished, as it were, in giving them birth. No monuments of this mother-language have been preserved, nor have we any history or even tradition of the nation that spoke it. That such a people existed and spoke such a tongue is an inference of comparative philology, the process of reasoning being analogous to that followed in the kindred science of geology. The geologist, interpreting the inscriptions written by the finger of Nature herself upon the rock-tablets of the earth's strata, carries us back myriads of ages before man appeared on the scene at all, and enables us to be present, as it were, at creation itself, and see one formation laid above another, and one plant or animal succeed another. Now languages are to the ethnologist what strata are in geology; dead languages have been well called his fossils and petrifactions. By skilful interpretation of their indications, aided by the light of all other available monuments, he is able to spell out, with more or less probability, the ethnical records of the past, and thus obtain a glimpse here and there into the gray cloud that rests over the dawn of the ages.

When these linguistic monuments are consulted as to the primitive seat of the Aryan nations, they point, as almost all ethnologists are agreed, to Central Asia, somewhere probably east of the Caspian, and north of the Hindu Kush and Paropamisan Mountains. There, at a period long anterior to all European history—while Europe was perhaps only a jungle, or, if inhabited at all, inhabited by tribes akin to the Finns, or perhaps to the American Indians—dwelt that mother-nation of which we have spoken. From this center, in obedience to a law of movement which has continued to act through all history, successive migrations took place towards the north-west. The first swarm formed the Celts, who seem at one time to have occupied a great part of Europe; at a considerably later epoch came the ancestors of the Italians, the Greeks, and the Teutonic peoples. All these would seem to have made their way to their new settlements through Persia and Asia Minor, crossing into Europe by the Hellespont, and partly, perhaps, between the Caspian and the Black Sea. The stream that formed the Slavonic nations is thought to have taken the route by the north of the Caspian. At a period subsequent to the last north-western migration, the remnant of the primitive stock would seem to have broken up; part poured southwards through the passes of the Himalaya and Hindu Kush into the Punjab, and became the dominant race in the valley of the Ganges; while the rest settled in Persia, and became the Medes and Persians of history.

It is from these eastern members that the whole family takes its name. In the most ancient Sanscrit writings (the Veda), the Hindus style themselves Aryans; and the name is preserved in the classic Arii, a tribe of ancient Persia, Aria, the modern Herat, and Ariana, the name of a district, comprehending the greater part of ancient Persia, and extended by some so as to embrace Bactriana. Ariana, or Airyana, is evidently an old Persian word, preserved in the modern native name of Persia, Airan or Iran. *Arya*, in Sanscrit, signifies 'excellent,' 'honorable,' being allied probably to the Greek *ari* (stos), the best. Others connect it with the root *ar* (Lat. *arare*, to plough), as if to distinguish a people who were tillers (*earers*) of the earth from the purely nomadic Turanians or Turks.

The several members of this ethnological group will receive special notice each in its place. As to the hypothetical mother-nation—the primitive Aryan stock before separation, it might seem impossible to affirm anything beyond its mere existence and locality. But the ethnologist does not content himself with this. In an admirable essay on *Comparative Mythology* (Oxford Essays, 1856), Professor Max Müller has drawn a picture of the Aryan family while yet one and undivided, in which the state of thought, language, religion, and civilization is exhibited in a multitude of details. Where the same name for an object or notion is found used by the widely spread members of the family, it is justly inferred that that object or notion must have been familiar to them while yet resident together in the paternal home. It is in this way established, that among the primitive Aryans not only were the natural and primary family relations of father, mother, son, daughter, hallowed, but even the more conventional affinities of father-in-law, mother-in-law, sister-in-law; that to the organized family life there was superadded a state organization with rulers or kings; that the ox and the cow constituted the chief riches and means of subsistence; and that houses and towns were built.

One general observation made by Müller is so interesting that we take the liberty of quoting it entire. 'It should be observed,' he says, 'that most of the terms connected with chase and warfare differ in each of the Aryan dialects, while words connected with more peaceful occupations belong generally to the common heirloom of the Aryan language. The proper appreciation of this fact in its general bearing will show how a similar remark made by Niebuhr, with regard to Greek and Latin, requires a very different explanation from that which that great scholar, from his more restricted point of view, was able to give it. It will show that all the Aryan nations had led a long life of peace before they separated, and that their language acquired individuality and nationality as each colony started in search of new homes—new generations forming new terms connected with the warlike and adventurous life of their onward migrations. Hence it is that not only Greek and Latin, but all Aryan languages have their peaceful words in common; and hence it is that they all differ so strangely in their warlike expressions. Thus the domestic animals are generally known by the same name in England and in India, while the wild beasts have different names, even in Greek and Latin.'

In this mainly pastoral life, the more important of the primitive arts were known and exercised: fields were tilled; grain was raised and ground into meal; food was cooked and baked; cloth was woven and sewed into garments; and the use of the metals, even of iron, was known. The numbers as far as a hundred had been named, the decimal principle being followed. The name for a thousand had not come into requisition until after the dispersion, for it differs in different Aryan tongues.

Finally, it was among the yet undivided Aryans, while abstract language did not yet exist, while every word was a metaphor, and the setting of the sun, for example, could only be expressed by his growing old and dying, that those stories of gods, heroes, and monsters originated, which, with more or less of variety, but still with a family-likeness, formed the pagan mythology of every member of the group.

AS was the designation both of a Roman weight (called also *libra*) corresponding very nearly to an English *pound* (q. v.), and also of a coin made of the mixed metal *aes*, or bronze. The As

(coin) originally no doubt weighed a (Roman) pound; but it was gradually reduced to $\frac{1}{96}$ of a pound, and even lower. It is thus difficult to assign any fixed value to the *As*. About 270 B.C., the denarius (=8½d.) contained 10 ases; so that the value of the As was then a little more than 3 farthings; when 16 ases went to the denarius, the value was about a halfpenny. It was by the *sestertius* (q. v.) that money was reckoned at Rome. The oldest form of As usually bore the figure of an ox, a sheep, or other domestic animal (*pecus*); from which it is usually supposed that the Latin word for money, *pecunia*, is derived.

As.

ARZIGNA'NO, a town of North Italy, 11 miles west-by-south from Vicenza, in a plain surrounded by hills. It manufactures woollens, leather, and silk twist. Pop. (1871) 2706.

A'SA, son of Abijah, and grandson of Rehoboam, was the third king of Judah. At the beginning of his reign, he was very young, and his character apparently undeveloped, for he allowed his grandmother, Maachah, to encourage idolatry; but on assuming the reins of government, one of his earliest acts was to remove her from all authority 'because she had made an idol in a grove' (1 Kings, xv. 13; 2 Chron. xv. 16). His zealous efforts to extirpate the vices and impieties of the people were on a whole successful. He took away the Sodomites out of the land, and the altars of the strange gods, broke the images, and cut down the groves. For the next ten years, he devoted himself to strengthening the defences of his kingdom, and organized a magnificent army of more than half a million, which seems to have been looked upon as a menace by other monarchs, for one of these, Zerah the Cushite, took the initiative, and penetrating through *Arabia Petræa*, invaded Judah, but was defeated with immense slaughter.

Before the battle commenced, Asa had invoked the aid of Jehovah: and some time after the victory, he and all his people entered into a solemn covenant 'to seek the Lord God of their fathers with all their heart and with all their soul' (2 Chron. xv. 12). Peace lasted for twenty years in the kingdom, but in the 35th year of Asa's reign, war again broke out between him and Baasha, king of Israel. He sought and obtained the aid of the Syrian monarch, Benhadad, but at the expense of 'the treasures of the house of the Lord;' and although successful against his adversary, he was indignantly upbraided and threatened by the prophet Hanani for not relying on Jehovah alone. Asa, flushed with success, threw the prophet into prison, and, it would appear, 'in his rage' oppressed some of the people at the same time—perhaps those only who sided with Hanani, for we know that at his death the nation honored him with a splendid funeral; and the sacred historian pays the highest tribute to his memory, declaring that Asa's heart was perfect with the Lord all his days.' He reigned from 955 to 914 B.C.

A'SA DULCIS (i. e., Sweet Asa), a drug in high repute among the ancients as an antispasmodic, deobstruent, and diuretic; also for supposed virtues of the most extraordinary kind, such as neutralizing the effects of poison, curing envenomed wounds, restoring sight to the blind, youth to the aged, &c. Its value was estimated by its weight in gold. The princess of Cyrene caused a figure of the plant producing it to be struck on the reverse of their coins, and it was sometimes called *Laser Cyrenaicum*. The plant is of the genus *Thapsia* (of the natural order *Umbelliferæ*), either *T. Garganica*, or a nearly allied species *T. Silphium*—perhaps the drug was produced by both. They are natives of the south of Europe and of Barbary, and appear to be very active purgatives.

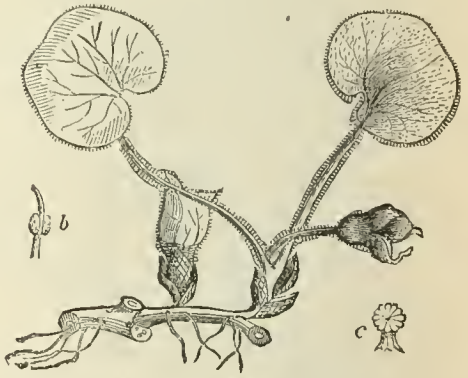
ASAFŒ'TIDA, or ASSAFŒTIDA (i. e., Fetid Asa or Assa), is a gum-resin, which has been supposed to be identical with the exuded juice of the *Silphion* of Dioscorides, so highly esteemed among the Greek physicians; but which, perhaps, was rather the *Asa dulcis*. Its name is derived from the Persian word *asa*, which means *a staff*. This drug is brought from Persia and Afghanistan, and is procured by drying the milky juice which flows from the root of the plant *Ferula* (*Narthex*) *A.*, which has been referred to the genus *Ferula* by Linnæus, and to *Narthex* by Dr. Falconer. The root of the A. plant is long, and generally undivided; white inside, but having a black covering; and contains in its interior a quantity of juice of an overpowering odor, which much resembles that of garlic. *Ferula* or *Narthex A.* has its radical leaves tripartite, their segments bipinnatifid, and nearly two feet in length. The gum-resin is said by some to be obtained also from *Ferula Persica*, a plant which has the root-leaves very much divided, and all either tripinnate or quadripinnate. The name *ferula*, like the Persian *asa*, refers to the appearance of the stem of the plant. *Ferula Persica* has long been propagated successfully in Britain, and even brings its seeds to perfection.

A. is prepared in the dry southern provinces of Persia, but chiefly in Khorassan and Afghanistan, and also to the north of the Hindu Kush range of mountains. About April, the root-leaves are taken away, and the root itself is more or less exposed by removal of the soil from about it. After a lapse of six weeks, a slice is cut horizontally from its summit, and a thick white juice exudes, the smell of which even exceeds in strength that of the drug when dry. The drug is sometimes met with in the market in the form of tears, but more frequently in lumps, which are made up of irregularly-shaped tears, agglutinated together by a softer substance. A. is extensively used in medicine and possesses stimulant and anti-spasmodic properties. When taken internally, it undergoes absorption, and may be detected in almost every secretion of the body, as the saliva, breath, and urine. According to the analysis of Pelletier, A. is composed of the following substances: resin, 65 parts; volatile oil, 3·6; gum, 19·44; bassorin, 11·66; various salts, ·30. In many parts of the East, this drug is used as a condiment, in which respect it seems to take the place of the garlic of some European nations.

A'SAPH, St., a cathedral city and a station on the Vale of Clwyd Railway, stands on a small hill between the rivers Clwyd and Elwy, in the north-west of Flintshire, Wales. The cathedral is a cruciform building, 178 by 68 feet, and was built in 1284 on the site of a wooden structure founded before 596. It has a tower 93 feet high, is one of the smallest of British cathedrals, and stands on the top of the hill on which the city is built. Kentigern, or St. Mungo, Bishop of Glasgow, and his disciple, St. A., are said to have founded the see of St. A. in the 6th c. The bishop, who has a revenue of £4,200, is patron of 121 of the 148 benefices in the diocese. Pop. in 1871, 1900. St. A., with the Flint district of boroughs, returns one member to parliament.

A'SAPHUS. See TRILOBITE.

ASARABA'CCA (*A'sarum Europæum*), a plant of the natural order *Aristolochiaceæ* (see ARISTOLOCHIA), a native of Europe, growing in woods; rare, and perhaps not truly indigenous, in Britain. The whole plant has acrid properties; the roots and leaves are aromatic, purgative, and emetic. The use of A., however, as an emetic has been much superseded by that of ipecacuanha, which is milder and safer. The powdered roots and leaves enter into the composition of cephalic snuffs, which cause sneezing, and are employed as a counter-irritant in cases of headache, ophthalmia, toothache, &c. The plant contains a volatile oil, and a crystalline substance called *Asarine*, to which it seems to owe its active properties. The genus *Asarum* is distinguished by twelve horned stamens, distinct from each other and from the style, and by a bell-shaped three-lobed perianth. *A. Europæum* has a very short stem with two shining kidney-shaped leaves on long stalks, from the axil of which springs a single drooping greenish-brown flower.—A nearly allied species, *A. Canadense*, a native of Canada, is stimulant and diaphoretic, and is used under the name of CANADA SNAKEROOT, instead of *Aristolochia Serpentaria*. It is also called WILD GINGER, and used as a spice, being of a warm aromatic quality, and not acrid, like its European congener.



Asarabacca (*Asarum Europæum*).
b, detached anther; *c*, style.

ASB'EN, or A'IR, a country of Central Africa, situated in 15° —20° N. lat., and 6°—11° E. long. Pop. estimated at 64,000. Its territory comprises a large amount of desert, as well as considerable tracts of mountain land. The inhabitants are chiefly of Berber extraction, and generally profess the religion of Mohammed. They are of a degraded character, and given to marauding. The climate is rather healthy, and generally hot and dry. The rainy season is from August till October. The soil in many places is

fertile, producing the doom palm, dates, and senna. Dr. Barth, the traveler, says of the aspect of the country: 'Rocky ground, overtopped by higher mountain masses or by detached peaks, and hollows overgrown with rich vegetation, and preserving for a longer or shorter time the regular form of valleys, succeed each other by turns, and constitute the predominant feature of the country of Asben.' The capital is Agades (q. v.).

ASBE'STOS, a mineral very closely allied to tremolite, actinolite, and hornblende, and which, along with tremolite and actinolite, is often ranked among the varieties of hornblende. It consists chiefly of silica, magnesia, lime, and oxide of iron, and is of a fine fibrous character, the fibres sometimes combined together in a compact mass, sometimes easily separable, elastic and flexible. It is generally of a whitish or greenish color. The variety called *Rock-cork* very much resembles cork, is soft and easily cut, and so light as to swim in water. *Rock-leather* and *Rock-wood* are varieties somewhat similar to rock-cork, but not so light. The finest fibrous variety with easily separable fibres is called *Amianthus* (from a Greek word signifying *unpollutible*, as A. is from a Greek word signifying *indestructible*), because cloth made of it was cleansed by passing it through fire. This cloth was used by the ancients to enwrap dead bodies placed on the funeral pile, so as to preserve the ashes of the body unmixed. Amianthus has sometimes been used for the wicks of lamps, and is often employed to fill vinaigrettes, being moistened from time to time with a few drops of aromatic vinegar. The finest amianthus is found in the Tarentaise in Savoy. It is particularly abundant in Corsica. It is found also in Cornwall, at Portsoy in Scotland, and in several of the Shetland Islands. The main supply came, till of late, from the older crystalline rocks of the Alps and Pyrenees, from North America and Silesia. Of late, much comes from Tasmania, and great quantities of a valuable kind have been obtained in New South Wales. A. is now applied to many purposes. A novel use for A. is for making non-conducting gloves for electricians. Minerals which resemble A. in their fibrous character are sometimes called *asbestous* or *arbestiform*, and some are believed to be varieties of augite rather than of hornblende.

A'SCALON, or A'SHKELON, a ruined city of Palestine, on the shore of the Mediterranean, 36 miles W.S.W. of Jerusalem. Its name often occurs in the Old Testament. It was in ancient times a fortified city, and the principal town of one of the five lordships of the Philistines. Herod the Great embellished it with baths, palaces, and fountains; but it suffered in the wars with the Romans. There was a celebrated temple of Derketo, the Venus of the Syrians, at A. After continuing long under the dominion of the Roman empire, the city came into the possession of the Saracens in the 7th c. In 1099 a great battle was fought on the plains of A., between the Crusaders and Saracens, when the Christians gained a decisive victory. The city, however, a number of years after, was recaptured by the Moslems, and held by them as a strongly fortified place until 1153, when it was taken by the Crusaders under Baldwin III. In 1187 it was retaken by the Saracens, but afterwards (1192) fell into the hands of Richard Cœur de Lion. Subsequently, being more than once dismantled and repaired during the wars between Richard and Saladin, it was reduced to desolation by Sultan Bibars in 1270.

The ruins of this ancient city occupy an extensive semicircular eminence, sloping gently to the east, but abrupt and steep towards the sea. Part of the walls are still standing, with the remains of Gothic churches, a palace, and several edifices of more ancient date, which attract the notice of the traveler and the antiquary.

A'SCARIS, a genus of *Entozoa*, or intestinal worms of the order *Nematoidea* of Cuvier and others. The ascarides have a body approaching to cylindrical, but thickest in the middle. They inhabit the intestines of animals. The species are numerous. One of the best known is *A. lumbricoides*, often called the common round worm, which occurs in the intestines of man and of some of the lower animals, as the hog, ox, horse, &c., and which often occasions severe disease, and sometimes death, particularly when it ascends from the intestines to the stomach.

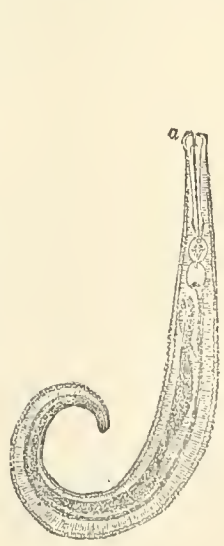
Its presence even in its most ordinary situation in the small intestines, is attended with unfavorable effects upon the general health; and the greater the number present—which, however, is not usually large—the greater, of course, is the injury; although when they remain in the intestines, worms of this species are less injurious and less annoying than other, and even much smaller intestinal worms. In subjects otherwise diseased, they occasionally find their way out of the intestines into the closed serous cavities of the body, and even pass through ulcerated parts of the external integument; but the mouth is formed only for suction, and is provided with no means of boring through the healthy intestine. An immense number of remedies (anthelmintics or vermifuges) have been proposed and used in order to expel this parasite, some of which are very effectual. They do not in general kill the worms, but act by making their dwelling-place disagreeable to them (see VERMIFUGE). It is, however, remarked by Küchenmeister, in his work on Parasites, that the treatment of cases of this description is as yet purely empirical, because, although there must be a condition of the intestinal canal which favors the thriving of worms, we are by no means certain what it is.

Ascaris lumbricoides (male).
One-third of the true linear dimensions; *a* is the head of the worm

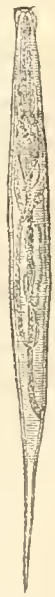
The *A. lumbricoides* is ordinarily, in size and appearance, pretty much like the Common Earthworm (*Lumbricus terrestris*), from which resemblance it has received its specific name, although the resemblance is rather in general form than in more essential characteristics. It has been seen fifteen inches in length. Its mouth consists of three fleshy tubercles, which can be spread out upon the intestine to form a broad circular sucker, and within which there is a small tube capable of being protruded. The alimentary canal consists of a muscular gullet and stomach, and a thin-walled intestine. Between the muscular layers of the body is produced a pale reddish oily matter, with a strong and very peculiar odor, which is gradually communicated to spirit in which the worm is preserved. The males are smaller than the females, and much more rare. The females produce eggs in great numbers; but it is uncertain if they are developed within the intestine in which the parent worm resides. They are certainly capable of being developed elsewhere, and probably the young enter the intestines of the animals of which they are eventually to be the parasites, after having spent a certain stage of their existence in very different circumstances; the worm in a very young state having never been found in the intestines of man or of quadrupeds, the situation of its perfect development. The inhabitants of damp valleys are believed to suffer more than others from the *A. lumbricoides*. It is said also to be particularly frequent in persons who are much accustomed to eat raw leaves and roots; and it has been supposed that the young may exist, perhaps in an encysted state, in the bodies of insects or other very small animals which are accidentally eaten along with such food, as the young tapeworm finds its way into the human intestines from its residence as a creature of very different size and form in the flesh of the sheep or the pig. The once prevalent idea of the equivocal generation of these worms is now completely abandoned.

The mouth of Ascaris lumbricoides, magnified.
Showing the fleshy tubercles spread out, with cockscombe-like muscles interior to them, and the entrance to the intestinal canal.

A vermicularis is another species usually referred to this genus,



Ascaris vermicularis (male).
Magnified twenty-five diameters: *a*, the mouth.



Ascaris vermicularis (female).
Magnified eight diameters.

and is the only other species troublesome to mankind. It is known as the Thread-worm or Maw-worm, and is very common both in children and adults. It infests chiefly the lower part of the intestines, and particularly the rectum, great numbers being often

present together, and occasioning intolerable itching, irritation, and loss of sleep, although there is not in general much serious injury to health. The same anthelmintics employed against other intestinal worms are found efficacious also in the expulsion of this; and clysters are often employed with great success. The Thread-worm is white not more than half an inch in length, the male much less. Some recent authors of high reputation have separated this species from A, and call it *Oxyuris vermicularis* but the term *Ascarides* is often employed in medical works with exclusive reference to it; and indeed this name, derived from the Greek *askarizo* to jump or move briskly, probably owes its origin to the liveliness of motion which this species exhibits. It has been recently, discovered that its nervous system is very highly developed, consisting of many ganglia, with connecting and ramifying cords.

ASCE'NSION, one of the comparatively few single islands on the globe, being about 800 miles to the north-west of St. Helena, and almost as far to the south south-west of St. Matthew. It is said to have received its name from the circumstance of its having been discovered by a Spanish navigator on Ascension-day. It is nearly in the middle of the South Atlantic, the lat. of its fort being 7° 55′ 55″ S., and its long. 14° 25′ 5″ W. A. is 8 miles long by 6 broad; its area being about 35 square miles. Though it was discovered as early as 1501, yet it remained uninhabited till 1815, when, in connection with Napoleon Bonaparte's detention in St. Helena, the English took possession of it. It is now used as a naval victualling-station and hospital. Pop. (census of 1871) 27, 15 being residents on the island, and 12 being in the Royal Naval Hospital. Like St. Helena, it is of volcanic origin, and generally mountainous—one peak rising to a height of 2870 feet. From the extreme dryness of the climate, which, however, is healthy, the surface is nearly destitute of verdure. Among indigenous productions are the tomato, caster-oil plant, and pepper; European vegetables are cultivated. See Mrs. Gill's *six months in A.* (1879).

ASCE'NSION, RIGHT (Lat. *ascensio*, a rising; Ger. *gerade aufsteigung*), the name given in astronomy to one of the arcs which determine the position relatively to the equator of a heavenly body on the celestial sphere, the other being the declination. See ARMILLARY SPHERE. It is the arc of the equator intercepted between the first point of Aries (q. v.), and the point at which the circle of declination passing through the star cuts the equator. Measured always from west to east, right A. on the heavens corresponds to longitude on the earth. The right A. of a heavenly body is ascertained by means of the transit instrument and clock. The transit instrument determines its meridian passage, and the transit clock gives the time at which this takes place. When the first point of Aries is in the meridian, the clock stands at 0 hours, 0 minutes, 0 seconds, and it is so arranged as to indicate 24 sidereal hours, the time that elapses between two successive passages of that point. The reading of the clock, therefore, at the passage of any heavenly body gives its right A. in time, and this, when multiplied by 15, gives the same in degrees, minutes, and seconds. The right A. is usually given, however, in time. The old term, *oblique* A., was given to the right A. of the point of the equator that rose simultaneously with the heavenly body; and the difference of the oblique and right A. was called the 'ascensional difference.'

ASCE'NSION-DAY, or HOLY THURSDAY, one of the great religious festivals of the Episcopal, and also of the Roman Catholic Church. It is held on the fortieth day after Easter, and is intended to commemorate the ascension of Christ into heaven. It is one of the six days occurring in the year for which the Church of England appoints special psalms, and the same church also particularly recommends it as a fitting day for the receiving of the communion. Ascension-day has been observed from the earliest times of the Christian Church. St. Augustine believes it to have been instituted either by the apostles themselves, or the primitive bishops succeeding them. Connected with the religious observances of this day were certain civic ones, which in some parts of England and Scotland are continued to this day—viz., *beating the bounds, or riding the marches*, though their religious connection is apparently forgotten. See ROGATION DAYS and PERAMBULATION.

ASCE'TICISM. Among the Greeks, *askesis* denoted the exercise and discipline practised by the athletes or wrestlers, who had to harden their bodies by exertion and to avoid all sensual and effeminating indulgences. In the schools of the philosophers, especially of the Stoics, the same word signified the practice of mastering the desires and passions, or of severe virtue. In these senses it passed into the language of the early Christians. The language of St. Paul in comparing the Christians to wrestlers who had to contend with Satan, the world, and the flesh, contributed to this. But the philosophy of the time had more to do with it, which held the freeing of mind from matter to be the means of union with God; or, at least, that the refraining from all luxurious pleasure was the way to restore the soul to its original purity. To understand the vast influence that ascetic ideas have exercised on the Christian religion, we must look beyond the bounds of its history. Their root lies in the oriental notion, that the Absolute or All is the only real existence; and that individual phenomena, especially matter in all its shapes, are really nothing, and are to be despised and avoided, as involving the principle of separation from the Absolute. The East, accordingly, is the native soil of A. The glowing imagination of the oriental carries the practice of it to a monstrous extravagance, as is seen in the frightful self-tortures inflicted by the yogins (see YOGA) and fakirs (see FAKIR), the suicides in the sacred Ganges and otherwise, and the practices recently prevalent of offering children in sacrifice, and of burning widows; most of which, however, have been humanely suppressed by the efforts of the British government. Buddhism, which may be considered as a kind of puritan revival or reformation—the methodism of the Indian religion—carried the principle beyond its previous bounds. In its contemning the world; in its inculcating a life of solitude and beggary, mortification of the body, and abstinence from all uncleanness and from all exciting drinks, the object was to keep as distant and detached as possible from this 'Vale of Sorrow' (see BUDDHISM and NIRVANA). The sober Chinese, and the more moral and rational Persians, never carried asceticism to these extravagances; and the earnest Egyptians sought to confine it to monogamy of the priests, abstaining from the flesh of swine and from beans, rigid purity, circumcision, moderate flagellation, and frequent contemplation of death (which there were arrangements for bringing to remembrance, even in the midst of festivities). These are certain milder forms of A., but the principle is the same.

It is in the light of this fore-history that we must consider Judaic and Christian asceticism. In the oriental mind, especially in Egypt, circumcision, avoiding all uncleanness, and fasting, were signs of humiliation before God; and in the Mosaic ritual they were conditions of the favor of the holy Jehovah. Voluntary vows, abstaining even from lawful food, wine, &c., were held to have a special purifying, consecrating efficacy, particularly for prophets and men of special callings. But self-castigation continued for long foreign to the sobriety of Judaism, and even hermitism came into established practice only shortly before Christ, in Palestine among the Essenes (q. v.); in Egypt among the Therapeutæ (q. v.); though doubtless Jewish A. had become more stern and gloomy since the exile in Babylon.

A. was far less congenial to the reflective nations of the West, above all to the cheerful Greeks. A Greek felt himself entitled to enjoyment as well as his gods; hence Greek religious festivals were pervaded by cheerfulness. The only exception appears to be the Eleusinian mysteries, which never took hold of the people generally, and the passing phenomenon of the Pythagorean fraternity. The attack made by the Socratic school upon the body as the prison of the soul—a view reminding one of the East—and the extravagant contempt for the elegances, and even decencies of life, professed by the later Stoics and Cynics, were no genuine fruits of the popular Greek mind; and we must also ascribe to the infusion of oriental philosophy the ascetic tendencies of Neoplatonism, in holding abstinence from flesh and from marriage as chief conditions of absorption into the divinity.

It was into the midst of these ideas that Christianity was introduced. The Jewish converts brought with them their convictions about fasting. Fasting and Nazaritic observances were thought sanctifying preparatives for great undertakings; and the inculcation of abstinence from marriage, on the ground of the expected speedy re-appearance of Christ, falls in with the same notion, namely, that the flesh, that is, the sensuous part of our nature, is the seat of sin, and must therefore, before all things, be rigorously chained. The old oriental traditions of A.; the spirituality of Christianity, pointing away from earth to heaven; opposition to the corruption of the heathen world; the distinction made between belief and knowledge, as a higher and lower stage of intelligence, leading to a corresponding distinction of a higher and lower stage of virtue: all combined to make the Christians of the first two centuries hold aloof from the world and its wisdom, and favor abstinence from marriage, more especially on the part of the clergy. This ascetic spirit began as early as the commencement of the 2d c. to court trial in the perilous practice of men and women living together under vows of continence. We find Cyprian dissuading from the dangerous experiment, and even the authority of the church interposed to the same effect. But during the first three centuries no irrevocable vows yet bound the devotees to a life-long A. Fasting was also comparatively rare.

But the tendency to outward manifestations now began to grow stronger. The inward and spiritual life of the Christians had greatly declined; and if the previous bloody persecutions had driven individuals from human society into the deserts, the growing secularization of the church, after Christianity became the state religion, had the same effect to a still greater degree. All this paved the way for the chief manifestation of A.—namely, monasticism, which the church found herself compelled by the over-

whelming tide of opinion within and without to recognize, and to take it under her protection and care. See MONACHISM. From the African Church, represented by Tertullian and Augustine, a spirit of gloomy and crushing supernaturalism spread deeper and deeper over the Western Church generally, intensifying the ascetic tendencies, and leading to still more marked separation from a despised world. There were not wanting healthier minds—as Jovianus, Vigilantius, and others—to raise their voices against fasting, monkery, and the outward works of A. generally; but such protests were vain, and became ever rarer.

From the 11th c., the Cathari, Waldenses, and other sects, though ascetics themselves in a way, yet assailed the external A. of the church; the classic Petrarch fought on the same side; and so did Wickliffe, Huss, and Jerome of Prague, in their premature struggles at Reformation. After a preliminary skirmish by Erasmus, the struggle was decided in the reformation of the 16th c. The fundamental principle of that movement, that salvation is secured by justification through faith, and not through dead works, struck at the root of monkery and mortification in general. But the victory has not been so complete as is often assumed. The ascetic spirit often shows itself still alive under various disguises even in Protestantism. The Mennonites inculcated a rigid A.; and with the Shakers of America, celibacy is practised as a virtue. The essence of A. is to hold self-denial and suffering to be meritorious in the sight of God, in and for itself, without regarding whether it promotes in any way the good of others or the improvement of the individual's own character. In this light, many traits presented by Puritanism, Methodism, and Quakerism appear ascetic. It is not impossible that vegetarianism, total abstinence, and other recent austerities, though advocated on other grounds, recommend themselves to the feelings of many from their falling in with this deep-seated propensity to A.; which seems a relic of that dread of the malignity of the invisible and supernatural powers which haunts the human mind in an unenlightened and savage state.

Even in the Romish Church, ascetic practices have been modified in recent times; fastings are less rigorous, and the self-sacrifice of conventual life is more directed to beneficial ends. Mohammedanism has undergone the same change. In the Greek church, monasticism had always a milder form.

ASCH, a town in the west of Bohemia 100 miles west-north-west from Eger. It has cotton, linen, and woollen manufactures. Pop. (1869) 9405.

ASCH, a town in the west of Bohemia, 100 miles west-north-west from Eger. It has cotton, linen, and woollen manufactures. Pop. (1880) 13,209.

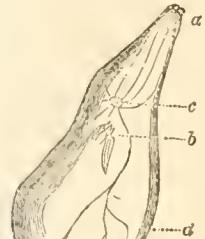
ASCHA'FFENBURG, the chief town on the right bank of the Maine, in the Bavarian district of Unterfranken (lat. 50° 1′ N., long. 9° 7′ E). It is built upon an eminence, and has both a healthy and attractive situation, but the streets are narrow, irregular, and slope steeply towards the river. The castle of Johannisberg, built between 1605—1614, by Johann Schweikhardt, Elector of Mentz, and the favorite hunting residence of many of his successors, forms a quadrangle, with towers at each corner, and overlooks the whole town. Besides the collegiate church, the military barracks, and the town-hospital, A. possesses a Roman villa, built by the late King Louis, in imitation of the Castor and Pollux edifice discovered at Pompeii. It is celebrated for its manufacture of colored papers, besides carrying on a considerable trade in wood, building-stone, tobacco, wine, &c. Pop. (1875) 10,849, principally Catholics. A. existed as early as the invasion of Germany by the Romans, who built a castle here. In 974, Otto I., Duke of Swabia and Bavaria, founded the collegiate church, which greatly increased the prosperity of the place. After Otto's death, it came into the possession of the archbishops of Mentz, and remained with them until the dissolution of the Germanic empire. In 1814, along with the principality of which it is the capital, it was ceded to Bavaria by Austria.

ASCHAM, ROGER, a distinguished English writer and classical scholar, was born in 1515 at Kirby Wiske, in Yorkshire. He received his early education in the family of Sir Anthony Wingfield, and in 1530 entered St. John's College, Cambridge, where he took his degree of M. A. in 1536. The study of the classics, especially Greek, had recently been revived at Cambridge, and the natural bent of A. impelled him with ardor to these studies. His reputation as a classical scholar soon brought him numerous pupils; and there being at that time no Greek chair, he was appointed by the university to read lectures in the public schools. He at first opposed the then new method of pronunciation which is still used in England; but afterwards adopted and defended it. His leisure hours were devoted to music, penmanship, in which he excelled, and archery.

In defence of the latter art, he wrote, in 1544, a treatise entitled *Toxophilus*, the pure English style of which, independently of its other merits, ranks it among the classical pieces of English literature. For this treatise, which was dedicated to Henry VIII., he was rewarded with an annual pension of £10, equivalent to about £100 of our present money. About the same time, he was appointed university orator. In 1548, on the death of his former pupil, Grindal, he was called to supply his place as master of languages to the Lady Elizabeth. In this office he gave the highest satisfaction; but at the end of two years abruptly resigned it, on account of some offence he had taken at some persons in the princess's household. That he did not lose favor at court, however, is manifest, from his having soon after been appointed secretary to Sir Richard Morysine, ambassador to the court of Charles V. He spent three years in Germany, and published an account of his observations in that country. He also made a short tour in Italy. During his absence, he had been appointed Latin secretary to Edward VI. On his return, after the death of the king, the interest of Gardiner, Bishop of Winchester, secured his appointment to the same office under Mary; his pension also was doubled. His prudence and moderation preserved him from offending by his Protestantism. After the death of Mary, Elizabeth retained him at court in the double capacity of secretary and tutor, which he discharged till his death, in 1568. His principal work, *The Schoolmaster*, a treatise on classical education, was published in 1571 by his widow. His Latin letters and poems have been frequently reprinted. The best edition of the former is that of Elstob (Oxford, 1703). To an edition of his English works, by the Rev. J. Bennet (1767), is prefixed a life by Dr. Johnson.—ASCHAM, a case for the reception of the bow, arrows, strings, and other accoutrements of the archer, derives its name from the author of the *Toxophilus*.

ASCHERSLE'BEN, a town in the district of Magdeburg, in the province of Prussian Saxony, lat. 51° 46′ N., long. 11° 27′ E. It is situated on the river Eine, is 32 miles distant from Magdeburg, and has a pop. of (1875) 17,532. The inhabitants are chiefly occupied in agriculture and gardening, but its trade is not very important. It has, however, considerable manufactures of woollens, linens, earthenware, &c. In the vicinity are some ruins erroneously supposed to be those of the old burgh of Ascania, the original seat of the House of Anhalt.

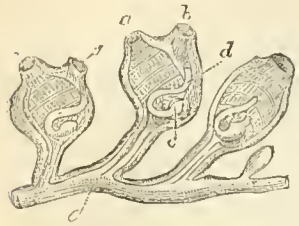
ASCI'DIA, a Linnæan genus of marine mollusca, now much restricted as a genus, but the type of a family called *Ascidiadæ*. The name Ascidians is also commonly employed to designate all those tunicated mollusca which form the order *Saccobranchiata* of Owen, or in which respiration is carried on by means of gill-sacs (*branchial sacs*); and these are divided into Compound and Solitary Ascidians (*Aggregata* and *Solitaria*). The ascidians, along with the other *Tunicata*, are acephalous, or destitute of a head, and are enclosed, not in a shell, but in an elastic tunic with two orifices composed of a substance apparently identical with the *cellulose* of plants, consisting only of carbon and hydrogen. Within the external tunic is a muscular membrane, regarded as corresponding to the *mantle* of other mollusca, and the openings of which agree with those of the tunic. The greater part of the cavity of the mantle forms a branchial sac, the lining of which, folded in various ways, constitutes the gills (*branchiæ*); and into it currents of sea-water are continually brought by the respiratory movements, passing out through the vent or anal orifice. Multitudinous *cilia* in the mouth and branchial sac, cause by their action this continual flow of water. The motion of the cilia is apparently quite involuntary. By this flow of water, the particles of food requisite for the animal are brought in, so that the aëration of the blood and the supply of the stomach are carried on together by the same means. The œsophagus or gullet opens from the branchial sac, which is indeed regarded as probably an expansion of the upper part of it—a dilated pharynx. Under the branchial sac is the stomach; and the alimentary canal, which is more or less tortuous, finally returns upon itself, so that the two orifices are not far separate. The liver consists of follicles produced into tubes, and communicating with the stomach by a single opening. There is a heart and a circulation of blood, with the remarkable peculiarity of alternations in its course, the circulation now and then pausing and being reversed. The transparency of many of the ascidians permits these and other internal movements to be easily observed. The nervous system is very simple, consisting of a single ganglion, situated between the mouth and the anal orifice, and which sends out filaments to both of them, and other branches over the surface of the mantle. The mantle is capable of contracting suddenly to eject a jet of water, and along with it any body the presence of which is disagreeable. It also contracts and ejects water, if the animal is touched, and this appears to be the only means of defence which these creatures possess. There is no trace of eyes or of other organs of special sense



Nervous System of Ascidia.

a, mouth; *b*, vent; *c*, ganglion; *d*, the mantle (the external tunic being removed).

The ascidians are found in all seas, and often constitute an important part of the food of fishes. Some of them are occasionally used as human food, as *Cynthia microcosmus* on the shores of the Mediterranean. Many of them are very small, but some attain a size of five or six inches in diameter, and when touched, eject water to a considerable height, the largest of them to about three feet. They are all fixed by the base, in their natural state, to some solid substance, as a rock or seaweed; sometimes by the intervention of a stalk or peduncle. In some kinds (*Social Ascidians*), the peduncles of a number of individuals are connected by a tubular stem, and to some extent they have a common circulation of blood, although each has its own heart, respiratory apparatus, and digestive system; and if a ligature is drawn around the peduncle of one so as to cut it off from the common circulation, circulation takes place in it as in a solitary ascidian. In other kinds (more strictly called *Compound Ascidians*—which designation, however, is by some authors applied to those just described, whilst these are called *Aggregate Ascidians*), the tunics of many are united into a mass, and they form systems like zoophytes. The compound system sometimes bears a general resemblance to an actinia. Very frequently it forms a slimy crust upon algæ, shells, &c., or projects in globular or conical masses, 'more like a lump of inanimate matter than a being endowed with vitality'—'a curious and interesting internal organization, veiled by the coarsest exterior.' The individuals are sometimes connected by a gelatinous flesh, which consists of cellulose, and there is sometimes a calcareous deposition in this connecting substance as in the compound polypes. The individuals in these systems have always sprung by gemmation from one, and both the solitary and compound ascidians propagate by eggs.



Section of Social Ascidian.

a, mouth; *b*, vent; *c*, stomach; *d*, intestinal canal; *e*, common tubular stem.

Ascidian (young).

The young have the power of active locomotion, resemble tadpoles in form, and swim by means of a vibratile tail, which disappears when they settle, being usually detached by contradiction at the base. The sexes are supposed to be distinct only in some of the ascidians. The ovaries are usually large, and the ova are carried away by the stream which passes through the animal. It is in the solitary ascidians that the highest organization is to be observed, and in which alone a distinction of sexes appears. In them, a muscular ring surrounds the mouth, and can be closed to exclude what is unfit to enter. Within this aperture there is also a fringe of tentacula, short and simple, or longer and minutely divided. In the compound ascidians, gemmation does not begin till the single animal has been fully developed; thereafter, bud after bud is produced, according to the plan upon which the compound system is constructed, and the procreative force of the germ-mass finally exhausts itself in the formation of male and female organs, in which that force is again mysteriously renewed under its two forms of the spermatozoon and the germinal vesicle, by the combination of which the reproductive cycle again begins its course.'

The name ASCIDIAN ZOOPHYTES (*Zoophyta Ascidivida*) has been used to designate those zoophytes or polypes which form the class *Polyzoa* of Thompson, *Bryozoa* of Ehrenberg and which in certain features of their organization resemble the A., although in other respects they differ widely from them. The *Alcyonidium* and *Alcyonella*, already noticed in the article *Alcyonium*, belong to this class. See POLYPI and ZOOPHYTE.

ASCLEPIADA'CEÆ, or ASCLEPIA'DEÆ, a natural order of dicotyledonous or exogenous plants, mostly shrubs, often with twining stems, almost always with milky juice. The leaves are entire, and have cilia between their stalks in place of stipules. The flowers are peculiar in their structure, although symmetrical and regular. The calyx is divided into five segments, the corolla into five lobes; there are five stamens and the stigma has five angles. The filaments are usually united so as to form a tube, which is generally furnished with a coronet of peculiar hood-shaped appendages; the anthers are two-celled, the pollen grains cohering in wax-like masses, which fall out of the anther cells, and become attached to glands at the angles of the stigma; there are two ovaries and two styles very close together, and often very short, with one dilated stigma common to both. The fruit consists of two follicles, or, by abortion, of one only, having numerous imbricated seeds with thin albumen, the end of the seeds terminating in long down. There are about one thousand known species, chiefly natives of warm climates. Some of them are cultivated in gardens and hothouses upon account of their curious or beautiful flowers, among the most familiar of which are some of the species of *Asclepias* (q. v.) or Swallow-wort; perhaps none of them is more highly or deservedly esteemed than *Stephanotis floribunda*, the fragrance of which equals its beauty, and which, since its introduction into British hothouses, has been sought for the bridal-garlands of the highest aristocracy. No hothouse climber is better known than *Hoya carnosa*, at each flower of which a drop of honey is always found to hang.

Vincetoxicum officinale.

a, root; *b*, fruit; *c*, single seed.

A number of species are medicinal, as Indian Sarsaparilla (q. v.), (*Hæmidesmus Indicus*); Mudar (q. v.) (*Calotropis gigantea*), so highly prized in the East Indies; *Sarcostemma glaucum*, the Ipecacuanha of Venezuela; *Tylophora asthmatica* and *Secamone emetica*, the roots of which are used as emetics, and in smaller doses as cathartics, and the former of which is reckoned among the most valuable medicinal plants of India; *Cynanchum acutum*, which yields a purgative called Montpelier Scammony, and *Vincetoxicum officinale*, which possesses similar properties. Argel (q. v.), much used for adulterating senna, belongs to this order.—The down of the seeds is sometimes employed as a substitute for silk or cotton (see ASCLEPIAS); and the stems of not a few species afford useful fibres, as those of the *Asclepias Syriaca* (see ASCLEPIAS), the Mudar (q. v.) and other species of *Calotropis*, natives of India and Persia, *Hoya viridiflora*, *Holostemma Rheedianum*, &c. The Mudar or Yercum fibre is very highly extolled by Dr. Royle (*Fibrous plants of India*). The bark of *Marsdenia tenacissima*, a small climbing-plant, yields a fibre called *Jetee*, of which the Rajmahal mountaineers make bowstrings, remarkable for their great elasticity, which they are supposed in some measure to owe to the presence of caoutchouc. The fibre of *M. Roylei* is used in Nepal. *Orthanthera viminea*, which grows at the base of the Himalayas, and has long leafless wandlike stems of ten feet in height, yields a fibre of remarkable length and tenacity, and which is supposed to be peculiarly suited for rope-making. The fibres of *Leptadenia Jacquemontiana* and *Periploca aphyllum* are used in Sinde for making the ropes and bands used in wells as water does not rot them.—The milky juice of most species of A. is acrid, but in some it is bland, and they are used for food, as is the milk itself of the Kiriaghuma or Cow-plant of Ceylon (*Gymnema lactiferum*). A few species, as *Marsdenia tinctoria*, a native of Silhet, yield indigo of excellent quality. The flowers of the genus *Stapelia* have a strong smell of carrion, and flies sometimes lay their eggs upon them, as it were by mistake.—No species of A. is a native of Britain.—The order is generally regarded as nearly allied to Apocynaceæ.

ASCLEPI'ADES, a Greek physician, born at Prusa, in Bithynia, who flourished during the early part of Cicero's life. He has been confounded with several other persons of the same name, and, in consequence, our accounts concerning him are both confused and contradictory. He seems to have wandered about considerably before he finally settled at Rome, as we read of his being at Alexandria, Parium on the Propontis, and Athens. It is not known either when he was born or when he died. A. was opposed to the principles of Hippocrates in medicine. Pliny, who professes very little respect for him, reduces his medicinal remedies to five: abstinence from flesh, abstinence from wine under certain circumstances, friction, walking, and 'gestation' or carriage exercise, by which he proposed to open the pores, and let the corpuscles which caused disease escape in perspiration; for his leading doctrine was, that all disease rose from an inharmonious distribution of the small, formless corpuscles of which the body was composed. He is said to have been very popular with the Romans on account of his pleasant and simple cures. His maxim was, that a physician ought to cure surely, swiftly, and agreeably—a thing which, unfortunately, is not always possible. A. is also alleged to have been the first who distinguished between acute and chronic diseases, but his knowledge of anatomy was apparently very slight. The fragments of his which remain have been gathered together, corrected, and published by Gumpert, under the title, *Asclepiadis Bithyni Fragmenta* (Weimar, 1798).

ASCLE'PIAS, or SWALLOW-WORT, a genus of plants, the type of the natural order *Asclepiadaceæ*. The corolla is wheel-shaped and reflexed; the coronet fleshy, and each of its hooded tips has a horn. The species are generally upright—seldom climbing and twining—herbaceous plants with opposite, whorled,

or alternate leaves. They are mostly American. The flowers are disposed in simple umbels between the leaf-stalks.—*A. Syriaca*, Syrian or Virginian Swallow-wort, sometimes called Virginian Silk, appears to be a native of North America, and not of Syria, as was supposed. It is frequently cultivated in flower-gardens. It has an unbranched stem 4—7 feet high; thick, ovate leaves, covered with a grayish down on the under side; and large, stalked, nodding umbels of many dull red flowers, which diffuse a strong and sweetish odor. The whole plant is full of an acrid white milk, which contains caoutchouc. The young shoots are eaten in North America like asparagus, as those of *A. stipitacea* are in Arabia. A brown well-tasted sugar is prepared in Canada from the flowers; and the silk-like down of the seeds has been used for the manufacture of textile fabrics, either alone, or along with wool or silk, but is more frequently employed for the preparation of wadding, and for stuffing mattresses and pillows. The plant appears, however, to be chiefly valuable for the fibre of its stalks, which is used for the manufacture of thread, cloth, ropes, nets, &c., in many parts of North America, and on account of which it has been recommended for general cultivation in Europe. The fibre is said to be of very superior quality. The plant rapidly extends by its creeping roots, and readily becomes a weed, where it has been introduced.—The roots of several other North American species are used as diaphoretics and expectorants, as *A. incarnata*, *A. tuberosa*, &c. The latter is a very ornamental garden-flower, and is called Butterfly Weed and Pleurisy Root in the United States, where it is frequent on stony and sandy grounds. *A. Curassavica* is called Wild Ipecacuanha in the West Indies, and a decoction of it is used by the negroes as an emetic and purgative.

A'SCOLI (anciently, *Asculum Picenum*), an old city of Italy, capital of the province Ascoli-Piceno, and the seat of a bishop, latitude 42° 50′ N., longitude 13° 37′ E. It is built on a hill, on the right bank of the Tronto, which formed the boundary between the late Roman and Neapolitan territories. Pop. (1872) 22,937. From the Adriatic, it is distant 16 miles west; from Ancona, 53 south. Its harbor (Porto d'Ascoli) has some coasting-trade, and is defended by two forts. The town is beautifully situated, commanding a fine view of the fertile valley through which the river flows, and of the rugged Apennines, which here rise to an elevation of 7212 feet.

In ancient times, it was inhabited by the Piceni, the descendants of a colony of Sabines, who maintained their independence against the Romans until 268 B.C. Nearly two centuries after, they took a prominent part in the Social War; and on the taking of their town by Pompeius Strabo, were subjected to the severest punishments. The town was annexed to the Papal States by Pope Clement V. in 1426; and with them passed to the kingdom of Italy.

ASELLI, ASELLIO, or ASELLIUS, CASPAR, a celebrated Italian physician, was born at Cremona about the year 1581. He served at first as a military surgeon, but afterwards became professor of anatomy and surgery at Padua. In 1622, while at Milan, where he was in the habit of spending a great portion of his time, he discovered the lacteal vessels. Before A.'s time, anatomists had supposed that the chyle was carried from the intestines into the liver by the mesenteric veins. Happening one day to dissect a living dog, he noticed for the first time the multitude of little vessels, which suck up the nutritive portion of the food. At first, he took them for nerves, and did not pay particular attention to them; but on pricking one with the point of his scalpel, a white liquid spurted out, and the discovery flashed on him in a moment. He seems, however, never to have understood or described them with complete accuracy. He died at the age of 45, leaving a treatise on the subject of his discovery, which was published a year after his death. It is entitled *De Lactibus, sive Lacteis Venis, Quarto Vasorum Mesaraicorum Genere, Novo Invento, Dissertatio*, and has several times been reprinted.

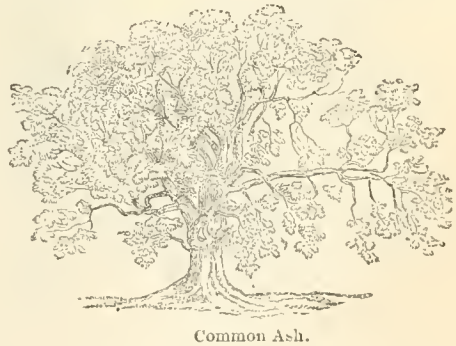
It is curious to reflect that such men as Gaspard Hoffman and Harvey zealously combated the opinions of A. It was nearly half a century before professional men admitted that a great discovery had been made in anatomy. See LACTEALS.

ASE'LLUS, in Ichthyology, a generic name now disused, but by which the cod and other *Gadidæ* were formerly sometimes designated. It is retained in the pharmacopœias, in the name of Cod-liver Oil, *Oleum jecoris aselli*.—The same generic name is now employed, in a different department of natural history, to denote a genus of small Isopod Crustaceans, one of which, *A. quaticus*, is common in stagnant ponds in Britain, and is sometimes called the Water Hog-louse. This genus is the type of a family, *Asellidæ*.

A'SES. The singular of this name in Old Norse is *As*, pl. *Aesir*; in Gothic, *Ans*; in Saxon, *Os* (*Es*). The A. are a race of gods in Northern or Scandinavian Mythology (q. v.), though not the oldest, yet the most powerful, like the Jupiter dynasty among the Greeks. They are usually considered as numbering twelve gods, and as many goddesses. The gods are—Odin, Thor, Baldur, Niord, Freyr, Tyr, Bragi, Heimdal, Widar, Wali, Uller, and Forseti; the best known of the goddesses—Frigga, Freyja, Idunna, Eira, and Saga. The worship of the A., or the Odin religion, was rooted not only among the nations of Scandinavia, but among the Germanic races generally, at least in its outlines. Besides other traces, proofs of its prevalence are to be found in a multitude of Gothic, Saxon, and Old High German proper names, many of which continue still in use, though their connection with German paganism passes unperceived: Oswald, Esmond, Oswin, Anselm, Ansgar, &c.

ASGILL, JOHN, an eccentric English *littérateur*, born about the middle of the 17th c. He studied for the bar, and at intervals during the whole of his chequered life transacted legal business in some form or other; but having early displayed a predilection for writing political pamphlets, he soon became involved, in spite of his cleverness, in serious pecuniary difficulties. Fortunately for *him*, parliament had just passed an act (1699) for the resumption of forfeited estates in Ireland, and commissioners were appointed to settle claims. A bright vision flitted across the mind of the much-harassed man. He sailed for the sister isle, and found the whole country wrangling in lawsuits. His talents, and the favor of the commissioners, secured to him a lucrative practice; and he even acquired sufficient influence to obtain a seat in the Irish parliament. Some time, however, before taking possession of his seat, A. had published a most extraordinary pamphlet, entitled *An Argument proving that, according to the Covenant of Eternal Life revealed in the Scriptures, Man may be translated hence into that Eternal Life without passing through Death, although the Humane Nature of Christ himself could not thus be translated till he had passed through Death* (1700). Much to A.'s surprise, the public flew into a rage against this absurd production; the Irish parliament voted it blasphemous libel, and the astonished author was expelled from the House after four days. In 1705, A. returned to England, and entered the English parliament as member for Bramber, in Sussex. But the fame of his unlucky pamphlet haunted him perpetually, and at last proved a Nemesis; for the English House, resolving not to be less virtuous than the Irish one, took up the treatise, condemned it to be burnt by the common hangman, as profane and blasphemous, and expelled A. on the 18th December, 1707. After this his circumstances rapidly grew worse, until at last he found something like peace in the King's Bench and the Fleet, between which two places his excursions were confined for the term of his natural life. Here he continued to practise professionally, and—for he never succeeded in overcoming this weakness—to indite innumerable pamphlets on political and theological topics. He died in November 1738.

ASH (*Fra'xinus*), a genus of trees belonging to the natural order *Oleaceæ*, and distinguished by very imperfect flowers, in which the



Common Ash.

calyx is obsolete, and the corolla either wanting or 3—4-partite; the fruit is a *samara*, a seed-vessel foliaceous at the extremity. The leaves are deciduous, and are pinnate with a terminal leaflet. There are about fifty species, mostly natives of Europe and of North America.—The COMMON ASH (*F. excelsior*) grows wild in the middle and south of Europe and north of Asia. It is an undoubted native of Britain. The flowers are quite naked; the leaves have five or six pairs of leaflets. The flowers appear before the leaves in spring, and the tree is not covered with leaves until the season is far advanced, losing them again early in autumn. It is, however, a most beautiful and umbrageous tree, highly ornamental in parks; but in parks or hedgerows it is extremely injurious to the grass or crops immediately around it. It rises to the height of 100—150 feet, generally with a smooth stem. The wood is white, tough, and hard, much valued by wheel-wrights, cart-wrights, coach-makers, joiners, and turners. It is also excellent for fuel. Sometimes it becomes irregular in the disposition of its fibres, and finely veined, and is then prized by cabinet-makers. The wood of the young trees is almost as valuable as that of the old. Indeed,

the value of the timber is greatest in trees of which the growth has been rapid, as it exhibits the characteristic toughness in the highest degree. The A. prefers a loamy soil, but grows in almost any, and succeeds in situations too elevated or too exposed for

Common Ash.

most other trees. It has of late been extensively planted in elevated situations in some parts of the north of Scotland, and there, in the more sheltered glens, it grows to a large size. Cultivation has produced and perpetuated a number of varieties, of which the most remarkable are the *Weeping A.*, with boughs bent almost straight down to the ground; the *Curled-leaved A.*, with dark-green wrinkled or curled leaves; and the *Entire-leaved A.*, a very curious variety, with many or all of the leaves simple (not pinnated), which has been erroneously regarded by some botanists as a distinct species, and named *F. simplicifolia*, *F. heterophylla*, &c.—The SMALL-LEAVED A. (*F. parvifolia*) and the LENTISK A. (*F. lentiscifolia*) are both natives of the shores of the Mediterranean, and are very graceful and ornamental trees.

The AMERICAN A., or WHITE A. (*F. Americana*), is readily distinguished from the Common A. by its lighter bark and paler green leaves. The flowers have a calyx, and the leaflets are shortly stalked and entire (those of the Common A. being sessile

Common Ash.

a, a branch with leaves; *b*, flowers; *c*, fruit on a considerably larger scale than the leaves and flowers.

and serrated). It is abundant in New Brunswick and Canada, but becomes rare to the south of New Jersey. The trunk often rises more than forty feet undivided. The wood is used for the same purposes as that of the Common A.—The RED A., or BLACK A. (*F. pubescens*), is very similar, but of smaller size, and has a deep brown bark. It is most abundant in Pennsylvania, Maryland, and Virginia, especially in swampy ground.—The BLACK A., or WATER A. of the New England States, New Brunswick, &c. (*F. sambucifolia*), is a large tree with buds of a deep blue color.—The BLUE A. of Ohio, Kentucky, Tennessee, &c. (*F. quadrangulata*), is also a large tree. The branches are quadrangular, the young shoots having on the angles four membranes which extend their whole length.—The GREEN A. (*F. juglandifolia*), readily recognized by the brilliant green of its young shoots, is chiefly found in the middle states; and the CAROLINA A. (*F. Caroliniana*), remarkable for the great size of its leaflets, chiefly in the southern states. Besides these, North America produces a considerable number of other species or varieties. The wood of all of them is used for somewhat similar purposes to that of the Common A.—In the south of Europe grows the MANNA A., or FLOWERING A. (*F. Ornus*, called *Ornus Europæa* by some botanists), whose flowers have a 4-partite calyx, and four small yellowish-white petals. The tree has much resemblance to the Common A. From it the substance called MANNA (q. v.) is obtained by means of transverse incisions in the bark; but in very favorable situations, it flows spontaneously during the greatest heat of summer. Manna is chiefly collected in Calabria and Sicily. A nearly allied species, *F. rotundifolia*, a native of Greece and the Ionian Islands, yields it also in perhaps equal quantity. The Common A. is said sometimes to produce the same exudation in the same warm climates.

The MOUNTAIN A. is the ROWAN TREE (q. v.), and belongs to a different natural order. Its resemblance to the A. is chiefly in its leaves.

The A. has a peculiar importance in Scandinavian mythology. The first man and woman formed were Ask and Embla (Ash and Elm). The court of the gods is represented in the Edda as held under an A., called Yggdrasil (q. v.). Connected, perhaps, with these traditions is the superstitious belief in A. twigs as a charm against witchcraft and magic.

ASHANTI′, or ASHANTEE′, a negro kingdom in Western Africa, on the north of the Gold Coast in lat. 6°—8° N., and long. 0°—3° W. It is mountainous, well watered and healthy, except in the lower alluvial districts. The principal rivers are the Volta, Prah, and Assinie. Pop. 1,000,000, of whom a fifth are warriors. The land is extremely fertile, producing maize, millet, rice, yams, tobacco, sugar, cocoa, the pine-apple, and other fine fruits, with gums, dye-woods, and timber. The principal exports are gold-dust and palm-oil, together with slaves. The natives are remarkable for their skill in certain articles of manufacture, their cottons are beautiful, as also their earthenware and sword-blades. The capital is Coomassie (q. v.).

The beginnings of the A. kingdom are obscure, but its traditions point to an emigration some hundreds of years ago from a region north of the Kong Mountains, probably caused by the spread of the Mohammedan empire of Timbuctoo. Our first positive glimpse of it is got in the year 1700, when Coomassie was made the capital by Osai Tootoo I., who conquered Akim, Assin, Gaman, Denkira, and other neighboring states, and became a sort of feudal sovereign over a large district. In their course of conquest over the Fantees, the Ashantis became involved in war with the British (1807—1826), and were finally driven from the sea-coast. In 1873—1874, in consequence of disputes arising in connection with the cession of the Dutch forts to Britain, they were again involved in a war with the same power; and an army under Sir Garnet Wolesley forced its way to the center of the kingdom. After a severe battle at Amoaful, and several days' fighting, Coomassie was taken, February 4, 1874, and burned on the 6th, and, though, the rainy season had set in, the army returned in safety to the coast. The people are sanguinary in disposition and in their religious ceremonies, but brave and more intelligent than the races along the coast.

A′SHBOURNE, a small town in a rich district near the left bank of the river Dove, in the west of Derbyshire. It lies on the steep south slope, with high hills on the north. It has a cruciform church, as old as the 13th c., with triplet lancet windows, which was restored in 1845 at the cost of £5000. Pop. in 1871, 2083, chiefly engaged in the cotton, lace, and iron manufacture, and in the cheese and malt trade. At A., in 1644, the parliamentary troops defeated those of Charles I. Pop. (1881) 3485.

A′SHBURTON, LORD (ALEXANDER BARING), born in 1774, a younger son of Sir Francis Baring, Bart., was, in early life, for many years commercially engaged in the United States and the Canadas, in the service of the great London mercantile house founded by his father. On the death of the latter, in 1810, he became the head of the firm of Baring Brothers & Co., and in 1812 was elected M. P. for Taunton. He represented that place, Callington, and Thetford, on the liberal interest, till 1831, and in 1832 was returned for North Essex as a moderate Conservative. In the short administration of Sir Robert Peel (1834—1835), he was President of the Board of Trade, and Master of the Mint, and was created Baron A. by patent in April 1835. This title had been conferred, in April 1782, on the celebrated lawyer John Dunning, who had married Alexander Baring's aunt, and it became extinct on the death of his cousin, the second Lord A., in 1823.

In 1842, Lord A.'s knowledge of business, and thorough acquaintance with American institutions, customs, and modes of thought, caused him to be appointed special ambassador to the United States, to settle the north-west boundary question, and other disputes, that then threatened to involve the two countries in war. In August of the same year, he concluded the famous treaty of Washington, commonly called the A. Treaty, by which

the frontier line between the state of Maine and Canada was definitely agreed to. By this treaty, seven-twelfths of the disputed ground, and the British settlement of Madawaska, were given to the United States, and only five-twelfths of the ground to Britain; but it secured a better military frontier to England, and included heights commanding the St. Lawrence, which the award of the king of Holland, who had been chosen arbiter, had assigned to the Americans. By the 8th and 9th articles, provisions are made for putting an end to the African slave-trade; and the tenth article provides for the mutual extradition of suspected criminals. Lord A. opposed free-trade, but strongly supported the penny-postage system when first proposed by Rowland Hill in 1837. He formed a valuable collection of old paintings. His death took place May 13, 1848.—His eldest son, William Bingham Baring, second Lord A. of this creation, born 1799, and educated at Oriel College, Oxford, entered parliament in 1836, as member for Taunton, and in September 1841 was appointed Secretary to the Board of Control. In February 1845 he became Paymaster-general of the Forces, and Treasury of the Navy. In 1855 he was made Commander of the Legion of Honor, and in 1860 he was president of the Geographical Society. He died in 1864.

A'SHBURTON, a small town in the south of Devonshire. It mainly consists of two paved streets crossing each other. It has a church in the Perpendicular style, with a tower 94 feet high. The population in 1871 was 2335,-employed in the mines, slate-quarries, and serge manufacture. Till 1868, A. returned one member to parliament.

A'SHBY-DE-LA-ZOU'CH, a small town near the source of the Mease, a tributary of the Trent, in the north-west of Leicestershire. Pop. in 1871, 7302. Leather-making is the principal manufacture, but nail-making, malting, wool-stapling, iron-smelting, and the manufactures of stockings, hats, and fire-bricks are carried on. In the neighborhood are collieries, and saline springs containing common salt in greater proportion than the sea; and ironstone, limestone, and fine clay are found. A canal 30 miles long, without a lock, connects the town with Coventry. The ruins of A. Castle stand on a height on the south side of the town. Mary, Queen of Scots, was once confined in this castle. St Helen's Church, an ancient structure with a tower, is the burying-place of the Hastings family, as well as of Selina, Countess of Huntingdon, the founder of the sect called the Countess of Huntingdon's Connection.

A'SHDOD. See AZOTUS.

ASHES, the remains of animal and vegetable bodies after burning. It is not strictly correct to speak of the ashes of a mineral. When lead, for instance, is exposed to heat, it turns to dross, which has the appearance of A., but is merely the lead combined with oxygen. In the same way, volcanic A., as they are called, are only a finer kind of pumice-stone, the solidified scum of molten lava. The ashes of organic substances destroyed by fire consist of the fixed salts contained in these substances. In land-plants, the most important are salts of potash, along with silica and lime, in sea-plants, soda takes the place of potash. By lixiviation of the A., the potash or soda is dissolved and separated from the insoluble mass, and is then purified by crystallization. The A. of sea-plants contain also more or less iodine. Peat and turf ashes contain, besides alkalies, more or less clay and sand; the same is true of pit-coal, which sometimes contains iron.

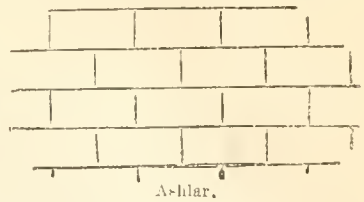
At one time, the A. or inorganic ingredients of plants were considered unessential to their existence. But the progress of vegetable chemistry has taught that a certain proportion of saline food is absolutely necessary to the development of plants. The analysis of the A. of the different kinds of vegetable substances has become of great interest.

The A. of animal bodies do not differ greatly from those of vegetables. Bone-A. consist essentially of lime united with phosphoric acid. This bone-earth is very valuable as manure for grain. In well-wooded countries, A. from burnt wood form an article of considerable trade. They are much used in the arts, as soap-boiling, bleaching, dyeing glassmaking, &c. Wood-A. are also used in washing and other domestic processes, as a cheap preparation of potash (q. v.).

The covering of the head with A. has long been a common sign of mourning among eastern nations, indicative of the very deepest distress. Instances of this are mentioned in Scripture. Penitents in the early Christian Church signified their sorrow and humiliation in like manner, by standing at the door of the church in 'sackcloth and ashes.' See ASH-WEDNESDAY.

ASHFORD, a small town on the west of the confluence of the two upper branches of the river Stour, near the middle of Kent. Pop. in 1871, 8458, which has largely increased from its having become the junction station of three great lines of railway. Damask is manufactured here.

A'SHLAR, or A'SHLER, building-stone squared and hewn, as distinguished from rubble, or rough stones which are used as they come from the quarry without being dressed. A. is laid in regular courses in building, and is of various kinds, according to the style of working that side of the stone which is to form the facing of the wall. Thus, there are *tooled* A.—the marks of the tooling being either *random* or in *grooves; polished* A., in which the face of the stone is rubbed smooth; and *rustic* A., in which only the joints are accurately hewn, the face of the stone being left projecting irregularly. Quarriers apply the term A. to squared stones before being hewn. In old documents, the term appears under a variety of forms, such as achlere, ashelar, aslure, and estlar.


Ashlar.

ASHLEY, LORD. See SHAFTESBURY.

ASHMOLE, ELIAS, a celebrated antiquary, was born at Lichfield on the 23d May 1617. In 1633, when only sixteen years of age, he commenced the study of law, and five years after, he was admitted to practice as a solicitor in Chancery. During the civil wars, he embraced the side of the Royalists, and was appointed captain in Lord Ashley's regiment, and comptroller of the Ordnance; but at the same time exhibited his love of study by joining Brazenose College, Oxford, where he sedulously applied himself to mathematics, natural philosophy, astronomy, and astrology. In 1646, he became acquainted with several famous astrologers; amongst others, William Lilly, whose conversation had a great charm for him; and in 1650, he published a work of Dr. Dee's, to which he subjoined a treatise of his own. Continuing with singular perseverance his researches in this dim region of superstitious philosophy, he was enabled, in the course of two or three years, to issue his *Theatrum Chymicum Britannicum*, which procured for him a high reputation, and the friendship even of men like John Selden. In 1658, appeared his *Way to Bliss*, a work on the philosopher's stone—the last he published in connection with astrology. At the restoration of King Charles various honors and emoluments were conferred upon him. In 1682, he presented to the university of Oxford a very fine collection of rarities, which properly, however, belonged to certain persons of the name of Tradescant. In this transaction he exhibited a rather mean ambition to exclude the rightful owners of the cabinet of curiosities from participating in the honor of the gift, and posterity has unfortunately gratified his wish by calling it the Ashmolean Museum. He died May 18, 1692, leaving behind him a large quantity of manuscript, a considerable portion of which has since been published.

ASHMUN, JEHUDI, an American philanthropist, was born at Champlain, in the State of New York, in 1794. He was educated with a view to the Christian ministry; but eventually became editor, in Washington, of a monthly magazine called *The Repertory*. In this periodical he advocated the views of the African Colonization Society for founding a colony of liberated negroes on the west coast of Africa. In 1821 he published a life of the Rev. Samuel Bacon, who had fallen a victim to an unsuccessful attempt to realize these views in the previous year. Learning the difficulties which surrounded a second attempt at planting a settlement in Africa, A. resolved to devote himself to the good work. Receiving an appointment as one of the agents of the African Colonization Society, he conducted a body of liberated negroes from Baltimore, and landed at Cape Mesurado, the seat of the infant colony, in the autumn of 1822. Dr. Ayres and the other agents of the Society having meanwhile abandoned the settlement from severe illness, he assumed the superintendence of affairs as the sole representative of that body. Here, for more than six years, he devoted his powers and his life to the establishing, on a fair and solid basis, this colony, so full of hope for the American negro. He showed great courage and tact in opposing the united forces of the natives at the outset of his management, and no less ability in after-negotiations with the chiefs, by which the colony acquired very considerable accessions to its territory. His health at length becoming sadly impaired, he bade adieu to the settlement, then recently called Liberia, in March, 1828, and landed at New Haven, Connecticut, in a state of great exhaustion. After a brief revival, he relapsed, and died on the 28th August 1828, in his thirty-fifth year. His remains were honored with a public funeral. A memoir of his life, by R. R. Gurley, appeared at Washington in 1835.

ASHTABU'LA, a rapidly increasing town of the state of Ohio, North America, on the Cleveland and Erie Railway, 3 miles from Lake Erie, and 49 miles north-east from Cleveland. It stands on a river of the same name, which flows into Lake Erie, and at the mouth of which there is a harbor. It is a place of considerable trade. Pop. (1880) 4445.

A'SHTAROTH. See ASTARTE.

A'SHTON-IN-MAKERFIELD, a small township in a carboniferous district in the Middle of South Lancashire. Pop. in 1871, 7463, chiefly engaged in collieries, and in the cotton manufacture.

A'SHTON-UNDER-LYNE, a town in the S.E. of Lancashire. Pop. (1871) 37,389; (1881) 43,389. It returns one member to parliament. It is a great seat of the cotton manufacture. The population is also employed in bleaching, dyeing, and calico-printing, in collieries, and in the manufacture of machines, bricks, &c. To the west of the town is a large moss or shaking bog, containing fir-trees full of turpentine, and black oak, with a loamy bottom at the depth of 10 feet.

ASH-WEDNESDAY, the first day of Lent (q.v.), so called from the Roman Catholic ceremony of strewing ashes on the head as a sign of penitence. This custom, probably introduced by Gregory the Great (590—604), was sanctioned by Pope Celestin III. in 1191, and afterwards generally prevailed. Before mass, the ashes were consecrated on the altar, sprinkled with holy water, and signed three times with the cross, while the priest recited the words *Memento quod cinis es, et in cinerem reverteris!* ('Remember that thou art dust, and must return to dust!') Next they were strewed on the heads of the officiating priests, the clergy, and the assembled people. The ashes were said to be those of the palms consecrated on the preceding Palm Sunday (q.v.)—The Protestant Church in Germany does not celebrate A. In the Church of England, it is observed by the stricter members, but without anything of the ceremony from which it derives its name; and the *commination*—a series of denunciations against impenitent offenders—is appointed to be read in the service for this day.

A'SIA, the largest division of land on the globe, generally regarded as the birthplace of the human race, and the most ancient seat of civilization. Its superficial area, including islands, has been estimated at from 16 to 20,000,000 square miles, and its population at 840,000,000. This enormous mass of continent lies almost entirely in the northern division of the eastern hemisphere, while its world of islands extend across the equator on the south-east. On three sides, it is surrounded by the ocean; but on the west, is partially connected with Africa and Europe. The continental mass is more than four times as large as Europe. Some idea may be formed of its vast extent by the calculation that, though it contains more than half of the whole population of the globe, the number of its inhabitants is so small compared with its area, that Europe may be said to be three times more densely populated. The coast-line is about 33,000 miles in length; and on the south and east, is diversified by seas, bays, and gulfs, affording advantages to navigation and commerce far superior to those of Africa, but inferior to those possessed by Europe and America. On the west side, the Dardanelles and the Sea of Marmora may be regarded as but a slight interruption of the great table-lands of Europe and A. which form the continent of the old world.

Horizontal Configuration.—A. is bounded N., by the Arctic Ocean; E., by the Pacific Ocean; S., by the Indian Ocean; and on the W., by Europe, the Black Sea, Archipelago, Mediterranean, and the Red Sea. On the extreme north-east the peninsular land of Kamstchatka is separated from North America only by the narrow Behring's Strait. On the south-east a bridge of numerous islands—Sumatra, Java, Borneo, Papua, &c.—extends towards Australia. The body of the continent may be regarded as a trapezium, of which the offsets, consisting of several large peninsulas, bear some resemblance to those of Europe; though in A. everything is on a more gigantic scale. Thus, one of these offsets, the peninsula of Arabia, is four times as large as France. On the west extends the peninsula of A. Minor, or Anatolia, divided from Europe by the Strait of Constantinople, the Sea of Marmora, and the Dardanelles, with the Black Sea on the north, and the Levant on the south. On the south of A., the peninsular configuration may be divided into three principal masses, corresponding to the southern coast of Europe: Arabia may be considered as a counterpart to Spain; Italy, with its neighbor-island Sicily, is represented by Hindustan and Ceylon; and, as in Europe, the broken Grecian peninsula is connected with A. by a bridge of numerous islands extending on the south-east, so, in A., the Eastern Peninsula (or India beyond the Ganges), lying between the Bay of Bengal and the Chinese Sea, is connected with Australia on the south-east by the vast Eastern Archipelago. This world of islands is divided into the several groups of the Philippine Islands, Borneo, Celebes, Molucca Islands, Sumatra and Java, Timor and the numerous adjoining isles. The east coast of A. is characterized by the deep indentations of the Pacific Ocean in the Chinese Sea, Yellow Sea, and Seas of Japan, Okhotsk, and Kamstchatka; all fringed with numerous islands, and separated by the peninsula of Corea, the island of Saghalien, and the peninsula of Kamstchatka. On the north, the Siberian coasts are also deeply indented, but rather by the embouchures of large rivers than by arms of the sea. The whole length of continental A., from the Dardanelles to the Japan Islands, is 6000 miles; its breadth, from Malacca to the north-east cape of Siberia, is 5300 miles; with its islands it extends from 10° S. lat. to 78° N., and from 36° E. long. to 190° E. or 170° W. Such an extent of surface must include all varieties of soil, climate, and production.

Vertical Configuration.—Equally grand are the features of this continent when regarded vertically: it has the most extensive lowlands, the most immense table-lands, the highest chains of mountains, and the most elevated summits in the world; tracts doomed to everlasting snow or scorching sterlity, salubrious valleys of continual verdure, and noisome jungles of the rankest growth. The table-lands of Asia occupy two-fifths of the whole continent. The eastern extremity is 2000 miles broad; the western, less than 1000. The whole mass may be regarded as consisting of two parts, separated, or, to speak more properly, perhaps, connected by the lofty, snow-covered mountain-isthmus of the Hindu Kush. These great divisions are styled respectively: 1. The Eastern Plateau, including the Table-land of Tibet, and the Desert of Gobi; 2. The Western Plateau, or Table-land of Iran. The former, a vast four-sided mass considerably larger than the whole area of Europe, extends 2800 miles from the mountain chain, Hindu Kush, to the Tonquin Gulf in China. On the south, the plateau is divided from the plains of Hindustan by the Himalaya Mountains, which have a mean height of 18,000 feet, while several of their summits rise from 25,000 to 29,000 feet above the level of the sea. Even the passes over this enormous range of mountains are almost as high as the summit of Mont Blanc. Here Dhwalagiri, long supposed to be the Mont Blanc of the Himalayas, and with precisely the same signification, viz., 'white mountain,' rising to 26,826 feet, leaves all the peaks of the Andes far below; while Kunchinjinga reaches to 28,156 feet, and Mount Everest, now believed to be the loftiest summit in the world, attains the height of 29,002 feet. Cultivation is found at 10,000 feet above the sea; while flocks graze some 4000 feet higher. In Eastern Tatary and Tibet, the ground is cultivated at a height only 2000 feet lower than the summit of Mont Blanc. On the east, the table-land of Tibet is bounded by the Chinese mountain ranges Yun-ling and Khing-khan, which, towards the south, are connected with wild Chinese alpine regions of which little is known; while towards the north, they extend into another mountainous region, where the eastern chain of Shangpe-shan opposes to the Pacific Ocean a wall of rock 3000 feet high. On the north, the chain of the Altaï Mountains, 3000 miles long, and divided into several groups, forms the boundary between the great plateau and the plain of Siberia, which is larger than the whole area of Europe.

The Western Plateau, or Table-land of Iran, rises generally about 5000 feet above the sea; but in some parts to 7000 feet; descending again, however, in the central and southern parts, where it spreads out into sandy and gravelly plains, to 2000 and 1200 feet. It has been divided into three sections: the Plateau of Iran proper; the Median-Armenian Alpine region; and the Anatolian Table-land. The *first* division, or the Plateau of Iran, has a mean altitude of about 3000 feet. Salt plains, with gravel and sand, form large portions of the surface, and mountain-walls on all sides hem it in. On the northern edge ascend the Persian mountains; on the east, the steep and lofty parallel chains of the Indo-Persian boundary mountains; and on the south, the plateau, for 1000 miles along the Persian Gulf and Arabian Sea, is bounded by the wild terraced regions of Beloochistan and Farsistan. The *second* division, or the Median Armenian Alpine region, includes the mountainous regions of Armenia, Kurdistan, and Azerbijan. Here the table-land is compressed to about half its general width. From this plateau, of which a part is mentioned in Scripture as 'the mountains of Ararat,' rises the volcanic cone commonly styled Mount Ararat, to the height of 17,212 feet above the sea-level. Anatolia, the *third* and most westerly division of the table-land, is bounded along the shores of the Black Sea by mountains rising to 6000 or 7000 feet, and partly covered with forests; on the south-west the Taurus chain of mountains, beginning in the islands of Rhodes, Cos, &c., extends in several ramifications through a part of Asia Minor, runs in a single range along the coast of Karamania, and in the east an occasional height of 12,000 and 13,000 feet.

The Western Plateau, thus divided into three sections, is full of diversities of soil and scenery. A great part of the table-land of Iran (or Persia) is extremely barren and arid, which serves to explain the enthusiastic terms in which the Persian poets have spoken of the beautiful valleys found here and there among the mountains. The coasts of the Persian Gulf are sandy wastes. Between Irak and Khorassan, a desert of clay, covered with salt and nitre, varied only by patches of verdure here and there, occupies 27,000 square miles, and joins the wide sandy desert of Kernan. A great part of Beloochistan is an arid plain, covered with red sand.

Besides these central masses, there are several detached mountain chains and plateaus. The Ural Mountains, forming the land-boundary between Europe and Asia, and separated from the Altaï chain by salt lakes, marshes, and deserts, are divided into three sections: the Northern, Central, and Southern Ural. The second of these divisions is rich in minerals—gold, platina, magnetic irons and copper. On the isthmus between the Black Sea and the Cas-

ASIA
ATLANTIC OCEAN
ARCTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN
N. AMERICA
EUROPE
AFRICA
AUSTRALIA
RUSSIAN EMPIRE
SIBERIA
CHINESE EMPIRE
EAST TURKESTAN
TURKESTAN
TIBET
MONGOLIA
MANCHOORIA
JAPAN ISLANDS
PHILIPPINE ISLANDS
INDIA
BURMAH
SIAM
PERSIA
ARABIA
TURKEY IN ASIA
AFGHANISTAN
BELOOCHISTAN
KAMCHATKA OR BEHRING SEA
SEA OF OKHOTSK
YELLOW SEA
EASTERN SEA
CHINA SEA
JAVA SEA
BAY OF BENGAL
ARABIAN SEA
CEYLON
BORNEO
CELEBES
JAVA
SUMATRA
NEW GUINEA
AUSTRALIA
British Miles
Geographical Miles
Longitude East
of Greenwich

pian, the alpine ridges of the Caucasus reach a height of from 10,000 to 11,000 feet, while individual peaks tower up to the gigantic height of 17,000 or 18,000 feet, as, in the still faintly volcanic peak of Elbruz (18,493 feet) and Kasbeck (16,523)—both, however, on the northern or European side of the main mass of the Caucasus. The high lands of Syria rise gradually from the neighboring deserts to the height of 10,000 feet in Libanus and Antilibanus, and slope steeply in terraces down to the narrow coast-lands of Phœnicia and Palestine. The plateau of the Deccan, in India, rises to an average height of from 1500 to 2000 feet, and is divided on the west from the narrow coast-level of Malabar by the Western Ghauts, 4700 feet; on the east, from the broad level coast of Coromandel, by the Eastern Ghauts. On the north, it is divided from the low plains of Hindustan by the Vindhya and Malwah mountain chains; and, on the south, the Ghauts unite at the sources of the Cavery, and form the Neilgherry (or Blue Mountains, 8760 feet high), the loftiest in the peninsular portion of Hindustan. These slope steeply down to a low narrow plain, then rise again to a considerable height in the Aligherry range, sink into the sea at Cape Comorin, and reappear in the group of Adam's Peak in Ceylon. The Malayan Mountains, or chains of the Eastern Peninsula, may be regarded as offsets of the Sine-shan, and extend to the extreme south point of A., reappearing with volcanic peaks in the Sunda Islands.

The six great *Lowlands* of A. are, 1st, The *Siberian* lowlands in the north, which is by far the largest. It stretches from the northern declivities of the Altaï and Uruf Mountains to the shores of the Arctic Sea, and is, for the most part, cold, gloomy, and barren. 2d, The *Bucharian* lowland, or the wild sterile waste between the level of the Caspian Sea and Lake Aral, much of it beneath the level of the sea. It is composed to a large extent of gravelly soil. 3d, The *Syrian and Arabian* lowland, the south of which is hot and arid, with almost no oases; but the north is watered by the Tigris and Euphrates. 4th, The lowlands of *Hindustan*, comprising the great Indian desert, 400 miles broad, together with the vast and fertile plains of Bengal, generally called the Valley of the Ganges, and ranking, perhaps, next to China as a region of fertility. 5th, The *Indo-Chinese* lowlands, comprising the long levels of the Burman empire, through which flows the Irrawady, and the rich regions of Cambodia and Siam. 6th, The *Chinese* lowlands, commencing in the east at Pekin, and extending as far south as the Tropic of Cancer, containing 210,000 square miles, or an area seven times the size of Lombardy. It is watered by a copious river-system and numerous canals, and may be regarded as a vast garden, exceeding in productiveness all other parts of the world.

Hydrography.—The hydrography of A. displays as striking a variety as the structure of its land. The alpine regions send down in some directions torrents of water, which form rivers almost rivaling in magnificence those of America, and which flow for hundreds of miles through plains of unsurpassed fertility. On the other hand, there are wide stretching tracts, like the deserts of Africa, destitute of water, and doomed to eternal sterility. Only one large sheet of water, Lake Hamoon or Seistan (q. v.), refreshes the high table-land of Iran. The low steppe of Turan contains the Caspian Sea (q. v.), the largest of all lakes, and Lake Aral (q. v.). In the valley of Cashmere lies Lake Ular, 40 miles in circumference, and the only considerable sheet of water in the Himalaya chain. At the northern base of this mountain-chain, Lake Palte is remarkable for its annular form. In Tibet and the Altaï Mountains, lakes are very numerous.

One of the most striking characteristics of Asian river-systems is found in its double rivers, or two streams rising in the same region, flowing in almost parallel directions, and either uniting, or nearly so, before entering the sea. Among these twin rivers may be mentioned—the Syr-Daria and Amu-Daria, flowing into Lake Aral; the Euphrates and Tigris, in Western A., surrounding the plain of Mesopotamia, uniting at Koona, and together flowing into the Persian Gulf; the Ganges and Brahmaputra; and the Yang-tze-kiang and Hoang-ho, in China, rising near each other, then widely separated in their courses, but again approaching each other, and both falling into the Yellow Sea, only 100 miles apart.

The six great river-systems of A., comprising rivers which will be found fully noticed under their respective names, are—the Mesopotamian, that of North-west India, that of North-east India and Tibet, the Indo-Chinese, the Chinese, and the Siberian. The *first* comprises the two famous streams, the Tigris and Euphrates. The *second* comprises the Indus with its tributaries. The *third* system comprises the Brahmaputra and Ganges. The *fourth* system comprises the rivers of the Indo-Chinese peninsula; the chief of which are the Irrawaddy, the Martaban or Saluen, the Me-nam, and the Me-king or Cambodia. The *fifth* system is the Chinese. It comprises four great streams, all of which flow in an eastern or north-eastern direction into the Pacific; the Hong-kiang, or Canton River; the Yang-tze-kiang (or Son of the Sea); the Hoang-ho, or Yellow River; and the Amur. The *sixth* system comprises the large rivers of Siberia, the principal of which are the Obi, the Yenisei, and the Lena. They all have their sources in the Altaian Mountains; flow north, or nearly so; and for 800 or 900 miles before their embouchure, traverse a dreary, flat, monotonous waste, until their sluggish waters creep into the Frozen Sea.

Geology.—The geological structure of Asia is so complex, the different formations are so broken up and scattered, that a general description would be unintelligible. We must refer to separate notices, where the geological structure and phenomena of circumscribed districts will be given in detail, and the reader will, in this way, be enabled to form a correct impression of the geology of Asia as a whole. See INDIA, CHINA, TIBET, &c.

Natural History.—The vast extent of A., and its great diversities of climate, naturally lead us to expect in it a great variety of natural productions, both animal and vegetable. This expectation is heightened when we consider how completely this vast continent is divided into separate portions by mountain ranges of great altitude, and how extensive the mountainous tracts themselves are, as well as the great extent of the elevated plateaux or table-lands, and when we add to these considerations that of the peculiar character of wide regions—wastes of sand—level steppes—and extensive districts of which the soil is strongly impregnated with salt. Accordingly, we find, both in the flora and fauna of Asia, all the variety which such considerations might lead us to expect.

The most northerly part of the continent, however, differs comparatively little in its productions from the corresponding parts of Europe and America. It exhibits the same arctic flora, with differences comparatively inconsiderable. Pines, birches, and willows form, as in the other continents, the last forests of the north; but upon account of the more severe climate, they do not reach a limit so northerly as in Europe, and particularly in the west of Europe. Some of the common plants of Europe are abundant as far east as Kamstchatka; the Crowberry (*Empetrum vigrum*), so plentiful in the moors of Scotland, is still more plentiful throughout Siberia; the same *Vaccinia* (Bilberries, &c.) and *Rubi* (brambles, &c.) abound in the Kamstchatkan forests as in those of Scandinavia. There are, however, interesting differences. Heaths are comparatively rare in Asia, its flora agreeing in this respect with that of America, rather than with that of Europe. The larch, which in Europe occurs only on the central mountains, extends far northward at the mouth of the Obi to the utmost limits of arborescent vegetation; probably a mere variety of the same species, although it has been described as distinct. In Kamstchatka, a different kind of birch replaces the common birch of Europe as a forest tree, and the Siberian stone pine is different from that of the south of Europe. Siberia in its less frigid regions produces a luxuriant vegetation, of which herbaceous plants of unusually large size for a cold or temperate climate are a characteristic feature; as species of Rhubarb, Angelica, and Cow-parsnip (*Heracleum*), some of which are now well known in Britain. It is indeed from the central and eastern temperate parts of Asia that the cultivated species of rhubarb are derived, and from the same region the rhubarb root, so valuable in medicine, is brought. In the abundance of *Grossulariaceæ* (Currants), the warmer parts of Siberia resemble North America, although most of the species are different.

To the south of the Altaian Mountains, the flora of Asia corresponds in part with that of the great eastern plain of Europe; but it exhibits also peculiarities which may in some measure be ascribed to the saline character of large districts, the stony or sandy desolation of others, and the elevation of the great central plateau. The flora of Asia Minor and of Syria has a general resemblance to that of the south of Europe, although exhibiting also features which belong rather to that of India or of Africa. Shrubby *Labiatæ* are particularly characteristic of this region, from which not a few of them have found their way into the gardens of Europe and of other parts of the world, upon account of their fragrance, their medicinal qualities, or their use for the grateful seasoning of food.—The tropical flora of Arabia abounds in trees which yield fragrant balsams and resins, particularly of the natural order *Amyridaceæ*. Indeed, both the warmer temperate and the tropical regions of Asia excel other parts of the world in the number and variety of the odoriferous drugs which they produce, with odors of the most various characters, from myrrh and frankincense to asafœtida. Arabia has long been noted for the production of coffee, which is now also pretty extensively cultivated in other warm parts of A. The date-palm is as characteristic of Arabia as it is of Egypt. Acacias and mimosas also abound.—The flora of Persia in part resembles that of Arabia, although it is less tropical, and the altitude of its mountains gives to it in some places an extremely different character.—The abundance of *Scitamineæ* is regarded as particularly characteristic of India; and plants of this order yield ginger, galangal, cardamoms, turmeric, and other articles of commerce, amongst which not the least is a kind of arrow-root. Its *Leguminosæ* are also very numerous, both herbaceous and shrubby, or arborescent, many of them exhibiting great beauty of foliage and splendor of flowers; some producing useful kinds of pulse; others timber, gum, medicines, &c. The number of valu-

able medicinal plants which belong to the Indian flora is very great, as is also that of dyewoods; and it abounds in fine fruits, of which the mango and mangosteen may be particularly noticed. *Cucurbitaceæ* (Gourds) are very numerous; as are also trees of the genus *Ficus* (Fig), some of which produce caoutchouc, and amongst which are the sacred peepul and the banian-tree, so remarkable for the roots which descend from its branches to become new stems, and for the extent of ground which it canopies. Palms are numerous in the tropical parts of A., and particularly in the south-eastern regions, but less numerous than in the tropical parts of South America. The cocoa-nut is one of the most common palms in the vicinity of the sea. Some of the Asiatic palms are valuable for the sago which they yield. The natural order *Dipteraceæ* is one of those that are peculiar to India and south-eastern A., and includes some of the noblest timber-trees; but the Indian teak, so valuable for ship-building, is of the order *Verbenaceæ*.

The flora of the Eastern Peninsula, Siam, Cochin-China and, the south-eastern part of A. generally, differs considerably from that of India, and exhibits, if possible, a richer variety. The change from the Indian flora is still greater in the islands, and a resemblance to that of Polynesia and of Australia begins to appear. The bread-fruit takes the place of its congener, the jack of India. These regions produce nutmegs, cloves, and other spices. The *Lauraceæ* are abundant, yielding cinnamon, cassia, and camphor. Gutta-percha has recently been added to the number of the most valuable exports. China and Japan have many plants peculiar to themselves, and are remarkable for the prevalence of the *Ternstræmiaceæ*, the natural order to which the tea-plant and the camellia belong. It is scarcely necessary to mention how extensively tea is cultivated in China, and how important it is in the commerce of the world. The diversity of climate, however, both in China and Japan, is so considerable, as to imply no small diversity of productions. In like manner, the Himalaya Mountains possess a flora very different from that of the Indian plains, and which in some of its most characteristic features, particularly in the prevalence of large rhododendrons and magnolias, has been found remarkably to agree with the flora of the southern parts of the United States; whilst at still greater altitudes there is a strong resemblance to that of more northern regions, or of the European Alps; forests of pines appear, and along with them the *deodar*, a cedar scarcely, if at all different from the cedar of Lebanon. The mountains of Java also produce oaks and other trees resembling those of the temperate zone, although the species are peculiar. But many parts of A. have as yet been very imperfectly explored.

Many of the cultivated plants of Europe are known to be natives of A., and others are supposed to be so. As the cradle of the human race, and the scene of the earliest civilization, it is natural to suppose that it supplied the first fruits and other vegetable productions which man sought to improve by cultivation; and of some which, as the apple and the cherry, are probably natives of Europe, it seems probable that the first improved varieties were introduced from A. We do not know with certainty of what part of the earth some of the principal cereal plants or grains are natives—as wheat, barley, oats and rye; but there seems great probability in the supposition that they are of Asiatic origin. Rice certainly is. It has been cultivated from time immemorial in some of the warm parts of A.; and its introduction into other quarters of the world is comparatively recent. Maize—introduced from America—is now to be reckoned among the most important cultivated plants of A., and its cultivation is rapidly extending, as is that of the potato. Wheat, oats, barley, rye, beans, pease, and buckwheat, are the principal crops of regions similar in climate to those in which they are cultivated in Europe. Barley and buckwheat are cultivated in the Himalayas at the extraordinary elevation of almost 12,000 feet, and crops of barley are to be seen even at 15,000 feet above the sea.

Millet of different kinds, durra, and other grains of inferior importance, are cultivated to some extent in India and other warm regions; also different kinds of pulse. The banana and plantain are of the same importance as in other tropical countries; and the yam and cocco or eddoes contribute largely to the supply of human food. The sugar-cane is cultivated in the warm parts of A., but not with so much spirit or success as in America, although it is a native of the East and not of the West Indies. Pepper is one of the native productions of the East Indies, and is extensively cultivated. Tobacco, whether or not any species of it is indigenous to A,, is now produced in large quantities. Indigo is extensively cultivated in India, and the opium poppy too extensively. Different species of cotton are natives of India, and have long been cultivated there and in China. Hemp is cultivated in India, not for its fibre, but to afford the means of intoxication; and flax chiefly for the oil of its seeds; but both hemp and flax are extensively cultivated for their fibres in other parts of A.; and India and the other tropical regions produce many plants valuable for their fibres, among which are species of *Musa*, *Corchorus* (yielding the jute of commerce), and *Urtica* (nettle). Among the crops of India is sesamum, valued for the oil of its seeds.

It seems probable that we are indebted to the warmer temperate parts of A. not only for the orange, the lemon, and all the other species of the genus *Citrus*, but also for the olive, the peach, and nectarine, the apricot, the fig, the mulberry, and the vine, with many other of the fruits now most generally esteemed and cultivated. China and Japan being the seats of an ancient civilization, many useful plants have long been cultivated there, which have scarcely yet found their way into other parts of the world. Floriculture has been practised there with great assiduity from a remote antiquity; and varieties of Hydrangea, Camellia, Tree Pæony, Chrysanthemum, &c., have, from time immemorial, been scarcely if at all less numerous than those of the tulip and hyacinth in Holland.

The zoology of A. is not less interesting than its botany. Amongst domestic animals, the most important are the ox and buffalo, the sheep, the goat, the horse, the ass, the camel, and the elephant. A number of species of ox and buffalo are natives of A., from more than one of which the domesticated races appear to have derived their origin. Very distinct from all the others is the yak (q. v.) of Tibet, a creature which is of great use to the inhabitants of the elevated regions of the Himalayas, and is to them almost what the reindeer is to the Laplander. The sheep and goat are natives of the mountainous parts of Central A. The horse and the ass seem to belong to the same regions; and all of these have been domesticated from the earliest times. The camel is of incalculable value as a beast of burden in the regions of heat and drought, and as affording the means of traversing the great deserts. It is used principally in the southwest of A. and in India. The elephant is a native of the tropical parts of A., but is of a different species from that of Africa. The reindeer constitutes the chief wealth of some of the tribes of the north. Dogs are also used by some of the Siberian tribes for drawing their sledges. Different races of dogs are domesticated in different parts of A., and a small kind is fattened for its flesh in China; but in the Mohammedan parts of A., the dog is reckoned an unclean animal, and is known chiefly as a prowler about towns and villages, and a devourer of offal.

The tropical parts of A. abound in monkeys, of which the species are very numerous. Among them are some with long, and some with short tails, but none with prehensile tails, like the sapajous of America. Many are altogether tailless, and among these is the orang-outang, found in the south-eastern islands. A much larger ape, called the pongo, has been said to exist in Borneo, but it is still a doubtful species. The same warm regions abound in bats, many of which are of large size, and feed upon fruits, not upon insects. The flying lemur or colugo is another remarkable animal of the Indian Archipelago.—Bears are found in all parts of A.—the white bear in the extreme north, and other formidable species in the more temperate parts; whilst the tropical regions produce bears which are by no means ferocious, and feed chiefly on insects, fruits, and honey. Badgers are also found in A., and quadrupeds of several other plantigrade genera, allied to the bear, but of comparatively small size and inoffensive habits, as the beautiful Panda (*Ailurus*) of the north of India, and the Binturongs (*Ictides*) of Malacca and the neighboring archipelago.—Animals of the Weasel family (*Mustelidæ*) are numerous, among which the Teledu (*Mydaus meliceps*) of Java rivals the skunks of America in the horrible stench with which it surrounds itself for defence. More important are the sable and sea otter, pursued in the northern regions upon account of their furs.—Of the Dog family, or *Canidæ*, A. has not only wild dogs, but also wolves, foxes, hyænas, and jackals; the two former abounding chiefly in the colder, the two latter in the warmer regions. The arctic fox inhabits the most northerly shores and islands. The warmer parts of A. produce a number of species of the allied family of the *Viveridæ*, among which are the mangouste or Indian ichneumon—famous, like the Egyptian ichneumon, for the destruction of serpents—and the civet, from which is obtained a celebrated perfume.—Of feline animals, the most dreadful are the lion and tiger; the latter of which is peculiar to A., abounding in the warm regions of the south and east, never extending westward beyond the mountains and deserts which separate India from Persia; but, on the contrary, advancing far to the north, beyond the limits to which the lion advances, and even to the confines of Siberia. The leopard, the ounce, and many other cats, some of them large and dangerous, are found in A., especially in the warmer parts of it. Among them may be mentioned the chetah, or hunting-leopard, tamed for the chase in India.—A few small marsupial (or pouched) quadrupeds (*Phalangers*) are found in the Moluccas, and form one of the links by which the natural history of A. is connected with that of Australia.—The *Glires* or *Rodentia*, on the contrary, are numerous in all parts of A., and many species are peculiar to it. Squirrels, marmots, rats, mice, hares, &c., are common in all except the most northerly regions. The brown rat, now so common in Europe, is said to have emigrated from Persia so recently as the beginning of the 18th c. Lemmings abound in Siberia and the Tatarian deserts, of which the jerboa is also an inhabitant. Porcupines are frequent in the warmer parts of A.,

and the beaver is found in the north.—Of Edentate quadrupeds, the Pangolins (*Manis*) alone are Asiatic, and these are confined to the tropical regions.—Of *Pachydermata*, there are, besides the elephant, the horse, &c., already mentioned, several species of rhinoceros, wild boars, the babyroussa, and a species of tapir; all, except the wild boar, natives of the warmest etimates. One of the most interesting facts, however, connected with the natural history of A., is the abundance of remains of the mammoth, or fossil elephant, in the coldest parts of Siberia, its tusks still affording a considerable supply of ivory.—Of ruminating animals, besides those of the ox-kind, already mentioned, and the sheep and goat, there are deer, antelopes, and musks or musk-deer.

The reindeer and elk are natives of Siberia; further south, the species of deer are much more numerous, and the same countries produce many species of antelope. The musks are found in the central and southern parts of the continent; one of them, a native of the highest mountains, yielding the much-prized perfume from which it derives its name.—A. possesses vultures, eagles, and other *Falconidæ*, owls, ravens, and other birds of the crow kind, herons, storks, cranes, &c. Swans, geese, ducks of various species, and many other *Anatidæ*, frequent its waters, some of them abounding even in the coldest regions. Albatrosses are very numerous on the Kamstchatkan shores; flamingoes on those of the more southern countries. Pigeons abound, and among them is the turtle-dove. The gouras of the Indian Archipelago are birds of the pigeon family, of which one species is almost as large as a turkey. There are many kinds of thrush, finch, warbler, bunting, sparrow, and other birds identical with or allied to those of Europe, among which is the nightingale, often mentioned by the Persian poets, and many also, particularly in the warmer regions, which are peculiar and characteristic. Of these may be mentioned the splendid birds of paradise of the south-eastern islands, peacocks, pheasants, &c. The gallinaceous birds of Asia are numerous, and from this continent were probably derived the domestic poultry of other parts of the earth. The abundance of the parrot tribe constitutes a point of resemblance between the tropical parts of Asia and other tropical countries, but lories are peculiar to the East Indies. The ostrich inhabits the deserts of Arabia as well as of Africa. The cassowary is found in the south-eastern islands. The edible swallows' nests of the East Indian coasts have long been celebrated.—Lizards and other saurian reptiles are very abundant in the warmer parts of Asia; and great crocodiles and gavials infest the rivers of the East Indies. Boas, pythons, and other great serpents, are found in the tropical regions, which produce also many venomous serpents. The cobra da capello is one of the most dreaded. But the temperate parts of Asia have also venomous serpents, scarcely less dangerous. Some of the East Indian tortoises are remarkable for their great magnitude, and turtles are found in the seas.—Both the salt and fresh waters of Asia produce many kinds of fish. The *Salmonidæ* of the rivers of Siberia supply an important part of the food of its inhabitants. The goldfish, now so well known in Britain, is a native of China. Some of the fish of the tropical parts of Asia have attracted attention from the peculiarity of their form or habits. Insect life is exceedingly abundant in the warm parts of Asia, as in all other warm countries. Bees are numerous, and honey is produced in great quantities. Of other insects, it seems only necessary here to mention the silk-worm, which was introduced from Asia into Europe; and the locust, which sometimes devastates great tracts of the Asiatic countries bordering on the Mediterranean and the Black Sea, and occasionally extends its ravages into regions further west. Of molluscous animals, the pearl-oyster deserves particular notice, upon account of the important pearl-fisheries which exist in different places.

Ethnography.—The whole population, consisting of 840,000,000 people, may be divided into the Mongolian, Aryan, and Semitic groups. The *first* of these includes all the peoples and tribes in the east, north, and south-east of Asia; the *second* (see ARYAN RACE) embraces the inhabitants of Northern India, Afghanistan, Persia, and part of Asiatic Turkey; the *third* includes the Syrian, Hebrew, and Arabian races (see ETHNOLOGY).

A further subdivision and classification may be made as follows: 1. The *East-Asian group*, including the people of Tibet, China, Japan, Corea, and the Indo-Chinese peninsula; all alike in the use of monosyllabic languages. This last people, however must be subdivided into Western and Eastern, the former comprising the inhabitants of the Burman empire, Pegu, Laos, and Siam, having affinities with the Hindus; and the latter, comprising the inhabitants of Tonquin, Cochin-China, and Cambodia, have affinities with the Mongolians of Tibet and China. 2. The *Tartar group*, including the Turkomans, Mongols, and Tungusians, who are spread over the whole table-land of Central Asia and the neighboring lands in the north. The Turkoman family is divided into three sections—the first including the east Turkomans, inhabiting Tashkend, Khiva, Balkh, and Usbekistan; the second including the so-called Tatars of the Urals and the neighborhood of Astrakhan and Kazan; the third including the Turks or Osmanli. With the exception of a few small tribes in Siberia, all the Turkish varieties are Mohammedans, use the Arabic alphabet, and employ numerous Arabic words in their dialects. 3. The *Siberian group*, including the Samoiedes, people of Kamstchatka, &c., speaking languages which have only recently been studied by philologists. 4. The *Malay-Polynesian group*, mixed with Australasian negritos, are spread over all the islands of Polynesia and the Indian Archipelago. The Malayan people of Java, Sumatra, Celebes, the peninsula of Malacca, the Sunda Islands, Moluccas, and Philippines, have an incipient literature, which has been formed under Moslem and (since the 16th c.) under European influence. The South Sea islanders are clearly divided into two races by physical form, color, and language. One race is allied to the Australasian negrito, and the other to the Malayan. In most of the islands, there is a partial intermixture of the two races, but generally the distinction is obvious. It is probable that all the copper-colored Polynesians belong to the same family with the people of the Indian Archipelago. 5. The *Deccan group*, including all the people employing the Tamul, Carnatic, Telugu, and Singalese languages, all having a certain measure of civilization and a literature. 6. The *Indo-Germanic* or *Aryan group*, marked and subdivided by the three languages, Sanscrit, Persian, and Armenian. About thirty distinct nations, each having a peculiar dialect and literature, belong to the first subdivision; the second includes the peoples of Beloochistan, Afghanistan, Persia, and Kurdistan; the third, the Armenians. All these families have literatures partly written in dead languages — the Sanscrit, Pali, Zend, and old Armenian. 7. The heterogeneous tribes inhabiting the Caucasus, whose affinities are not yet settled. 8. The *Semitic group*, including all the peoples whose languages are related to the Hebrew and Arabic.

Religions.—The same Asian characteristic of variety and wide contrast is found in the creeds as in the countries and tribes of people: the Brahminical religion of India; the doctrines of Buddha, Confucius, and of Lao-tse in China; the worship of the Grand Lama in Tibet; the creed of Islam in several varieties in Arabia, Persia, and India; the rude heathenism of the north; the various sects of native Christians in Armenia, Syria, Kurdistan, and India; the Greek Church in Siberia; these and other forms of faith or religious profession display diversities and contrasts nearly as striking as those of Asian geography. Christianity, now the religion of Europe and America, owes its origin to Asia. For an account of the existing religious systems of Asia, see articles MOHAMMEDANISM, INDIA (*Religion*), BUDDHISM, LAMAISM, &c.

Civilization.—The number of people civilized—in the Asiatic sense of the word—is far greater than that of wild and nomadic hordes; but culture here, when arrived at a certain point, assumes a stationary character, widely differing from the restless intellectual activity and industrial progress of Europe. The laws of states, families, industry, commerce, art, and science are, in India and China, so many branches of one fixed and permanent religious system, which has maintained its sway through many centuries, and would long remain unchanged, if left undisturbed by European influence. The Arabs, Persians, and Turks, collectively known as the Easterns, are distinct in civilization from the Hindus and Chinese. The institution of slavery among the former, of *caste* among the Hindus, and the civil and political equality of China, are distinguishing marks. The Turk is a monotheist and fatalist; the Hindu is either a mystical pantheist or polytheist, acknowledging a multitude of gods; the Chinese is rather a utilitarian moralist.

Industry.—The industry and commerce of the Asiatic continent bear no adequate proportion to its capabilities—such as they are, they will be described under the different countries.

Political Aspect.—The political institutions of A. present to us some striking contrasts. While the barbarous hordes in the north live almost without the idea of government, and scarcely know that the Russian czar claims them as his subjects; and the nomadic tribes, under their khans or sheiks, have a sort of patriarchal government, subordinate to higher powers; the most extreme forms of monarchy and despotism have existed among the more cultivated nations. The government of China is an absolute monarchy in form, but, in fact, is strictly limited by the force of tradition. The emperor is apparently unlimited in authority; but it is an essential duty of an emperor to rule exactly according to the precepts handed down by his ancestors.

Reverence for ancestors and their institutions is, therefore, the sole presiding and conservative principle which has so long preserved the great Chinese empire from political changes. A., now so passive, anciently took an active part in the great movements of the world's history; contended against Egypt and Greece, and afterwards contributed to the greatness and glory of the Macedonian and Roman empires. From the north of the Caspian Sea, came the vast hordes of the Huns who spread themselves abroad over Europe. The armies of Genghis Khan and Tamerlane overran the Slavonian plains, while the Arab califs, with their fanatical troops, established their religion and government in three quarters of the world. Under the Osmanli fell the eastern Roman empire,

and still the Turk maintains a political position in Europe, but one now becoming very feeble and insecure. In proportion as Europe has advanced, A. has declined in political power, so as to countenance the theory of a gradual movement of the spirit of civilization and progress from the eastern to the western world. So soon as the Asiatic nations have reached a certain moderate pitch of culture, the history of civilization ceases so far as they are concerned, and is followed by the mere chronology of states or dynasties. It would appear that all great future changes in the destinies of the peoples of Asia must proceed from European impulses. When Portuguese ships had rounded the Cape and so reached India, a new era of Asian history began. The Portuguese, the Spaniards, Dutch, French, Danes, and English planted their standards on Indian soil. The English speedily extended their dominion here, and soon overshadowed all the other European powers; though the Portuguese and French still maintain their footing in Hindustan, and the French, the Spaniards, and the Dutch own large territories in Further India or the Indian Archipelago. Lately England has increased her influence in the extreme west of Asia; having secured the right to occupy Cyprus, while guaranteeing the defence of the Asiatic dominions of the Porte. Meanwhile Russia has extended her sway over Siberia, Caucasia, and Turkestan; securing thus the keys of China and the approaches to Persia. Even in some of the nominally independent powers, European influence is very powerful; the throne of Persia, for example, is surrounded by European diplomatists. And while Russia and Britain are striving to share between them supremacy in Asia, the French and the Americans have a large share of the commerce of the Eastern coasts.

The following table gives an approximate estimate of the area and population of A., according to the more important existing political divisions:

State.	*Area in Square Miles*	*Population.*
Chinese Empire:		
China Proper,	1,530,000	405,000,000
Dependencies of Mantchuria, Mongolia, Tibet, Corea, &c.	2,410,000	28,500,000
Japan	155,517	33,299,014
Independent Arabia	956,000	3,700,000
Persia	630,000	5,000,000
Afghanistan	275,000	4,000,000
Kafiristan	20,000	300,000
Beloochistan	105,500	1,000,000
Independent Turkestan:		
Turkoman Territory	79,000	175,000
Khiva	22,000	700,000
Bokhara	83,000	2,286,000
Eastern Turkestan (q. v.)	427,000	580,000
Dzungaria	133,000	500,000
Further India:		
Anam	196,000	21,000,000
Burmah	190,000	4,000,000
Siam	305,000	5,750,000
Tribes south of Assam	18,000	130,000
Cambodia	33,000	890,000
Independent Malacca	31,000	209,000
Asiatic Turkey, including the Turkish possessions in Arabia	742,000	13,171,000
British Possessions in Asia:		
Hindustan: Immediate possessions	899,341	191,095,445
Native States more or less completely under English influence	557,903	492,203,053
Straits Settlements	1,206	308,097
Hong-Kong	32	121,985
Labuan	45	4,898
Nicobar and Andaman Islands	3,276	18,500
Russian Possessions:		
Caucasus (partly in Europe)	172,170	4,893,332
Siberia	4,765,400	3,405,084
Central Asia	1,079,283	3,356,759
Ferghana (Khokand)	28,160	960,000
French Possessions:		
Cochin China	21,632	1,526,867
French India (including Chandernagore, Karikal, Mahé, and Pondicherry)	196	266,308
Portuguese Possessions:		
Goa, Salcète, Bardez, &c.	1,390	474 234
Damao	30	40,980
Diu and Gogola	12	12,303
In Indian Archipelago	5,506	[?] 250,000
In China [Macao]	1	71,834
Dutch Possessions in the Indian Archipelago [Java, parts of Sumatra, Celebes, Borneo,] &c	612,520	24,370,600

ASIA, CENTRAL. This term is usually, in its geographical sense, used of the region lying between the Altai Mountains and the Persian Gulf, and includes part of Siberia, all Turkestan, Afghanistan, Beloochistan, and part of Persia. An earlier usage —that of Humboldt—gives this name to the khanates of Bokhara and Independent Tartary. In Russian official language, Central Asia is an administrative division of the empire lying to the S. W. of Siberia, and comprising, with part of what used to be called Siberia, the recent Russian annexations in Turkestan. Russian Central Asia is divided into the governments of Akmollinsk, Semipalatinsk, Turgai, Uralsk, Semiretchensk, Syr-Darai, Saref-chan, Kuldja, Amu-Daria, the Trans-Caspian territory, and Ferghana. The total area is given at 1,227,000 sq. miles, and the pop. at 4,490,000.

ASIA'GO, a town of North Italy, 22 miles North from Vicenza. It stands on a ridge, among the Southern spurs of the Alps. It is celebrated for the manufacture of straw-hats, and also for carpenter-work and turning. Pop. 5140. The surrounding district known as the 'Seven Communes,' is well wooded, and abounds in sheep and cattle (SETTE COMMUNI).

A'SIA MI'NOR, the ancient name of what is now called Anatolia (q. v.). Here, in Ionia, was the early seat of Grecian civilization, and here were the countries of Phrygia, Lycia, Caria, Paphlagonia, Bithynia, Lydia, Pamphylia, Isauria, Cilicia, Galatia, Cappadocia, &c., with Troy, Ephesus, Smyrna, and many other great and famous cities. Here, from the obscure era of Semiramis (about 2,000 years B. C.), to the time of Osman (about 1300 A. D), the greatest conquerors of the world contended for supremacy; and here took place the wars of the Medes and Persians with the Scythians; of the Greeks with the Persians; of the Romans with Mithridates and the Parthians; of the Arabs, Seljuks, Mongols, and Osmons with the weak Byzantine empire. It was here that Alexander the Great and the Romans successively contended for the mastery of the civilized world. But, notwithstanding all these wars, the country still continued to enjoy some measure of prosperity till it fell into the hands of the Turks, under whose military despotism its ancient civilization has been sadly brought to ruin.

ASINALU'NGA, or SINGA LONA, (anc. *Ad Meusulas*), a town of Tuscany, North-Italy, in the province of Siena Railway. It is beautifully situated on hills bordering the Val di Chiana, and is a well-built town, with wide and well-paved streets, and a handsome collegiate church, in which are many fine paintings. Pop. of commune, 8500.

ASKEW, or ASCOUGH, ANNE, one of the sufferers for Protestant opinions at the dawn of the Reformation in England. Having embraced the views of the reformers, she was turned out of doors by her husband, a gentleman of Lincolnshire, and a zealous Roman Catholic. On this she went up to London to sue for a separation; but was eventually arrested on a charge of heresy, and was examined by the Bishop of London and others on the doctrine of transubstantiation, the truth of which she denied. After further examination and torture by the rack, she was burned at the stake, in Smithfield, July 16, 1546.

ASMANNSHAU'SEN, a village in the jurisdiction of Rüdesheim, Nassau, is famed for the wine which is produced on the slate-mountains in its vicinity. Of this there are two kinds, red and white, the former of which is greatly preferred. It has a rich red, color, like Burgundy, possesses a rare aromatic flavor, and is noted for its uncommon strength and fire. But it retains its excellent qualities only about three or four years; after which, year by year it becomes weaker, and loses its color. The choicest sort, which is preferred by connoisseurs to all the red wines of the Rhine, and even to Burgundy itself, is cultivated in the ducal vineyards at Wiesbaden.

ASMODE'US (properly, ÂSCHMEDAI, 'the destroyer'), an evil genius or demon mentioned in the later Jewish writings. A. was described as the author of many evils. In the Book of Tobit (q. v.), he is represented as slaying the seven husbands of Sara, and hence, in modern times, has been jocularly spoken of as the destroying demon of matrimonial happiness. In the Talmud, A. is described as the prince of demons, and is said to have driven Solomon from his kingdom.

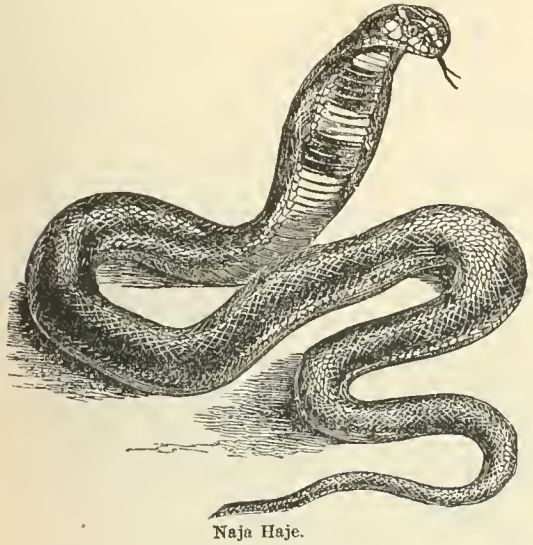
ASMONÆ'ANS. See MACCABEES.

ASO'CA (*Jonesia Asoca*), an Indian tree of the natural order *Leguminosæ*, sub-order *Cæsalpineæ*, remarkable for the beauty of its red and orange flowers. The leaves are abruptly pinnate, shining, and very beautiful. The A. is often mentioned in Indian poetry, and is connected also in various ways with the Hindu mythology.

ASO'LA, a fortified town of Northern Italy, in the province of Brescia, situated on the left bank of the Chiese, 19 miles west-north-west from Mantua. It is a place of great antiquity. The chief branch of industry, not agriculture, is the manufacture of silk twist. Pop. of commune, 5500.

ASP (*aspis*), a venomous serpent, the name of which has come down from ancient times; the vague description of ancient authors, however, causing uncertainty as to the species. It is very generally supposed to be the *Naja Haje*, the El Haje or Haje Nasher of the Arabs, which is very common in Egypt, Cyprus, &c., and often appears in hieroglyphic and other sculptures as one of the sacred animals of ancient Egypt. It is sometimes from 3 to 5 feet in length, of nearly equal thickness throughout, with a gradually tapering tail; brownish, varied with dark and pale spots; the scales of the neck, back, and upper surface of the tail slightly carinated; the tail about one-fourth of the whole length of the animal. The neck is capable of considerable dilatation, through the

distension of its loose skin, although not so much as that of the nearly allied cobra da capello of India (*Naja tripudians*). The dilatation of the neck takes place when the serpent is irritated. The jugglers of Egypt are accustomed to perform tricks with this serpent, as those of India with the cobra da capello, causing it to dance to their music; after they have first, however, carefully extracted the poison-fangs. It is very venomous. Several varieties exist at the Cape of Good Hope, one of which is nearly white; and one is called Spuugh Slang, or Spitting Snake, by the colonists, from its supposed power of ejecting its poison to a distance



Naja Haje.

when irritated; the poison which distils from the fangs in such circumstances being probably carried off by the forcible expirations which the creature makes—a characteristic, however, not exclusively belonging to a particular variety.—Other serpents of the same family, *Viperidæ*, are by some believed to be the true asp, particularly *Vipera Echis* and *V. Cerastes*. The former is of a grayish or yellowish brown color, with rays and eye-like spots on the upper parts; it is found both in India and the north of Africa. The latter is of a grayish color, and has a very broad heart-shaped head, a short obtuse rounded muzzle, and the superciliary or eyebrow scales remarkably developed, so that one of them is often produced into a sort of spine; it inhabits the deserts of Northern Africa.—The name asp is now generally given to *Vipera Aspis*, a native of the Alps, found also in the south-east of Europe and in Sicily, which much resembles the common viper, but is more slender, and has a larger head; it is also more venomous.

ASPA'RAGINE ($C_8H_8N_2O_6$,2HO) is a crystalline substance which exists ready formed in common asparagus, in the marsh-mallow, in comfrey, in potatoes, in chestnuts, in the leaves of the deadly nightshade, in liquorice-root, in the milky juice of the lettuce, in the tubers of the dahlia, and in the young shoots of vetches, peas, beans, &c. According to Piria, the young shoots of these plants, when formed in the light, contain as much asparagine as when they are grown in the dark, but the asparagine disappears as the plant arrives at the flowering stage. Other chemists, including Pasteur, find that vetches grown in light are free from asparagine. This substance is readily obtained from the expressed juice of the young shoots of asparagus, of young vetches, &c., which, after filtration and evaporation to a syrup, soon deposits it in crystalline prisms of a right rhombic form. These crystals dissolve freely in boiling water, the cooled solution having a mawkish and cooling taste, and a slight acid reaction. Asparagine exhibits two remarkable transformations. (1.) When its aqueous solution is heated with alkalies or acids, it is decomposed into aspartic acid ($C_8H_7NO_8$) and ammonia; from this and other reactions, there is no doubt that it should be regarded, according to modern views, as the Amide (q.v.) of aspartic acid. (2.) While a solution of pure asparagine-crystals remains unchanged, if any coloring matter is present the solution passes into fermentation, and the whole of the asparagine is converted, by the assimilation of hydrogen, from the pigment into succinate of ammonia, a reaction which may be expressed as follows:

Asparagine. Succinate of Ammonia.

$$C_8H_8N_2O_6,2HO + H_2 = 2NH_4,C_8H_4O_8.$$

Like most of the amides, this substance unites both with acids and alkalies, but the resulting compounds are of little general interest. That asparagine plays an important part in the physiology of plants, is obvious from its wide distribution.

ASPA'RAGUS, a genus of plants of the natural order *Liliaceæ*, having an almost bell-shaped six-partite perianth upon an articulated stalk, six stamens, one style, with three recurved stigmas, and the cells of the berry two-seeded. The species of this genus are herbaceous or shrubby plants, natives chiefly of the south of Europe and of Africa, with abortively diœcious flowers; the stem is unarmed in some, in others thorny; at its first sprouting leafless, and covered with scales at the top; afterwards very much branched, with numerous fasciculate, generally bristle-like leaves. The most widely diffused species is the Common A., *A. officinalis*, a native of Europe, which grows on the banks of rivers and on the seashore, in meadows and bushy places, especially in sandy soils, occurring in a few places in Britain, and is also in general cultivation as a garden vegetable; its young shoots, when they first sprout from the earth, forming a much esteemed article of food, which, however, is only in a slight degree nutritious. These sprouts contain a peculiar crystalline substance, called *Asparagine*, and have a specific action on the urinary organs, so that their long continued use in very large quantities is apt even to produce bloody urine.

They are no longer retained in the pharmacopœia, but both the shoots and the roots of A. are still occasionally used as a diuretic in dropsies, and as a lithic to dissolve urinary calculi. For these purposes, the root is preferred, and is administered in the form of an infusion or decoction.—The thick and tender kinds of A. are most esteemed for the table. It is one of those plants which have been much increased in size, and considerably altered in general appearance, by cultivation, being seldom more than a foot high in its wild state, and not much thicker than a goose-quill, whereas it has been obtained in gardens more than half an inch in diameter, and its stems rise to the height of four or five feet. It was a favorite vegetable of the ancient Romans. It is generally planted in rows, at distances varying from 1 foot to 2½ feet. Litter or vegetable mould is spread over it in autumn. It is allowed to occupy the same ground for many years, and the shoots are not gathered for use till the plants are four years old. Some of the growers of A. for the London market have 100 acres under this crop.

Asparagus.
a, a young shoot; *b*, flowers; *c*, the upper end of a stem, showing branches, leaves, and fruit [all reduced].

—The seeds have been used as a substitute for coffee, and are recommended for that use upon the continent, even at the present day. A kind of spirit has been made from the fermented berries. The young shoots of several other species are also eaten, as those of *A. tenuifolius*, *A. acutifolius*, and *A. albus*, natives of the south of Europe; the last of which is much used in Spain and Portugal as a salad, in soups, and as a boiled vegetable. On the other hand, the sprouts of the Bitter A., *A. scaber*, which is very similar to the Common A., are uneatable, on account of their great bitterness.

ASPA'RAGUS STONE. See APATITE.

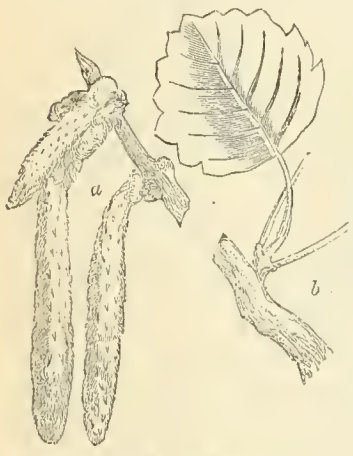
ASPA'SIA, one of the most remarkable women of antiquity was the daughter of Axiochus, and born at Miletus. The circumstance that in Athens all foreign women, whatever their character, were equally esteemed, or rather disesteemed, and that their children, even when begotten in wedlock, were held illegitimate, has originated the erroneous notion that A. was a courtesan. She certainly broke through the restraint which confined Athenian matrons to their own homes; for after her union with Pericles, who had parted from his first wife by her own consent, her house became the rendezvous of all the learned and distinguished people in Athens. Socrates often visited her. Her eloquence and knowledge of politics were extraordinarily great. Her husband—though, strictly speaking, the Athenian law would have refused this appellation to Pericles—was honored with the title of Olympian Jove, while she herself was dignified with the name of Juno. From the comic writers and others, she received much injustice. It was Hermippus, the comic poet, who took advantage of a temporary irritation of the Athenians against Pericles, to accuse A. of impiety; but the eloquence of the great statesman disarmed the enmity of the judges, and procured her acquittal. Her influence over Pericles must have been singularly great, although this has obviously been exaggerated, and even caricatured. The brilliant

but not historically accurate Aristophanes charges her with the origin both of the Samian and Peloponnesian war, the latter on account of the robbery of a favorite maid who belonged to her. Plutarch vindicates her against such accusations; and Thucydides, who details minutely the causes of the Peloponnesian war, does not once mention her name in connection with these. After the death of Pericles, A. married Lysicles, a cattle-dealer (an important, lucrative, and dignified profession in ancient times), who, through her influence, soon became an eminent man in Athens. The name of A. was, after her death, applied to many women of remarkable accomplishments and amiability.

A'SPECTS, in Astronomy, are certain positions of planets with respect to one another, as seen from the earth. In the days of astrology, there were five aspects—Conjunction (indicated by the Symbol (☌), Sextile (*), Quartile (□), Trine (△), Oppysition (☍). Two planets are in conjunction when they have the same longitude; the aspect is sextile when they are 60° apart; quartile, when the distance is 90°; trine, when it is 120°; and at 180° they are opposite to one another, or in opposition. Astrology ascribed to these A. great influence over the fate of individuals and of nations. The only two of the terms now in use are *conjunction* and *opposition*.

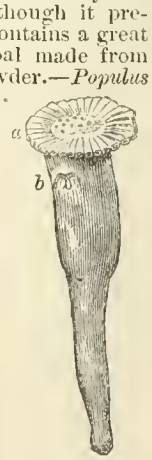
A'SPÉ, a town of Valencia, Spain, in the province of Alicante, and 21 miles west from Alicante, near the river Elcha. It is pretty well built, but the streets are narrow and winding. It has numerous flour-mills and oil-mills, also soap-manufactories and brandy distilleries. There is a considerable trade in wine. Pop. 6744.

A'SPEN, or TREMULOUS POPLAR (*Po'pulus tre'mula*, see POPLAR), a tree which grows plentifully in Europe and Siberia. It is a native of Britain, and is frequent in Scotland, where it is found even at an elevation of 1500 feet above the sea. It has received the specific name *tremula*, from the readiness with which its leaves are thrown into a tremulous motion by the slightest breath of wind — a property for which, indeed, the aspen-leaf has become proverbial. The leaves are nearly orbicular, but broadly toothed, so as almost to exhibit angles. The footstalks are compressed, which favors the readiness of motion. It grows quickly, with a straight stem, reaching to a height of from 60 to 80, or even 100 feet. In unfavorable situations, it becomes dwarfish. The wood is soft, porous, light, white, and smooth; it does not make good fuel, but is very fit for the turning-lathe, and especially for being made into troughs, trays, pails, &c. It is deemed excellent for arrows. If the stem be peeled and allowed to dry before it be cut down, the wood becomes harder, and is then capable of being used as timber for the interior of houses; and on this account the tree is of great importance in many districts, and the more so as it succeeds in any soil, although it prefers one which is moist and gravelly. The bark contains a great quantity of a bitter alkaloid, *Salicin*. The charcoal made from this tree can be used in the manufacture of gunpowder.—*Populus trépida*, a very similar species, a native of North America, is called the American A. It is regarded by some as a mere variety. Very similar, also, is another North American species, *P. grandidentata*.



Aspen, [*Populus tremula*], reduced. *a*, a portion of a branch with catkins; *b*, do., with leaves.

ASPERGI'LLUM, a remarkable genus of Lamellibranchiate Conchiferous Mollusca, in which the shell has the form of an elongated cone, terminating at the larger end in a disk, which is pierced with numerous small tubular holes, the little tubes of the outer range being largest, and forming a sort of ray around it. The animals of this genus are borers, some of them living in sand, others burrowing in stone, wood, or thick shells. *A. Javanum* is popularly called the Watering-pot, and the same resemblance has suggested the name A. (from the Latin *aspergo*, to sprinkle). The most interesting circumstance in the structure of the shelly tube of A. is the presence of two small valves, incorporated in the substance of the tube, to which they bear a very small proportion. 'They there form the stamp,' says Owen, 'of its true affinities, but subserve as little any ordinary final purpose as the teeth buried in the gums of the fœtal whale.' The affinities are with mollusca inhabiting bivalve shells. A rudimentary bivalve shell is found, in like manner, cemented into the shelly tube of the fossil *Teredina*, which bored the drift wood of the London clay.



Aspergillum. *a*, the disk with holes; *b*, the rudimentary valves.

There is also a genus ASPERGILLUS in Botany, containing many of the small fungi commonly known by the name of Mould (q. v.), which occur on decaying substances of various kinds. Some of the species are peculiar to diseased animal tissues.

A'SPERN, or GROSS A'SPERN, a village of Austria, on the left bank of the Danube, 5 miles E.N.E. of Vienna. Pop. about 700. This village and the neighboring one of Essling are celebrated as the scene of a sanguinary battle in the summer of 1809, between the French army under Napoleon I. and the Austrians under Archduke Charles. After the battle of Eckmühl, in which the Austrians were defeated, the Archduke retired to the left bank of the Danube, leaving the road to Vienna open to the French. On the 12th of May 1809, the French army entered Vienna, when the Archduke concentrated his forces on the opposite bank of the river. Napoleon threw bridges over the river, and on the 21st the French army began crossing to the attack. The Austrians at first seemed to give way; but when about half the French had crossed the river, they returned to the charge, and almost surrounded the enemy in the narrow plain between the two villages. Here ensued the battle of Aspern, a terrific conflict, the grand object of the contending hosts being the possession of the villages. At the close of the day, it remained undecided; but next morning it was renewed with fury on either side, when, after terrible slaughter, Napoleon ordered a retreat, and his shattered ranks retired to the little island of Lobau, in the middle of the river, whence they afterwards slowly withdrew to the right bank. The loss on the side of the Austrians was given at 4000 killed, and 16,000 wounded; that of the French at double that amount. Marshal Lannes, the most daring among the French generals, was among the slain. Both the villages were reduced to heaps of ruins.

ASPE'RULA. See WOODRUFF.

ASPHA'LT, or ASPHA'LTUM, is the name given to a bituminous substance of solid consistence. See BITUMEN. It probably owes its origin to vegetable matter which has been subjected to a slow process of decomposition or decay, resulting in the production of a bituminous coal, from which, by volcanic agency, the A. has been distilled and diffused over the neighboring district. The largest natural deposit of A. is in the island of Trinidad, where the plain known as the *Pitch Lake* is found. See TRINIDAD. The A. from Trinidad is largely used for ships' bottoms, and is reputed to kill the teredo or borer, which proves itself so very destructive to the wood of ships in tropical regions. A. is also found on the shores of the Dead Sea in large quantity, and is known to the Arabs by the name of *Hajar Mousa*, or *Moses's Stone*. It likewise occurs in South America at Coxitambo near Cuenca, in Alsace, and other parts of the European continent, in East Lothian and Fifeshire (Scotland), in Shropshire, &c.

During the manufacture of coal-gas, much tarry matter is evolved from the retort, and is received in the coolers or condensers. If this tar be subjected to partial distillation, naphtha and other volatile matters escape, and an artificial A. is left behind, which possesses the principal properties, and can be employed for the majority of purposes to which native A. is applied. The various kinds of A. have a pitchy odor, are of a black or dark-brown color, but do not soil the fingers; are insoluble in water, sparingly soluble in alcohol; but are in great part dissolved by ether, oil of turpentine, and naphtha. *Petroleum* (q. v.), or *Rock Oil*, is a native liquid bitumen, which largely exudes from crevices in rocks in many districts, and is essentially A. dissolved in naphtha. The specific gravity of A. is very near that of water, ranging from 1000 to 1100. When set fire to, it burns readily with a smoky flame, and is often used in the smaller gasworks as fuel, by being allowed to run very slowly into the furnace-fires. A., besides being employed for coating the exterior of ships' bottoms, is also used, in a heated condition, for saturating timber which is intended for piles in the construction of breakwaters, river-bridges, and other situations where the combined action of the air, water, and minute animals would soon render ordinary wood rotten and useless. Wooden houses may be preserved in the same manner by a coating of A. applied externally; and ground-flooring placed in damp situations is much the better of the spaces between the planks being filled up with A.

About 1840, A. began to be generally used for foot-pavements in cities, and also for floors of cellars and outhouses. For purposes of this nature it is heated in portable boilers, into which, at a certain stage of the preparation, there is poured a quantity of thoroughly dried sand, gravel, or powdered limestone, which is well mixed with the liquid A. The mixture is then spread on the spot prepared for it; and when cool, forms a hard kind of pavement. Of this method of forming footways, high expectations

were at first formed; but latterly the process of asphalting has gone out of use in England, as it is found not to be so durable as stone, and therefore, in ordinary circumstances, more costly. In Paris, however, asphalting is still extensively practised in the more spacious thoroughfares. The better kinds of A. are used in the manufacture of the black varnish, which is employed in forming the enamel which coats the variety of leather known as *Patent Leather*. A. is not of itself used in medicine, but its natural solution is naphtha, viz., *Petroleum*, is a valuable agent when applied either externally or internally. The synonyms of A. are — *Native Pitch, Mineral Pitch, Jews' Pitch, Dead Sea Bitumen, Compact Bitumen, Trinidad Bitumen*, and *Maltha*.

White Asphodel.

A'SPHODEL (*Aspho'delus*), a genus of plants which has by many botanists been made the type of a natural order *Asphodeleæ*, now, however, generally regarded as forming part of the order *Liliaceæ*. The *Asphodeleæ* are either fibrous-rooted or bulbous-rooted. Among the latter are onions, hyacinths, squills, star of Bethlehem, &c.; among the former, asparagus, A., &c. The roots of the asphodels are fleshy and thick. The species are not very numerous, and are mostly natives of the countries around the Mediterranean Sea. The Yellow A. (*A. luteus*) and the White A. (*A. albus*) have long been known in Britain as garden-flowers. The yellow A. has an unbranched stem 2—3 feet high, much covered by the sheathing bases of the long narrow leaves. The leaves of the white A. are all radical, and its flowers are in branched clusters. Both species flower about the time when spring passes into summer.

ASPHY'XIA (Gr.) means literally a cessation of the pulsation from any cause, but is usually applied to the condition resulting from the blood in the body no longer being brought into the proper relations to the atmospheric air by respiration, so as to allow a sufficiently free exchange of carbonic acid and oxygen. See RESPIRATION. A., or suspended respiration, may result from several causes. No air, or but a scanty supply, may be admitted, as in strangulation, drowning, choking, or disease in the windpipe; the chest may be prevented from expanding either from a superincumbent weight or paralysis, as when a man breaks the upper part of his neck above the phrenic nerve, thus paralyzing the diaphragm; and again, although there may be every capacity for respiration, the air itself may be in fault, and contain too little oxygen in proportion to other elements, as carbonic acid or sulphuretted hydrogen, which act as poisons when inhaled. Aquatic animals may be asphyxiated either by depriving the water they inhabit of oxygen, or impregnating it with the gases just mentioned.

As this condition of A. advances, in drowning or otherwise, the small vessels of the lungs become gorged with blood, which the heart has no longer power to force freely through them, the right side of the heart and pulmonary artery become filled with blood, while but little returns to the arterial or left side of the heart.

The person becomes pallid, except in such vascular parts as the lips, cheeks, and finger-tips, which become blue; and soon the blood, no longer aërated, produces the phenomena of poisoning by carbonic acid. After some slight convulsive movements, the person becomes insensible, the pulsations of the heart grow gradually feebler, and at last cease altogether. In man this occurs in from a minute and a half to five minutes. Some persons, no doubt as the Ceylon divers, can by habit do without a fresh supply of air for a longer period; and some diving animals have an arrangement of blood-vessels by which they are enabled to be under water for a long time. Restoration of asphyxiated persons may be attempted with hopes of success at a very long period after apparent death. The object of all methods is of course to fill the lungs with fresh air. One of the most efficient is that of the late Marshall Hall: lay the person down at once with his head on his left arm, open the mouth, and draw the tongue forwards, then roll him gently over towards the left till he is nearly quite over on his face, then on to his back again, making the body by its own weight compress the chest, which, on expansion by its elasticity, fills with air. Repeat this about 15 times in a minute. This remedy nearly superseded all others for the restoration of still-born infants and other asphyxiated persons, before the introduction of the method of Dr. Sylvester, an account of which is given under RESPIRATION, ARTIFICIAL.

ASPHY'XIANTS. Chemical substances enclosed in shells or other projectiles, and which act by producing a suffocating and poisonous effect. The French secretly made experiments with asphyxiating shot at Brest in 1851. The principal of these missiles seems to have been to carry into an enemy's ship the means of generating deadly gases which would suffocate the crews between decks. Scientific artillerists dread and discountenance these novelties; they have learned to regard war almost as a mathematical science, or, at any rate, as an elaborate application of such science; and they see nothing but savage cruelty in the 'diabolical chemistry' of asphyxiants. General Sir Howard Douglas, in a late edition of his *Naval Gunnery*, says: 'The author learns, with great regret, that some awful experiments have been made with fearful success, in the royal arsenal, with asphyxiant projectiles, combining in a frightful degree incendiary with suffocating effects.' Adverting to sick and wounded men on board a ship-of-war, he exclaimed: 'What shall be said of that inhuman system preparing for naval warfare in this age of enlightened humanity, which would advisedly, purposely, and deliberately consign the whole of these, and all other survivors, to indiscriminate death or mutilation? A ship may be sunk in action; yet there is always time to remove the sick and wounded, and save the survivors; but who shall approach a ship on fire to rescue her crew from the sudden and awful effects of that merciless and barbarous system, the object of which is to set fire to her at heart, and if possible, blow her up?' The Earl of Dundonald, Captain Norton, Mr. Macintosh, and many other inventors, some years ago brought asphyxiating composition before the notice of the English Admiralty and War-office; and the French arsenals were known to possess many such in store. Some of these compositions are liquids which burn fiercely, and ignite wood and canvas readily; some are contained in shells which, on bursting, scatter the suffocating and burning substances all around; and some assume other forms.

ASPI'DIUM. See FERN, MALE.

ASPINWALL, a town in Colombia, virtually, however, a colony of the United States. It is situated at the Atlantic extremity of the Panama Railway, and of the inter-oceanic Canal in progress, being about 8 miles to the north of the old Spanish port of Chagres, 49 miles from Panama, and equi-distant from the great trading capitals of Valparaiso and San Francisco. From its commanding position as a place of transit, A. is one of the busiest and most prosperous towns in the New World. It monopolizes the benefits of the traffic in both directions, to the almost utter exclusion of the rapidly decaying Panama. The climate of A., formerly very unhealthy, has been greatly improved by drainage. A. derives its name from Mr. Aspinwall the originator of the Panama Railway: it is also called *Colon*.

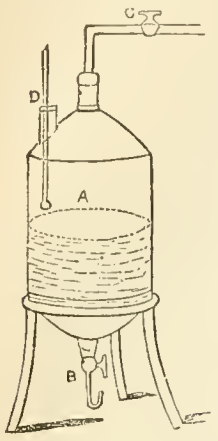
A'SPIRATE, the name given to the letter *h* in grammar, as marking, not an articulate sound, but a *breathing* (Lat. *spiro*, I breathe). It is also applied to a class of consonants. There is felt at once to be a relation, accompanied by a difference, between *p* and *f*, *t* and *th*, &c. To express the difference, the Greeks called the first of such a pair *psilon* (bare), the second *dasu* (rough); the Latin grammarians adopted the terms *lene* and *aspirate*, probably from the erroneous notion that the difference consists in the addition of the sound of *h*. There being no sound and no character in Latin corresponding to the Greek θ (*theta*), the Romans represented it by *th*; and this misleading expedient is continued for representing this aspirate and several others in all the alphabets derived from the Roman. According to some, the word ought to be *asperate*, i. e., 'roughened.' Of the sixteen mutes in a complete system (see LETTERS), eight are lene, each having its corresponding aspirate.

Lene— *p, b, t, d, k, g, s, z.*
Aspirate—*f, v, th*(in), *th*(ine), *ch, gh, sh, zh.*

In the corresponding words of allied languages, nothing is more common than the interchange of an aspirate and a lene: Ex., Lat. *pater*, Eng. *father*; Gr. *thura*, Ger. *thür*, Eng. *door*; Lat. *cap*(ut), Fr. *chef*, Eng. *chief*; Ger. *weib*, Eng. *wife*. Aspirated letters are also frequently interchangeable with one another: thus, Gr.

ther, a wild beast, is in Lat. *fera;* Lat. *facere*, to do, becomes in Span. *hacer*.

ASPIRA'TOR is the name of an apparatus employed to draw air or other gases through bottles or other vessels. It is of great use in the examination of gases by the analytical chemist. The simplest form of the apparatus is that represented in the figure, where a is a large vessel capable of being filled with water, having a tube with stop-cock at B, a second tube with a stop-cock at C, and a thermometer introduced at D. In working, the apparatus is filled with water; the tube C is attached to the vessels through which the gas is to be drawn; and the stop-cocks at C and B being opened, the weight of the water escaping at B acts as suction, and draws in the gas from the tube C and the attached bottles or other vessels. The thermometer at D denotes the temperature of the water, and subsequently gas, contained in the reservoir, while the upright turn of the tube B keeps any air from entering the reservoir by that route.—A more complicated form of A., but one which is much more convenient to experiment with, is that known as Brunners's A.; the principle of action, however, is the same.



Aspirator.

ASPLE'NIUM, a genus of Ferns, of the order or sub-order *Polypodiaceæ*. The species are numerous, and widely diffused both in the northern and southern hemispheres. Many of them are of great beauty; and the small size of some recommends them to cultivators of ferns who find themselves much limited as to space. Some of the species bear the English name *Spleenwort*, as *A. Trichomanes*, *A. viride*, *A. Adiantum-nigrum*, &c., having been formerly supposed efficacious in removing obstructions of the viscera. From the same circumstance the name A. (Gr. *a*, privative, and *splen*, the spleen) is derived. They have now fallen completely into disuse, but were at one time very much employed, chiefly in the form of a syrup like *Capillaire* (q. v.), and were administered not only in cases of cough, asthma, diseases of the liver, and cutaneous diseases, but even in stone and gravel. But perhaps none of them was so extensively used as the species which is styled in old books Common Spleenwort (*A. Ce'terach*), now the type of a distinct genus, and known as *Ce'terach officinarum*. Some of them, as *A. Trichomanes* and *A Adiantum-nigrum*, are frequently called Maidenhair. *A. Trichomanes* is a very beautiful little fern, common on rocks and old walls in Britain, and most parts of Europe, found also in some parts of Africa, and in North America. A very common British species, *A. Ruta-muraria*, is popularly known as Wall-rue.

ASS (*Equus Asinus*), a well-known quadruped, usually referred by naturalists to the same genus with the Horse (q. v.), but which it has recently been attempted to make the type of a distinct genus (*Asinus*), including all the solid-hoofed quadrupeds (*Solidungula* or *Equidæ*, see HORSE) except the horse itself. The distinction is founded on the short hair of the upper part of the tail and the tuft at the end of it, the darker stripes with which the color is marked, and the absence of the hard bony warts which are found on the hinder-legs of the horse, although the fore-legs exhibit warts in a similar position. The long ears of the A. are one of the characteristics of the species, but they are longer in domestication than in a wild state. It is usually also distinguished by a black cross over the shoulders, formed by a longitudinal and a transverse streak, the general color being gray; but when the general color is darker or lighter than usual, the cross is often less apparent, or to be observed with difficulty. The facial line is arched.

Some uncertainty still exists as to the origin of the domestic A.; a number of wild races having been described, some of which are perhaps, like the wild horses of America, the progeny of animals that have escaped from domestication. The probability, however, appears to be that the A. is a native of Central Asia, where it is found in a perfectly wild state, in Tatary, Mesopotamia, Persia, &c., on the banks of the Indus, and even to the southern extremity of Hindustan; but its range does not extend so far northward as that of the wild horse—a circumstance which may perhaps partly account for the inferiority of the domestic A. in northern climates. The wild A. is found both in mountainous districts and in plains; vast troops roam over the great Asiatic deserts, migrating, according to the season, in summer, as far northward as the Ural; in winter, southward to the borders of India.

It is fond of bitter and saline herbage, and of brackish water. It was first accurately described by Pallas, under the name *Koulan*, which it bears on the high steppes around the Caspian Sea. It was, however, well known to the ancients, and is called *Onager* and *Asinus sylvestris* by Pliny, who also mentions, under the name *Hemionus*, another species (*Equus Hemionus*), a native of the same regions, now called the *Kiang*, or the *Dziggethai*. The latter name appears to be of Turkish origin, and to signify Mountain A., but seems to be sometimes applied to the one of these species and sometimes to the other. This seems also to be the case with some of their other eastern names, as Kahur or Goor, and is a source of no little confusion.—The cross on the shoulders is less observable in the Koulan than it usually is in the domesticated A. It ought also to be mentioned that, in one remarkable particular, the domesticated A. agrees with the *Equus Hemionus*, and differs from the Koulan, the infra-orbital foramen of the skull being situated much lower. But the Kiang neighs like a horse, and the other *brays*. The harshness of the voice of the A. is ascribed to two small peculiar cavities situated at the bottom of the larynx.

The allusions to the wild A. in the Old Testament, and particularly in Job xxxix., naturally excite the surprise of readers acquainted only with the dull domestic drudge, the emblem of patience and stolidity; but to this day they are beautifully appropriate to the wild A. of 'the wilderness,' which has the 'barren land' or 'salt places' for its dwelling, and 'the range of the mountains' for its pasture.—The wild A. has a short mane of dark woolly hair, and a stripe of dark bushy hair runs along the ridge of the back from the mane to the tail. It has longer legs, and carries its

The Wild Ass.

head higher than the domestic A. Its troops have always a leader. It is a high-spirited animal, very fleet and very wary, trying to the utmost the powers of the hunter. It is a principal object of the chase in Persia, where its flesh is prized as venison is in Europe, and it is accounted the noblest of game. Xenophon, in his *Anabasis*, describes the wild A. as swifter of foot than the horse, and its flesh as like that of the red deer, but more tender.

The domestic A. is also, in Arabia, Persia, Syria, and other eastern countries, a much finer animal than as it is usually seen in Europe, although in Spain the favorable influence of a more genial climate upon its development is visible, perhaps also of better treatment, the A. being more highly valued. The A. is much used for riding in the East. From Judges v. 10, we learn that, at a very early period, the great were accustomed to ride upon white asses, and a preference is given to white asses in the East to this day. The A. has been domesticated from the earliest times; but it does not seem to have been introduced into Europe till a comparatively recent date. In Britain, it is employed chiefly by the poor, but might probably with advantage be much more generally employed than it is. Its price is scarcely one-twentieth of the price of the horse, and it can be kept at one-fourth of the expense, delighting in the coarse herbage which other animals reject, and satisfied with comparatively scanty fare. The obstinacy ascribed to the A. seems to be very generally the result of ill treatment; and

proverbial as it has become for stupidity, it is probably quite equal in intelligence to the horse.

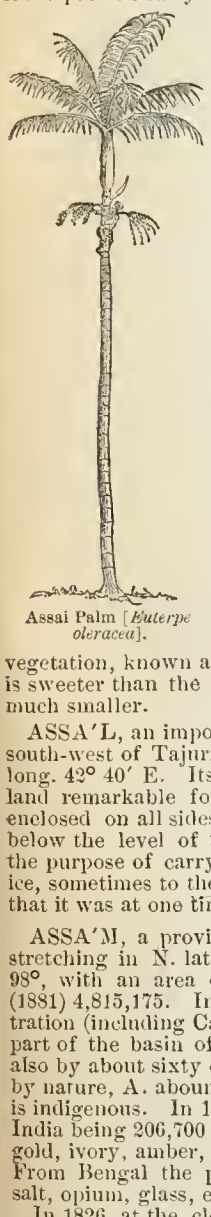
There are two hybrids between the A. and the horse—the MULE (q. v.), bred between the male A. and the mare; and the HINNY (q. v.), the offspring of the horse and the female A.

The milk of the A. contains more sugar of milk and less caseine than that of the cow, and therefore is recommended as a nutritious diet in cases of weak digestion. Its usefulness in cases of consumption has been long known, and it was often prescribed as a kind of specific when that disease was treated on principles very different from those which regulate its treatment now, and when very nutritious food was not usually prescribed to consumptive patients.

The leather called Shagreen (q. v.) is made by a peculiar process from the skin of the A., which also affords excellent leather for shoes, and the best material for drums. The bones of the A., which are very solid, were used by the ancients for making flutes.

ASSAB, an Italian trading station on the west coast of the Red Sea, near Bab-el-Mandeb. It was first acquired by a private company of Italians, but was taken over by the government of Italy in 1881.

ASSAI, a beverage very much used on the Amazon, prepared from palms nearly allied to the Cabbage Palm (q. v.). The most common species of A. palm is sixty feet high, with a smooth stem about four inches diameter. The fruit is small, in size and color resembling sloes, but is produced in great quantity upon branched *spadices*, which are thrown out horizontally beneath the crown of leaves. It consists of a hard seed, with a very thin covering of a firm pulp or flesh. The tree grows in swamps flooded by the high tides. Boys climb the trees for the fruit, upon which warm water is poured, and by rubbing and kneading, a liquid is procured, consisting simply of the pulp of the fruit and water, which is constantly vended in the streets of Pará, and of which the inhabitants are extremely fond. This is A. It is a thick, creamy liquid, of a purplish color, and a flavor like that of a freshly gathered nut. It is commonly used along with the bread made from Manioc (q. v.), called *farinha*, and either with or without sugar. Half the population of Pará make a daily meal of A. and farinha; and upon this hundreds are said chiefly to subsist.—The stem of the A. is sometimes used for poles and rafters, and its terminal bud as a cabbage or as a salad with oil and vinegar; but it is too much valued upon account of its fruit to be often cut down for these purposes.—Another species, *Euterpe Catinga*, is found in forests of a dry sandy soil and very peculiar vegetation, known as Catinga forests. The beverage made from it is sweeter than the common kind, but the produce of the tree is much smaller.



Assai Palm [*Euterpe oleracea*].

ASSA'L, an important salt-lake in the east of Africa, 25 miles south-west of Tajurrah, the chief seaport of Adel, lat. 11° 40′ N., long. 42° 40′ E. Its length is 8 miles; its breadth, 4. It lies in a land remarkable for its wild, waste, and sterile character. A. is enclosed on all sides but the east by hills, and is nearly 700 feet below the level of the sea. Abyssinian caravans resort to it for the purpose of carrying off the salt which incrusts its shores like ice, sometimes to the depth of half a foot. It has been supposed that it was at one time connected with the Bay of Tajurrah.

ASSA'M, a province at the N.E. extremity of British India, stretching in N. lat. from 24° to 28°, and in E. long. from 90° to 98°, with an area of 53,856 sq. miles. Pop. (1872), 4,132,019; (1881) 4,815,175. In 1874, it was formed into a separate administration (including Cachar) under a chief-commissioner. It forms part of the basin of the Lower Brahmaputra, and is intersected also by about sixty other rivers. Being thus irrigated, as it were, by nature, A. abounds in wood, and is very fertile. The tea-plant is indigenous. In 1880, A. had 150,000 acres in tea (the total for India being 206,700 acres). The other products are rice, mustard, gold, ivory, amber, musk, silver, iron, lead, petroleum, and coal. From Bengal the principal imports are woollens, India fabrics, salt, opium, glass, earthenware, tobacco, betel, &c.

In 1826, at the close of the first Burmese war, A. was ceded to the British. The upper portion of the province, however, was conferred, as a separate principality, on the native rajah, whom the Burmese had expelled; and it was only in 1838, that in consequence of his misgovernment, the entire country was actually placed under British administration. Since then, the province has exhibited a noticeable improvement, for which, considering that the population is only about 60 to the square mile, there is still, however, almost unlimited scope. The great evil is the prevalence of earthquakes, few months passing without a shock or two. The people, however, seem to think lightly of them—the only one that is specially remembered as being of extraordinary severity having occurred as far back as 1807.

A. is divided into thirteen districts. Gowhati and Sîlhat are the only towns of considerable size.

One of the most striking features of A. is the abundance of wild animals, such as tigers, rhinoceroses, leopards, buffaloes, and elephants. Of the elephants, not less than 500 are annually caught; and, when tamed, bands of them may be seen, harmless as cows, in the charge of a single attendant. The forests teem with game, and the rivers with fish.

ASSAS'SINS, a military order, a branch of the secret sect of the Ismaelites (q. v.). The secret doctrines of these Ismaelites, who had their headquarters in Cairo, declared the descendants of *Ismael*, the last of the seven so-called imaums, to be alone entitled to the califate; and gave an allegorical interpretation to the precepts of Islam, which led, as their adversaries asserted, to considering all positive religions equally right, and all actions morally indifferent. The atrocious career of the A. was but a natural sequence of such teaching. The founder of these last, Hassan-ben-Sabbah-el-Homairi, of Persian descent, and imbued with the free-thinking tendencies of his country, had, about the middle of the 11th c., studied at Nishpur, under the celebrated Mowasek, and had subsequently obtained from Ismaelite *dais*, or religious leaders, a partial insight into their secret doctrines, and a partial consecration to the rank of dai. But on betaking himself to the central lodge at Cairo, he quarreled with the heads of the sect, and was doomed to banishment. He succeeded, however, in making his escape from the ship, and reaching the Syrian coast, after which he returned to Persia, everywhere collecting adherents, with the view of founding, upon the Ismaelite model, a secret order of his own, a species of organized society which should be a terror to his most powerful neighbors. In 1090, Hassan conquered the fortress of Alamut, in the Persian district of Rudbar; and continued to increase in strength, intimidating princes and governors by a series of secret murders, and gaining possession of several fortified castles, with their surrounding territories, both in the mountain range south of the Caspian, in Kuhistan, and in the mountains of Syria (Massiat). The internal constitution of the order, which had some resemblance to the orders of Christian knighthood, was as follows: First, as supreme and absolute ruler, came the Sheikh-al-jebal, the Prince or Old Man of the Mountain. His vicegerents in Jebal, Kuhistan, and Syria were the three *Dai-al-Kibir*, or grand-priors of the order. Next came the Dais and Refiks, which last were not, however, initiated like the former, into every stage of the secret doctrines, and had no authority as teachers. To the uninitiated belonged first of all the Fedavies or Fedais—i. e., the devoted: a band of resolute youths, the ever ready and blindly obedient executioners of the Old Man of the Mountain. Before he assigned to them their bloody tasks, he used to have them thrown into a state of ecstacy, by the intoxicating influence of the *Hashish* (the hemp-plant), which circumstance led to the order being called Hashishim, or hemp-eaters. The word was changed by Europeans into Assassins, and transplanted into the languages of the West with the signification of murderers.

The Lasiks, or novices, formed the sixth division of the order, and the laborers and mechanics the seventh. Upon these, the most rigid observance of the Koran was enjoined; while the initiated, on the contrary, looked upon all positive religion as null. The catechism of the order, placed by Hassan in the hands of his dais, consisted of seven parts, of which the second treated, among other things, of the art of worming themselves into the confidence of men. It is easy to conceive the terror which so unscrupulous a sect must have inspired. Several princes secretly paid tribute to the Old Man of the Mountain. Hassan, who died at the age of 70 (1124 A.D.), appointed as his successor, Kia-Busurg-Omid, one of his grand-priors. Kia-Busurg-Omid was succeeded in 1138 by his son Mohammed, who knew how to maintain his power against Nuredin and Jussuf-Salaheddin. In 1163, Hassan II. was rash enough to extend the secret privilege of the initiated—exemption, namely, from the positive precepts of religion—to the people generally, and to abolish Islam in the Assassin state; which led to his falling a victim to his brother-in-law's dagger. Under the rule of his son Mohammed II., who acted in his father's spirit, the Syrian Dai-al-kebir, Sinan, became independent, and entered into negotiations with the Christian king of Jerusalem for coming over, on certain conditions to the Christian faith; but the Templars killed his envoys, and rejected his overtures, that they might not lose the yearly tribute which they drew from him. Mohammed was poisoned by his son, Hassan III., who reinstated Islamism, and thence obtained the surname of the New Moslem. Hassan was succeeded by Mohammed III., a boy of nine years old, who, by his effeminate rule, led to the overthrow of the order, and was

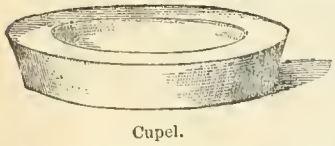
eventually murdered by the command of his son, Rokn-eddin, the seventh and last Old Man of the Mountain. In 1256, the Mongolian prince, Hulagu, burst with his hordes upon the hill-forts of Persia held by the Assassins, which amounted to about a hundred, capturing and destroying them. The Syrian branch was also put down about the end of the 13th c., but remnants of the sect still lingered for some time longer in Kuhistan. In 1352, the A. reappeared in Syria, and indeed they are still reported to exist as a heretical sect both there and in Persia. The Persian Ismaelites have an imaum, or superintendent, in the district of Kum, and still inhabit the neighborhood of Alamoot under the name of Hosseinis. The Syrian Ismaelites live in the district of Massiat or Massyad. Their castle was taken from them in 1809 by the Nossaries, but afterwards restored. See Hammer, *Geschichte der Assassinen* (Stutt. and Tüb. (1818); Guyard, *Fragments* (1874).

ASSAU'LT. In the sudden and vigorous attack of a fortified post, which is called an *A.*, the troops are told-off into 'storming-parties,' 'supports,' and 'firing-parties.' The storming-parties are those who take the most terrible duty, being that of making a forcible entry into the place. The firing-parties or musketeers seek to shield the storming-parties as much as possible from the fire of the enemy; they spread themselves out in extended order, to keep down the fire of the garrison—aiming at any soldier who may show his head above the parapet, and seeking to disable the artillerymen by firing into the embrasures. Many assaults are made by *surprise;* and in that case the storming and firing parties order all their preliminary movements as quietly as possible. In most cases, there is a necessity for the stormers to descend into a dry ditch, and to ascend from the ditch to a breach or a gate in the fortified wall. To aid in this duty, 'ladder-parties' are placed at the disposal of the storming-parties; these men have previously been practised in carrying scaling-ladders, descending and ascending ditches, and adjusting the ladders. In some celebrated sieges, ladders 40 feet long have been used, where the ditch was deep and the wall or bastion high; but it is seldom that a storming-party could venture on so perilous a work, for the men crowded on such a ladder would endanger each other. The 'supports' are troops who keep a little in the rear of the storming and firing parties.

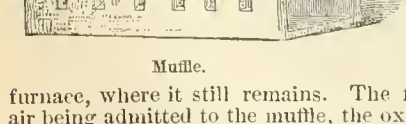
ASSAULT, in Law. See Beating and Wounding.

ASSA'Y, or ASSA'YING, is the process employed in determining the proportion of pure metal in a metallic ore or in an alloy. This method of analysis is more generally followed in the examination of compounds of silver and gold, but is likewise resorted to in the investigation of ores of iron, copper, tin, zinc, bismuth, antimony, mercury, and lead. In manufactured articles, also, such as silver-plate and gold-plate, some foreign metal (generally copper) is present, to impart hardness to the metal; and in Great Britain, each article is assayed at the Goldsmiths' Hall, previously to being sold, so as to determine the exact richness of the metal whereof it is made.

In the A. of compounds containing silver, the apparatus employed is a *cupel*—a small basin-shaped vessel of the form and size of the figure, made of bone-ash; and a *muffle*, composed of fire-clay, about 8 inches in length and 3 to 4 inches in diameter, shaped like a minature railway-tunnel, open at the one end, A, closed at the other end, B, and having numerous slits or air-holes, C, along the side. The more simple A. of silver consists in the examination of argentiferous lead ore. By a preliminary process, the sulphur is separated (see Lead); and weighed fragments of the mixed lead and silver being placed on cupels, the latter are introduced into the muffle, which has been previously heated in a furnace, where it still remains. The fire is then increased, and air being admitted to the muffle, the oxygen of the air unites with the lead, forming oxide of lead (PbO), which in part volatilizes through the openings in the side of the muffle, and in other part sinks into the porous bone-earth of which the cupel is made. Whilst the lead is thus carried away, the silver remains behind as a molten metallic globule, and when the last traces of lead-fumes leave the silver bead, the latter suddenly *lightens*, and immediately thereafter becomes brilliant and white. On being slowly allowed to cool, the globule of silver may be weighed, and the amount of pure metal thus determined. The use of the cupel during this process has led to the term *cupellation* being employed in place of A. When silver contains copper, which it does in ordinary coinage and silver-plate, it becomes necessary to mix lead with the alloy before attempting to separate the copper. The manner in which the lead is generally added is to roll the alloy of silver and copper in a piece of sheet-lead or lead-foil, and place the whole package on the cupel. During the heating in the muffle, the lead oxidizes as usual, and in part passing into the bone-earth of the cupel, carries the copper with it. The amount of lead required to effect the separation of copper from silver in this way is given in the following table:



Cupel.



Muffle.

Standard of Silver in One Part.	Amount of Copper Alloy in One Part.	Quantity of Lead Necessary for One Part of Alloy.	Quantity of Lead in Relation to that of Copper.
1000	0	$\frac{3}{10}$ part.	
950	50	3 parts.	60 to 1.
900	100	7 "	70 " 1
800	200	10 "	50 " 1
700	300	12 "	40 " 1
600	400	14 "	35 " 1
500	500	16 to 17 "	32 " 1
400	600	16 " 17 "	27 " 1
300	700	16 " 17 "	23 " 1
200	800	16 " 17 "	20 " 1
100	900	16 " 17 "	18 " 1
Pure copper.	1000	16 " 17 "	16 " 1

The metallurgic chemist, while performing an A, can determine, by the examination of the stains on the cupel after the process has been finished, what metal may have accompanied, and been separated from the silver, even in minute quantity. Thus, lead alone imparts a straw-yellow or orange stain; copper, a gray or dark-brown tint; and iron, a black stain.

During the A. of silver by the foregoing or *dry* method, a certain loss of metal generally occurs, which averages 2 parts in 1000; and this circumstance has induced the authorities in the mints of Great Britain, France, and other European kingdoms, as well as the United States, to adopt a *humid* process for the A. of silver, which will determine the value of a silver alloy to within 0·5 (or half a part) in 1000. The humid or wet A. consists in dissolving the compound of silver in nitric acid of density 1·25, and thereafter adding a solution of common salt (chloride of sodium, NaCl), which causes the precipitation of the chloride of silver (AgCl) in white flocculi. The common salt is made of a definite strength, and is poured out of a measured or graduated vessel, till all further precipitation of the silver ceases, when the amount required of the solution of common salt is read off, and by a simple calculation its equivalent in pure silver is obtained.

The A. of gold ores is conducted in a manner similar to that of silver. When the ore contains gold, lead, and copper only, it suffices to mix more lead with it, and heat in the cupel in the muffle furnace, when the lead and copper sink into the cupel, and the gold forms a globule on the upper surface. The proportion of lead required is regulated by the amount of copper present in the alloy.

Proportion of Gold contained in One Part of the Alloy.	Quantity of Lead necessary to completely remove the Copper by Cupellation.
1000 thousands	1 part.
900 "	10 parts.
800 "	16 "
700 "	22 "
600 "	24 "
500 "	26 "
400 " and under.	34 "

When the gold is accompanied by silver as well as copper, iron, and lead, it is necessary in the first place to subject the alloy to the A. process in the ordinary way, which gets rid of the copper, iron, and lead, but leaves the silver still incorporated with the gold. The weight of this residual button gives the combined weights of the silver and gold present in the alloy. The method of separating the silver from the gold is called *parting*, and consists essentially in acting on the alloy with hot nitric acid, which dissolves away the silver, forming the soluble nitrate of silver ($AgO.NO_6$), and leaves the gold undissolved. When the silver is present in small proportion, the gold assumes a protective influence, and keeps the nitric acid from acting on the silver; and to effect this separation satisfactorily, it is necessary that there should be about three parts of silver to one of gold. As that proportion does not occur naturally, or in any kind of manufactured gold-plate, it is requisite to incorporate some silver with it. This is generally accomplished by taking the proper quantities of gold and silver, wrapping them up in a piece of lead-foil, and heating on a cupel. The lead, during its disappearance from the heating vessel, causes the most intimate amalgamation of the silver and gold, which are left on the cupel as a metallic button. The latter, on being allowed to cool, is beaten out on an anvil with a smooth hammer, and is then passed through steel rollers, which yield a ribbon of alloy about the thickness of an enamelled address-card.

The ribbon of metal being coiled up, is technically called a *cornet*, and when introduced into the flask with nitric acid, the entire solution of the silver is accomplished, whilst the gold is left as a brown-colored spongy mass, of the shape and size of the cornet.

To give the metal the appearance and compactness of ordinary gold, the very friable metallic ribbon is gently transferred from the *parting glass* to a crucible by inverting the former into the latter; and the liquid wich runs in with the gold being poured off, the crucible and its contents are raised to a red heat in a furnace, when the gold recovers its beautiful yellow color and metallic lustre, and at the same time becomes soft and flexible. The gold is now pure, and in a fit condition to be weighed, and the amount obtained indicates the proportion of pure gold in the original alloy. As the quantity of silver which is required to be present during this process, in order that the *parting* by nitric acid may readily take place, is three parts of silver to one of gold, it is customary to call this department of a gold A. *quartation* or *inquartation*.

During the A. of silver or of gold, it is necessary to guard against any sudden increase or decrease in temperature. Independently of the probable loss of metal through the fracture of the cupels, it is found that when the final buttons of pure metal are obtained on the red hot cupel, if great care be not taken to cool the whole very slowly, the bead of gold or silver *spits*, and little portions are thrown off.

The mode of assaying gold now described cannot always be followed out in the examination of jewelery and other manufactured articles, as, though only a few grains are required for the A., yet the removal of such might entail the destruction of the article, and in such circumstances the *touchstone* is resorted to. This stone was originally brought from Lydia in Asia Minor, and consisted of a coarse-grained quartz saturated with bituminous matter, but black basalt and other stones are now employed for the same purpose. The manner of using the stone is to draw a streak upon it with the auriferous article; and from the color of the streak the richness of the gold can be very accurately determined by the practised assayer. The subsequent action of nitric acid on the golden streak serves still further as a means of determining the purity of the metal, as the acid readily dissolves the copper and silver, and leaves the gold. See Mitchell's *Manual of Practical Assaying* (5th ed., by Crookes, 1881).

ASSA'YE, a village in the N.E. of the Nizam's dominions, at the fork of the Juah and Kaitna. A. claims notice chiefly as the scene of the first great victory of the Duke of Wellington, then Major-general Wellesley, won on the 23d September 1803. The British troops in action were only about 4500, while the Mahrattas under Scindia and the rajah of Berar numbered 50,000, of whom 10,000 were commanded by French officers. 98 pieces of cannon, 7 standards, all the baggage, and a large part of the ammunition of the Mahrattas fell into the hands of the conquerors, whose military supremacy was soon acknowledged over a great portion of India. In 1851 a medal was struck in commemoration of the victory.

ASSEERGHU'R, a fort situated on an isolated mountain at the north-east angle of the presidency of Bombay, in lat. 21° 26′ N., and long. 76° 26′ E. Its elevation above the base of the mountain is estimated at 750 feet. Its extreme length and breadth are respectively 1100 and 600 yards; from the irregularity, however, of the outline, the area is computed at not more than 300,000 square yards, or somewhat less than $\frac{1}{10}$ of a square mile. With the exception of two avenues of ascent, both of them difficult and strongly fortified, the space is everywhere terminated by a carefully scarped precipice, varying in height from 80 to 100 feet. This formidable fastness has been twice taken by the British—first in 1803, and finally in 1819.

ASSE'MBLY (*assemblée*), in the conduct of an army, is the second beating of the drum before a march, at which the soldiers strike their tents if encamped, roll them up, and stand to arms.

ASSE'MBLY, GENERAL, in Scotland, Ireland, and the United States, denotes the highest court of the Presbyterian Church. It differs from the Anglican Convocation at once in its constitution and in its powers, representing as it does both the lay and the clerical elements in the church, and possessing supreme legislative and judicial authority in all matters purely ecclesiastical. The General A. of the Established Church of Scotland consists of representatives, clerical and lay, from all the presbyteries of the church. The royal burghs of Scotland also return elders to the General A. of the Established Church, and each of the Scottish universities sends a representative. The Assembly meets once a year, in the middle of May, at Edinburgh, and sits for ten days. Its deliberations are presided over by a Moderator, whose election is the first step in the proceedings, after a sermon by his predecessor. In former times, this office was sometimes filled by laymen: among others, in 1567, by George Buchanan. In modern times, the moderator is always a clergyman. 84 presbyteries, composing 16 synods, return members to the General A. of the Established Church of Scotland. Its relation to the state is represented by a royal commissioner, who exercises no function in the A. beyond that of adding by his presence the sanction of the civil authority to its proceedings. The other functionaries are a principal and a deputy clerk, both clergymen, a procurator, and an agent. All business not despatched during the session of the A. is referred to a commission, with the moderator as convener, which meets immediately after the dissolution of the A., and again quarterly. The General A. of the Free Church of Scotland, which has 16 synods comprising 73 presbyteries, and of the Irish Presbyterian Church, are similarly constituted, the principal point of difference being the absence of the royal commissioner. See PRESBYTERY, SYNOD, BARRIER ACT, &c.

ASSE'MBLY, NA'TIONAL (France). The States-general (q. v.), convoked by Louis XVI. of France, and opened May 5, 1789, consisted of the two privileged orders, clergy and nobles, and of the tiers-état or commons. The privileged orders refusing to join the third estate and deliberate in a common chamber, the latter, of its own authority, June 17, assumed the title of *Assemblée Nationale*, and the right to act in the name of France. The court attempted to annul this resolution in a royal sitting, June 23; but the deputies of the third estate, along with the liberal members of the other two orders, had bound themselves by oath not to separate until they had given France a constitution, and had declared every attempt at violence on the part of the court, treason. They refused to quit the common hall, and the court yielded, and commanded the nobles and clergy to join the National A. This was the beginning of the revolution, and the A. proceeded with astounding rapidity to metamorphose old France. The abolition of all privileges on the 4th of August was followed by that of hereditary jurisdiction, and of restraints on religion and the press, and by the declaration of the Rights of Man (q. v.). In February 1790, the monastic orders were suppressed, and all remnants of feudalism swept away; in March, *lettres de cachet* and the oppressive salt-tax were abolished; in June, all orders and titles of nobility. In July, non-catholics had the property confiscated from their ancestors restored; Jews were relieved from personal taxation; and game-laws done away. A decree of October 18 abolished the cruel criminal penalities of Louis XIV. In January 1791 all corporations and guilds were abolished, and free-trade introduced. In February, political rights were conceded to Quakers; in May, the customs at city gates were abolished; in June, the torture; the violation of the secrecy of letters was also declared criminal. In September, all citizens, of whatever color or religion, received political rights.

The principles on which the Assembly proceeded were the sovereignty of the people, the independence of the communes, the limitation of the royal power through a conditional Veto (q. v.), the separation of the political authorities, and the responsibility of ministers. Accordingly, the A., shortly after it was constituted, declared that to it alone, subject to the royal veto, belonged the legislative power. Several decrees, in September 1789, determined that the legislative body should form only one chamber, and should be renewed every two years; other decrees declared the king inviolable, and the throne inalienable. A decree of 7th November forbade the deputies to undertake the place of ministers; in December, the new organization of the communes was begun. January 1790, France was divided into departments; in April, trial by jury was introduced; in May, it was declared that the right of war and peace belonged to the nation alone, that is, to the A.

In regard to finance, which had been the immediate cause of the Assembly's being convoked, the reforms were equally thorough. It was decreed at the outset that taxes were to be apportioned and raised without regard to rank or person. Then followed the approval of a loan of 80 millions of francs. A decree of November 1789 ordered the publication of the public accounts; another in December established a national bank. In March 1790 appeared the first law sanctioning the sale of 400 millions worth of the national domains; and in April, another ordering the issue of *assignats* (q. v.) on the national property; in October, these assignats were declared to bear no interest. These measures were followed, in the beginning of 1791, by a series of laws regarding coining, taxation, encouragement to industry, revenue-management, &c. A committee of the A. appointed to reform church matters, made a complete overturn of the old ecclesiastical system. After a declaration that Catholicism had ceased to be the state religion, tithes were abolished, and church property confiscated. Church ornaments and valuables were appropriated as patriotic gifts to the state; the civil jurisdiction of the bishops was taken away, and monks and nuns were freed from their vows. The clergy were put under a civil constitution. Each department was a see, and the communes ruled and paid bishop and curés. All the clergy were amenable to the civil courts, without appeal to the pope or the interference of any ecclesiastical authority whatever. Every clergyman had to take an oath accepting this constitution, which led to the emigration of a number, and subsequently to enactments of excessive rigor against refractory priests (*prêtres insermentés*).

The A. having thus laid the revolution on a foundation of 3250 decrees, and having sworn to the new constitution, and got it accepted by the king, closed its sittings, September 30, 1791. From

its having framed the constitution (which lasted only 12 months), this assemby is usually called the Constituent A. It made way for the LEGISLATIVE ASSEMBLY, which was to reform the civil and criminal laws in accordance with the spirit of the new constitution. A decree had provided that no member of the Constituent should be returned to the Legislative A. But the democratic party received such preponderance at the elections, that the A. forgot its mission from the very first, and commenced a war with the remnants of the royal authority, which ended, August 10, 1792, with the overthrow of the throne and the suspension of the king. The constitution had provided for an appeal to the nation in extreme cases, and the Legislative A. now exercised that right by convoking a *National Convention* (q. v.), which, being invested with the powers of the sovereign, was to decide on the fate of the monarchy, and remodel the whole political system.

The title of National A. has been assumed by various other parliamentary bodies, originating in popular commotions, and aiming at radical political changes; as the French A. that met after the revolution of February 1848, followed, April 1849, by a Legislative A.; the German National A. at Frankfort; and the Prussian National A. Under the existing French Republic, the Senate and the Chamber of Deputies unite to form the National A.

ASSE'MBLY OF DIVI'NES, or WE'STMINSTER ASSE'MBLY, a celebrated convocation appointed by the Long Parliament for settling the doctrine, liturgy, and government of the Church of England. It consisted of 120 clergymen and 30 laymen—10 of whom were lords and 20 commoners—together with 4 clerical and two lay commissioners from the Church of Scotland. Among the more distinguished of the divines were Usher, Saunderson, Reynolds, Brownrigg, Ward, Twisse, Lightfoot, Gataker, Burges, Goodwin, Calamy, and Nye; of the laymen, Selden, Prideaux, the two Vanes, Rouse, Pym, Whitelocke, St. John, and Maynard. The Scottish divines were Henderson, Gillespie, Rutherford, and Baillie. 25 of those whose names were contained in the ordinance calling the Assembly, which was dated 12th June 1643, never appeared at the discussions, one or two of them having died about the time of the first meeting, and the others fearing the displeasure of the king. To supply the place of these absentees, some additional members, called the superadded divines, were summoned to attend. This notable Assembly held its first meeting on the 1st of July 1643, and continued to sit till the 22d February 1649, during which time it had met 1163 times. Its most important work was concluded long before that time. One of the first things it did was to give its sanction to the *Solemn League and Covenant*, against which Dr. Burges alone stood out for several days. The Presbyterians formed a large majority in the Assembly, and exercised a corresponding influence on its decisions. In doctrine, the members were almost unanimous; but on the subject of church government, opinions extremely opposite were maintained with keenness, especially on the question touching the sphere and limits of the civil power in matters ecclesiastical. The principal fruits of its deliberations were the *Directory of Public Worship*, submitted to parliament April 20, 1644; the *Confession of Faith*, October and November 1646; the *Shorter Catechism*, November 5, 1647; and the *Larger Catechism*, September 15, 1648. These several formularies, which contain a clear and rigid embodiment of Calvinistic theology and Presbyterian church government, constitute to this day the authorized standards of the Presbyterian churches of Scotland, Ireland and England. The *Directory of Public Worship* was ratified by both Houses of parliament, October 2, 1644, and the doctrinal part of the *Confession of Faith* in March 1648. An order of the House of Commons, October 13, 1647, ordained that the Presbyterian form of church government should be tried for a year, but no further legislation followed. What has hitherto been known as to the details of the proceedings of this remarkable convocation, has been derived chiefly from the *Letters* of Baillie, and Lightfoot's *Journal*.—See Hetherington's *History of the Westminster Assembly* (1843); and the 2d volume of Masson's *Life of Milton*, published in 1871 (pp. 509—527), where a list of the members, with brief biographic notices, is given. See CREEDS AND CONFESSIONS.

ASSE'NT, RO'YAL, is the regal act by which the sanction of the crown to bills which have passed through both Houses of parliament is given. See ROYAL ASSENT.

ASSER, JOHN, the learned and congenial biographer of Alfred, was a monk of St. Davids, from the Latin name of which, *Menevia*, he is termed in the old records *Asserius Menevensis*. About the year 880, his reputation for learning and piety procured him an invitation to the court of Alfred, where he resided at intervals during the rest of the king's life, assisting him in his studies, and enjoying an affectionate confidence, of which he seems to have been every way worthy. The king promoted him to various dignities, and finally made him Bishop of Sherburn. The *Saxon Chronicle* fixes the date of his death to the year 910. Several works have, with more or less authority, been attributed to A. The only one undoubtedly his, by which we can now judge of him as a man and a writer is his *Annales Rerum Gestarum Aelfredi Magni*. This simple and most interesting narrative was first published in 1574 by Archbishop Parker. Its trustworthiness has recently (1842) been questioned by Mr. Thomas Wright, in the article 'Asser' of his *Biographia Britannica Litteraria*. This gentleman has assuredly made the most of the objections to its reliability that can be legitimately urged. Lingard and Dr. Pauli have replied to these, and, at present, the general impression of scholars of Anglo-Saxon literature is that there is no good reason for doubting its general accuracy and fidelity. The best edition is that of Wise (Oxf. 8vo. 1722).

ASSESSED TAXES are charged on the people by a somewhat cumbrous system, papers being distributed to be filled up by the taxpayer, or, when the tax is of a specific amount, intimating the sum to be paid. The most notable instances are the income-tax, house-duty, and the local rates. This mode of collecting requires a whole army of assessors and collectors for determining and collecting the amounts due. Hence for many of the old assessed taxes, *excise licenses* have now been substituted, as in the case of the dog-tax, the taxes on armorial bearings, carriages, male-servants, and the game-license, and liquor and eating-house licenses. The simplification in the dog-tax is evident: the taxpayer simply takes out a license at the nearest post-office. The A. T. are under the management of commissioners of Inland Revenue. See TAXES.

ASSE'SSORS are persons sometimes associated with judicial functionaries, to assist in the argument and procedure before them, and to advise their judgments. They may be usefully employed by persons in judicial stations whose previous education and pursuits scarcely qualify them for the duties cast upon them. A. are usually barristers or advocates learned in the law, and familiar with judicial proceedings. By the Municipal Corporation Act, it is enacted that the burgesses shall annually elect from among those qualified to be counsellors, two auditors and two A., the former to audit the accounts of the burgh, and the latter to revise the burgess list. In the ecclesiastical law of England, a bishop, who is a spiritual judge, is assisted by his chancellor, as the episcopal assessor, and who, in fact, holds court for the bishop. But in the case of a complaint against a clergyman for any ecclesiastical offence under the Church Discipline Act (the 3 and 4 Vict. c. 86), the bishop is directed to inquire into the matter, assisted by three A., of whom the dean of his cathedral, or one of his archdeacons, or his chancellor, must be one, and a serjeant at law, or an advocate who has practised five years in the court of the archbishop of the province, or a barrister of seven years' standing, another.

The judges of the common law courts, and the Queen's counsel, being serjeants, are, as a condition of their offices, A. of the House of Lords, advising the House on points of law which may be propounded to them by their lordships.

A'SSETS. This is one of those terms in the law of England which in itself bears evidence of a Norman origin. It is derived from the French word *assez*, or more exactly, in Norman-French, *assetz*, 'enough' or 'sufficient,' signifying the property of a deceased person, which is sufficient in the hands of his executor and heir for the payment of his debts and legacies. In strictness, therefore, the term is not applicable to the property of a person who dies intestate, and without any debts to be paid. In general acceptation, however, it is understood to mean the property left for distribution by a deceased person, whether testate or intestate; and in commerce, and also in bankruptcy and insolvency, the term is used to designate the stock in trade and entire property of all sorts belonging to a merchant or to a trading association.

A. are either *personal* or *real*, the former comprehending such goods, chattels, and debts as devolve on the executor; and the latter including all real estate, whether devised or descending to the heir at law. In connection with this distinction, A. are also said to be *A. by descent*, and *A. in hand*, the former of these being recoverable from the heir to whom the land descends, and so far as such lands will extend—A. in hand, again, signifying such property as a person leaves to his executors sufficient for the clearing of burdens and bequests affecting his personal estate. A. are also in their nature either *legal* or *equitable*, according to the nature of the remedy which may be used by creditors against the executor or heir. Where there are several creditors of equal degree, the executor is bound to pay him who first obtains judgment for his debt; and he cannot resist on the ground that nothing will be left for the other creditors. If, after exhausting the whole A. which have come to his hands, by the payment of debts in due order, he be afterward sued by a creditor remaining unpaid, he is entitled to protect himself by an allegation that he has fully administered, or technically by a plea of *plene administravit;* and upon this plea the creditor is entitled to judgment that he shall be paid out of any other A. that shall come to the defendants, which is called a judgment of A. *in futuro*.

A. is not a technical term in Scotland, but it is nevertheless much used in the legal business of that country.

ASSI'DIANS. See CHASIDIM.

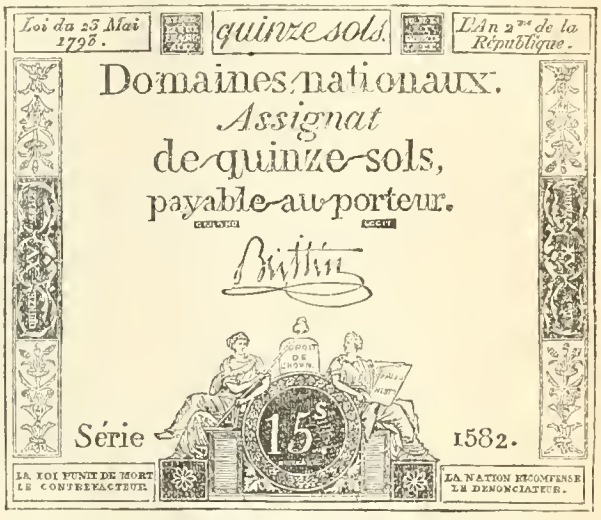
ASSIE'NTO, i.e., treaty, a word specially applied to a compact between Spain and some foreign nation, according to which the Spanish government conferred upon the latter, under certain conditions, the monopoly of the supply of negroes for its American colonies. It was Charles I. of Spain who first concluded an A. with the Flemings. Next, a similar compact was entered into with the Genoese (1580 A.D.), the Portuguese (1696), and on the accession of Philip V. to the Spanish throne in 1702, with the French Guinea Company, which from that time took the name of A. Company, upon the understanding that for ten years it should have the exclusive right of annually importing 4800 negroes of both sexes to the continent and islands of Spanish America. The A. was next transferred to England at the peace of Utrecht in 1713, and made over by government to the South Sea Company for 30 years, permission being also granted to the company to send yearly, during the term of contract, a ship, carrying 500 tons of goods, to these Spanish colonies. The misunderstandings that grew out of this last clause contributed not a little to the war that broke out between the two nations in 1739. At the peace of Aix-la-chapelle in 1748, the English company having still four years to run, their rights were guaranteed to them; but they relinquished them at the Madrid Convention of 1750, upon the payment of £100,000, and the concession of certain commercial advantages.

ASSI'GN, To, in Law, signifies to transfer or grant over to a third party a security, a right of credit, or other right, whether in possession or in reversion, granted by a party indebted or under obligation to the party assigning. The words of assignment are to *A.*, *transfer*, and *set over*, and they operate to transfer both real and personal property. A *Chose in Action* (q. v.), contrary to the ancient principle, can now be assigned in England indirectly by the common law, and directly according to the principles recognized in the practice of equity. Besides this general application of the word, as a technical term in conveyancing, both in England and Scotland, it is also employed in England in judicial procedure, where the decision of an inferior court is brought under review, and in proceedings in bankruptcy. See ASSIGNMENT, ASSIGNATION, ASSIGNMENT OF ERROR, BANKRUPTCY.

ASSIGNA'TION is a legal term in Scotch conveyancing, analogous to the English word Assignment (q. v.), by means of which the holder of any right, or the creditor in any obligation, or the proprietor of any subject not properly feudal (see FEUDAL SYSTEM), transfers his right or estate to a third party. The party making the A. is called the *cedent*, and the party in whose favor the A. is made is called the *assignee* or *cessionary*, and the act of assignment thus made is irrevocable, an element in the deed which has been traced to the practice of the French law, a source from which the Scotch lawyers of the 16th c. borrowed so much—the Court of Session itself being a mere copy of the Parliament of Paris. A direct conveyance of a debt in France was termed *un transport;* the granter, *cédant;* and the grantee, *cessionnaire;* and these terms, derived from a Latin origin, were introduced into the Scotch law; and hence the names of the parties to an A., as we have stated. Unlike the English common-law view of the assignment, the Scotch A. has the effect of investing the assignee with the whole right, which was in the cedent, although, according to the ancient practice, the A. gave, not simply the sum or subject assigned, but also the deed or written evidence of the right or thing assigned, a form arising from the circumstance of the instrument having been regarded as of the nature of a mandate or power of attorney to the assignee to make his claim and to act as in right of the cedent. In modern practice, however, it is usual to employ simply the terms 'assign, convey, and make over,' which correspond with the real character of the deed. In order, however, to complete the A., it must be *intimated* to the common debtor—that is, the party originally indebted to the cedent—and so essential is this intimation, that in the case of competing claims against the right interest or estate assigned, the A. first intimated will be preferred to one prior in date, but posterior in the date of intimation. Such intimation ought to be made by a *Notary Public* (q. v.), but other formal notice of the A. is sometimes admitted. But there are certain assignations which require no intimation, such as the endorsement of bills of exchange, adjudication (q. v.), which is a judicial A., and marriage, which is a legal A.; and the same is the rule with regard to all right and estate assigned under the operation of the bankruptcy laws. In Scotch agricultural leases, assignees are generally excluded expressly.

But although A. is the strict Scotch term for assignment, the latter is in Scotland the technical term for the transference of certain property, such as property in copyrights, patents, and registered vessels.

A'SSIGNATS. After appropriating to national purposes the land belonging to the church, the French National Assembly (see ASSEMBLY, NATIONAL), instead of bringing it into the market at a time of insecurity, when its value was depreciated, issued bonds on the security of it, which were called *assignats*, as representing land *assigned* to the holder. This paper-money consisted chiefly of notes for 100 francs (£4) each, though many of them were for sums as low as ten or five francs, and even lower; and the first issue amounted to 400 million francs. The first A., which were issued in the spring of the year 1790, bore interest; but subsequent issues did not. The facility of this plan of providing government income led to its being repeatedly had recourse to, as the property of wealthy emigrants—persons who abandoned their country in alarm—fell into the hands of the rulers, and was confiscated, till the amount rose to the enormous sum of 45,578 million francs, besides a great number of forged A. manufactured



Fac simile of Assignat.

abroad, and smuggled into the kingdom. The value of the A. naturally soon began to decline, and confidence once gone, the declension became fearful. In June 1793, one franc in silver was worth three francs in paper; in August, it was worth six. The state took the most extreme measures to compel the acceptance of A. at their full nominal value. The effects of these were to cause the A. to flow back into the public treasury, to raise the prices of all commodities, and to make every one averse to have any dealings with the state. One of these consequences was attempted to be met by fixing a maximum of prices. But no one could compel producers and dealers to produce and sell at a loss; so that all business became disorganized. At last the value of A. came almost to nothing. Millions of individuals had suffered incalculable loss, and only a few who had bought public lands with the A. that cost them little or nothing, had enriched themselves at the expense of the community.

In March 1796, a louis d'or (24 francs) brought 7200 francs in A. After this, they were withdrawn from the currency in 1796, and redeemed, at $\frac{1}{30}$th of their nominal value, by *mandats*, a new kind of paper-money, which enabled the holder at once to take possession of public lands at the estimated value while A. could only be offered at a sale. The mandats also soon fell to a seventieth of their nominal value, and were returned to government in payment of taxes or of land.

At length, in July 1796, the system of paper-credit, so obstinately persisted in by government and so disastrous in its results to the public, came to an end. A law was passed, declaring that every one was entitled to transact business in whatever circulating medium he pleased; that the mandats should be taken at their current value; and that the taxes be received either in coin or mandats at that rate. The A. were executed on a coarse kind of paper, and, as will be seen by the accompanying fac-simile, the devices were so meagre as to be easily counterfeited.

ASSIGNEE' IN BA'NKRUPTCY. See BANKRUPTCY.

ASSI'GNMENT, in the law of England, is the name given to a conveyance by which the party making the A. transfers or grants over, for a sufficient consideration, a right in expectancy, in reversion, or other right not in possession, such as a bond, a debt, or other *chose in action* (q. v.). In England, according to the strict rule of the old common law, no such right could be assigned or granted over, because such a proceeding was thought to be an encouragement to litigation. The only exception to this general rule was in the case of the crown, which might always either grant or receive a *chose in action* by A. Now, however, the proceeding is in constant practice. The courts of equity used to make the rule itself give way to the expediency of facilitating the transfer of property by directly sanctioning the practice; and even in those of common law the application of the ancient principle was evaded. Mortgages may be assigned; indeed the right to make such a trans-

fer is one of the properties of a mortgage security. A. is also the proper mode of assurance or conveyance for passing leasehold estates for years, and other chattel property; and by the 8 and 9 Vict. c. 106, s 3, it is enacted that all assignments made after the 1st of October, 1845, not being an interest which before the passing of the act might have been created without writing, shall be void at law, unless made by deed. But a mere note in writing, if duly signed by the parties, will nevertheless be supported in equity as an agreement, and pass an equitable interest to the assignee. It also appears that a patrol or verbal lease for a term not exceeding three years, nor valid as such within the Statute of Frauds (q. v.), may be assigned by a simple note in writing, if impressed with a proper stamp. Copyright is assignable; indeed, by the 5 and 6 Vict. c. 45, s. 3, copyright is expressly given to the author *and his assigns;* but it is not required, like a patent right, to be in every case under the seal of the proprietor, it being enacted by section 13 of the same act that an A. properly entered in the book of registry at Stationers' Hall shall be as effectual as if made by deed.

In regard to the right of A. generally, it may be laid down that the property in things personal is transferable with absolute freedom; and if they are assigned under a condition which is either repugnant to the gift itself, or against the policy of the law—such as a prohibition to dispose of the property assigned—the condition is void. There are some cases, however, where the right of alienation is, in respect to the incapacity of the owner, suspended; as to which it will be sufficient to remark that the law with respect to the disability of infants, insane persons, and persons under duress, applies in general to personal as well as to real property. A married woman, too, is in general under an absolute incapacity to make any transfer of things personal; for, with the exception of her equitable interest in property settled in trust expressly for her separate use, the goods and chattels which she may have possessed at the time of marriage, or subsequently acquired, belong, by the general rule of law, to her husband. There are also some few cases where, in respect of the nature of the interest itself, its alienation is absolutely prohibited. Thus, generally, the pay or half-pay of a military or naval officer, or the salary of an officer of trust, is, on a principle of public policy, not assignable, the object being to secure to such persons, even against their own improvidence, the possession of those means which are essential to the maintenance of their station and the performance of their duties. The sale or transfer of public appointments themselves is also, in general, contrary to the policy of the law, and in most cases expressly prohibited. See Stephen's *Commentaries*, vol. ii. p. 43.

An A. of goods and chattels is frequently made by a Bill of Sale (q. v.). Bills of Exchange (q. v.) and Promissory Notes (q. v.) are assigned by endorsement.

The corresponding term in the Scotch law is *Assignation* (q. v.). But in that system, A. is the legal and technical word for the transference of property in copyrights, patents, and registered vessels. See ASSIGNMENT in AM. SUPP.

ASSI'GNMENT OF ERROR. See ERROR and APPEAL.

ASSI'GNS, or in Scotch law, ASSIGNEES, is the legal name given to parties in whose favor an Assignment or Assignation (q. v.) is made.

ASSIMILA'TION. See NUTRITION.

ASSINIBOIA, a Canadian district or territory within the limits of the North-west Territories, but formed by an order in Council in 1882. It lies to the west of Manitoba, is bounded on the south by the United States frontier, west (at 111° W.) by Alberta territory, north (at 52° N.) by the new territory of Saskatchewan. It has an area of about 95,000 sq. miles; is intersected by the Canadian Pacific Railway, by the Qu'appelle, South Saskatchewan, and Souris rivers; and contains the towns of Regina (new capital of the north west), Fort Pelly, and Fort Ellice.

ASSINIBOI'NE, a river of British North America, rising in lat. 51° 40′ N., and about long. 105° E. At Winnipeg it joins the Red River (q. v.), which discharges its waters into Lake Winnipeg. At a point 140 miles from its mouth, the A. is 230 feet broad; its course measures about 400 miles. The river gives name to a tribe of Indians.

ASSI'SI (*Assisium*), a town of Central Italy, is built upon a steep hill, 13 miles S.E. of Perugia. Pop. 6200. It stands in a singularly picturesque situation, and is surrounded by a wall flanked with towers, and overhung by lofty citadel in ruins. It is the birthplace of St. Francis, who here founded the Convento Sacro, the first monastery of the Mendicant order that bears his name, a large and beautiful structure, and one of the earliest specimens of the Gothic style of architecture in Italy. The church and the galleries of the monastery contain fine paintings by Cimabue, Giotto, and other old masters. Besides the Convento Sacro, there are eleven other monasteries in A. Of these, the largest is the Portiuncula, which has a richly decorated church, with a cupola by Vignola. In the last century, this place was a great resort of pilgrims, visiting the tomb of the saint, of whom one hundred thousand are said to have been assembled here on one day.

A. occupies the site of the ancient Assisium, a municipal town of Umbria, and presents the remains of the forum, the baths, and the aqueducts of the days of the Romans. In the piazza, or square, there stands a beautiful portico of the ancient temple of Minerva, consisting of fluted Corinthian columns and a pediment. There are abundance of olive-trees, and some fine mineral springs in the vicinity. The town has given title to a bishop since 240 A.D. It has manufactures of needles and files.

ASSI'ZE. This word, literally signifying a 'sitting' or 'session,' is a term used in the principal European legal systems, and very much in the same sense, or rather senses in all, for it has more than one distinctive meaning. As is common with regard to most of our ancient legal technicality, the Latin language, in the first instance (*assideo*), and then the French (*assis*), appear to have led to its introduction into the phraseology of the law of England, and, it may be added, also of Scotland, although in the latter country it has a more limited application in judicial procedure than in England, *A.* being in Scotland the old technical expression for a jury. In England, this word may also signify a jury, and it is sometimes used to denote an ordinance, decree, or law. But in modern practice, it is commonly applied to the sessions or sittings of the judges of the superior law-courts, held periodically in each county, for the purpose of administering civil and criminal justice. These courts came into use in room of ancient justices in eyre, *justicia rei in itinere*. They are now appointed by commissions issued twice a year to the judges of the High Court of Justice, two judges being generally assigned to each circuit. (These are the *general* commissions; *special* commissions are occasionally granted to certain judges to try certain causes and crimes.) By accompanying writs of *association*, certain persons are directed to be associated with the justices and serjeants, in order to take the assizes, &c., that a sufficient supply of commissioners may never be wanting. But, to prevent the delay of justice by the absence of any of them, there is also issued, of course, a writ of *Si non omnes*, directing that, if all cannot be present, any two of them (a justice or serjeant being one) may proceed to execute the commission.

These commissioners or judges of A. are sent twice in every year on *circuits* all round the kingdom, to try by a jury of the respective counties the truth of such matters of fact as are then under dispute in the courts of Westminster Hall; and occasionally a third circuit is appointed in the course of the year, for the purpose of jail delivery. The circuits (formerly eight) are, since 1875, seven in number—Northern, North-eastern, Midland, South-eastern, Oxford, Western, and North and South Wales; and in going them, the judges or commissioners sit by virtue of four several authorities: 1. The commission of the *peace;* 2. A commission of *oyer* and *terminer;* 3. A commission of general *jail* delivery. The other authority is, 4. That of *nisi prius*, which is a consequence of the ancient commission of A. being annexed to the office of justices of A. by the statute of Westminster the second (13 Edw. I. c. 30); and it empowers them to try all questions of fact issuing out of the courts at Westminster that are then ripe for trial by jury. These, by the ancient course of the courts, were usually appointed to be tried at Westminster in some Easter or Michaelmas term, by a jury returned from the county wherein the cause of action arose; but with this proviso, *nisi prius*, unless before the day prefixed the judges of A. should come into the county in question, which in modern times they have invariably done in the vacations preceding; so that the trial has always, in fact, taken place before those judges. And now, by the effect of the statue 15 and 16 Vict. c. 76 (the Common Law Procedure Act, 1852), the course of proceeding is no longer even ostensibly connected with a proviso at nisi prius, but the trial is allowed to take place without the use of any such words in the process of the court, and as a matter of course, before the judges sent under commission into the several counties. The circuit system, however, does not extend to London and Middlesex, which have instead courts of nisi prius, which are held before the chief or other judge of the superior courts for the trial of civil causes, at what are called the London and Westminster Sittings; and the establishment of the Central Criminal Court (by the 4 and 5 Will. IV. c. 36, the jurisdiction of which was extended by the 19 and 20 Vict. c. 16) has sufficiently provided for the administration of criminal justice within these districts. The Judicature Act (1873, ss. 11, 16, 29, 37, 77, 93 and 99) made no important alteration in the manner of holding assize.

The circuit courts of Justiciary in Scotland, of which there are three—the North, the West, and the South—very much resemble the assizes in England, and have, in criminal matters at least, very much the same jurisdiction; but in civil causes their authority is very limited.

In the sense of an ordinance or law, the term A. has various applications, although chiefly in the more ancient systems of jurisprudence. Thus, the 'Assizes' of Jerusalem were, as we are told

in Gibbon's *Decline and Fall* (vol. xi. p. 93), a code of feudal laws for the kingdom of Jerusalem, formed in 1099 by an assembly of the Latin barons and of the clergy and laity under Godfrey of Bouillon. Then there were the 'Assizes' or ordinances regulating the price of bread, ale, fuel, and other common necessaries of life, but all of which have been abolished. The same regulations appear to have prevailed in Scotland in ancient times. See JURY TRIAL, FAIRS.

ASSOCIATE SYNOD, ASSOCIATE PRESBYTERY, &c., designations adopted among the dissenters from the Church of Scotland. See UNITED PRESBYTERIAN CHURCH. America has also an Associate Synod and an Associate Reformed Church, both sprung from the Scottish Secession.

ASSOCIA'TION. See CO-OPERATION; also, SOCIETIES, LEAGUE, COMPANY.

ASSOCIA'TION OF IDE'AS. This is a phrase of great importance in the Philosophy of the Human Mind, as expressing the most pervading fact at the foundation of our intelligence. By giving, therefore, a somewhat full exposition of this subject, we are able to explain, at once, a considerable number of the complex phenomena of mind in a more satisfactory way than by treating the several phenomena separately. What is meant by Association of Ideas, is familiarly illustrated by such occurrences as the following: When we see the sky becoming overcast, we think of rain as about to follow, the notion of rain not having previously been present to our mind. When we hear the church-bells, we are apt to think of the crowds in the street, or of some of the other circumstances of public worship. When we pass a house, we are reminded of its occupier; and meeting a person we know, we may be carried in thought to his office, and from that to other persons holding the same office, and so on. If an object is before my eyes, as a mountain, I am said to receive an impression or sensation of it, in consequence of the actual presence of the thing; but it is possible for me to remember the mountain, or to have an idea of it, when far away from the reality, in which case there must be some power in the mind itself, different from the susceptibility to present objects, a power of retaining, reviving, or resuscitating those states at first induced by contact with the actual. Besides the sights, and sounds, and touches caused by contact with real things, we are greatly occupied with sights, sounds, and touches remembered, anticipated, or imagined, which is to live in a world of ideas; and it is in this world that the process termed Association has its sphere. When an idea is brought before the mind without its original, as when I picture to my mind the late Duke of Wellington, the circumstance is owing to the mention of his name, or of some incident connected with him; and my remembrance of his personal appearance, as I have seen him when alive, is said to be the result of an association existing in my mind between two ideas, so that one is able to recall or restore the other. The association between names and things comprehends one of the most extensive applications of the power in question.

The circumstances under which one idea brings forward another into the view are principally these two—viz., first, previous *proximity;* and second, *likeness.* The term 'Contiguity' and 'Similarity' are used in Mental Philosophy to express them. The first is exemplified in the examples of association given above; for in most of those it will be found that the conjoined notions have been frequently in the view at the same time, in consequence of which they have, as it were, grown together, or become part of the same whole. Thus, we have often noticed the darkened sky followed by a shower; the two facts have occupied the attention simultaneously, and in virtue of some power belonging to our mental framework, they have cohered into an inseparable couple or aggregate in the mind. This is proximity, or contiguity. When one idea suggests another which was never in company with it before, it is generally through the force of some *likeness* between the two. I meet an old man in the street with a very peculiar face, which reminds me of the bust of Socrates. These two things had never accompanied one another in my mind before, and therefore it could not be the force of proximity that made the second to arise at the instigation of the first; but there was a certain amount of likeness or similarity between the old man's features and the features of Socrates, as represented to us in the bust; and it is a fact of our constitution, no less certain and no less important than the foregoing, that in cases where something now before the mind has a strong cast of resemblance to something formerly observed or conceived by us, but not at present thought of in any way, the present is apt to recall that past idea, whatever it may be. By the force of likeness, the traveler in new countries is constantly reminded of the scenes and objects familiar to him, and so is induced to draw comparisons between the one and the other. Identification and comparison both imply that things are brought together by virtue of their similarity, they not having been in company before. The principle of proximity operates most in Memory, Habit, and Routine; similarity has to do with invention and originality, and is essential to the processes of Reason and Imagination.

Law of Contiguity.—The principle of association by proximity is not confined to ideas. We must state it in a more comprehensive form, in order to comprise the full sphere of its application; for our mechanical habits are formed through the very same power of our constitution that enables us to recall or remember ideas. The taught movements of a soldier or of a skilled workman are connected together so firmly that one succeeds to another almost of its own accord. Everything of the nature of acquisition supposes a plastic property in the human system, giving permanent coherence to acts that have been performed together.

The following is a general statement of the law under consideration:

Actions, Sensations, States of Feeling and Ideas, occurring together, or in close succession, tend to grow together, or cohere in such a way that when any one of them is afterwards presented to the mind, the others are apt to arise.

And first, as to association of Actions, or voluntary movements. When we perform a train of movements without any further aid of the will than to commence the series, there must be a fixed connection between each and the one that follows, and the connection may be either instinctive or acquired. There are various cases of instinctive trains, such as the action of the heart, lungs, and intestines, and the movements of deglutition. When a morsel of food reaches the back part of the mouth, the muscles of the throat seize hold of it, and transmit it to the stomach, independent of our will. The connected movements in this case are provided for in the original structure of the nervous and muscular system. In walking, there is partly an instinctive tendency to alternate the limbs, and partly a confirming acquisition, the result of practice. But in those complicated operations that human beings are taught to execute in the various avocations of life, the associating principle is everything. The apparently simple and easy act of taking food is a complicated acquisition; in other words, an extensive group of associated movements. The seizing of the morsel is followed by the movement of the arm that carries it to the mouth; the mouth is opened simultaneously; after which follows the processes of biting and chewing; all which take place with the certainty of a machine, and without effort or attention directed to them. These associations were originally built up by slow degrees. 'As a general rule, it takes many repetitions to cement so firm a union between successive and simultaneous movements as is implied in the above instance.'

A good example of the association of movements is furnished in our acquirement of spoken language, as in committing to memory words, sayings, and passages of books. When a child has perfectly acquired the Lord's Prayer, the chain of association is so firmly knit, that the articulation of the words 'Our Father' is followed irresistibly with those next succeeding, and so on to the end. The cohesion in this case is between the vocal movements corresponding to the enunciation of the words. Having gone many times through this one definite succession, the stream of nervous power, in some way that we cannot at present explain, acquires a tendency to fall into this one definite track, and in future to bring on the movements in the exact order that they have so frequently followed.

It is not merely actual movements that can be joined together in this way, but the *ideas* of movement; for a man, meditating in language, and not speaking out his thoughts, can consolidate his trains so as to remember them afterwards.

When we proceed to Sensations and the Ideas, or subsequent traces, of Sensations, and take along with these the variety of our movements with their ideas, we find an unlimited scope for the associating principle; and the consequences of its operation spread far and wide in the domains of our happiness, our knowledge, and our active capacity. It is only possible here to present a few illustrative examples.

In the various mechanical acquirements, which include the whole of special handicraft industry and skill, as well as the use of the bodily members in the more general actions of daily life, there may be traced the linkings of actions with actions, or actions with sensations and ideas. The helmsman steering a ship associates in his mind each deviation of the needle from the proper point with the specific muscular exertion to be applied to the wheel to rectify the ship's direction. The workman fabricating in wood, metal, or stone, acquires a firm connection between each aspect of the material and the muscular power to be applied to bring it one step nearer the desired form. The power of copying anything we see, as in writing, drawing, moulding, &c., when completely mastered, is made up of associations between a visible appearance, and the train of movements calculated to reproduce it. After practice, all this is done, as it is called, mechanically, or without those operations of considering, willing, and remembring directions, that are essential to the learner in a new art. The associations that grow up after a certain amount of practice, are in this case associations between movements and appearances to

the eye, or sensations of sight. In the greater number of crafts, the eye is the guiding sense to the operator, but not in all. Sometimes the effect is vocal, as in performing music, and in making and tuning musical instruments, in speaking, &c. In other arts, the touch is the guiding sense, and in some, as in cookery, the taste and smell direct the operator. Each accomplished workman has in his mind many hundreds, not to say thousands, of couples or aggregates of definite movements with other movements and with sensations, contracted in the course of his apprenticeship to his calling.

If we inquire into the circumstances that favor and promote this extensive circle of acquisitions, we shall find several that may be named as of importance. In the first place, *a natural activity of temperament*, or an abundant flow of power to the active members, as shown in a great and various nobility of the frame, is a good basis of bodily acquirements. When the force of the system runs feebly towards the muscular framework, being perhaps expended in other ways, as in the thinking powers, more time is requisite to attain difficult mechanical arts. Another important circumstance is *the acuteness or delicacy of the sense* involved in the operation. A keen eye, sensitive to minute degrees of effect, is wanted in all the various occupations that turn on visible appearances; a good ear is indispensable to music and the arts of producing sounds; and so on. With a naturally dull sensibility to flavor, no man can easily become a good cook, or a taster of tea or wine. The third consideration is *the natural power of adhesive association* belonging to the individual character. Some minds have originally a more powerful adhesiveness than others, either for things generally or for special departments. We see this when a number of boys come together at school, and in apprentices learning together. Some are always found taking the start of the rest in rapidity of acquirement; and although the reason may be found in some of the other circumstances now mentioned, yet observation shows that when everything else is allowed for, there remain natural differences in the rapidity with which the adhesive bond is cemented; some acquiring without effort what others take both time and labor to accomplish. The fourth principal circumstance is the *interest* taken in the work, or the degree to which it engages the feelings of the learner. This is a material consideration, accounting for the acquisitions made in matters that we have a strong taste for without our having a pre-eminence in those other points that constitute natural capacity. These four conditions apply more or less to acquisitions generally.

A detailed exemplification of this great principle of our nature might be given through all the departments of the human intellect. The acquirements of speech, as already said, contain a wide range of instances. The adhesion of language is partly in the vocal organs, partly in the ear, and partly in the eye, when we come to written and printed characters. The associations of names with things, with actions (as in obeying direction and command), and with other names (in acquiring foreign languages), are a gradual growth favored by such conditions as the above. The acquirements in Science, Fine Art, and Business, and in everything that constitutes skill or knowledge, proceed upon this plastic property of the mind. It also enlarges the sphere of our pleasures and pains. There are connections established in the mind between our states of feeling and the things that have often accompanied them, so that the accompaniment shall have power to revive the feeling. It is thus that we contract affections, both benevolent and malevolent, towards persons and things, our friends, our home, our country, our property, our pursuits.

This power of stirring up dependent associations to an extent that may be almost called unlimited (although there are limitations), is peculiar to the animal organization. Nothing parallel to it occurs in the mineral or vegetable world. It is a property of mind alone, and has its seat in the nervous tissue. We know that growth or change is requisite to the progress of the adhesion; for it proceeds most rapidly in youth, health and nutrition, and decays in old age, and during exhaustion and disease. And even to keep our acquisitions from fading away, it is requisite that they should be occasionally revived. A language acquired in early years may be utterly lost by disuse. Sustained practice seems particularly necessary in early education; children's acquisitions are very liable to disintegrate, if not kept up and confirmed by new additions.

Law of Similarity.—This may be expressed as follows:

Present Actions, Sensations, Thoughts, and Emotions tend to revive their LIKE among *previous* impressions.

If the mind worked only by the principle of contiguity, nothing would ever occur to us except in some connection already formed. But some explanation is necessary as to the precise relationship subsisting between the two distinct forces of mental resuscitation, in order to show at once their distinctness and their connection. When the cohesive link between any two contiguous actions, sensations, or ideas, is confirmed by a new occurrence or repetition, it is perfectly obvious that the present impression must revive the sum-total of the past impressions, or reinstate the whole mental condition left on the occasion immediately preceding. Thus, if I am disciplining myself in the act of drawing a round figure with my hand, any present effort must recall the state of the muscular and nervous action, or the precise bent acquired at the end of the previous effort, while that effort had to restore the condition at the end of the one preceding, and so on. But this reinstatement of a former condition by a present act of the same kind, is really and truly a case of the principle before us, or of like recalling like; and without such recall, the progressive adhesion of contiguous things would be impossible. It would appear, therefore, that similarity is tacitly assumed in the operation of contiguity, and is indispensable to the process by which our acquisitions are gradually built up. Why, then, do we set up the associating force of likeness as something independent and distinct? To answer this question, we must advert to the fact, that in those cases where the same impression is deepened by every new repetition, the old and the new are not merely similar, they are *identical*, and the resuscitation takes place without fail, and as a matter of course.

But in going deeper into the explanation of the human intellect, we encounter many classes of similars, where there is not absolute identity, but the mixing of a certain amount of *diversity* with the likeness actually existing. The botanist classing together all the plants of the same order, as, for example, the *Rosaceæ*, has to be struck with the occurrence of certain common characters—viz., the properties that distinguish the order—in the midst of great varieties in all other respects. It is important that he recognize these general marks, whether the plants be trees or shrubs, whether they be poisonous or wholesome, and under many other diversities. It is exceedingly important in science, in the business of life, and even in the creations of fine art, that the mind should take cognizance of likeness surrounded by unlikeness, which is the case that renders it necessary to characterize as distinct the associating force now under discussion. In the case of perfect identity between a present and a past impression, the past is recovered, and fused with the present, instantaneously and surely. So quick and certain is the process that we lose sight of it altogether; we are scarcely made aware of the existence of an associating link of similarity under such circumstances. But when we pass from perfect to imperfect or partial identity, we are more readily led to perceive the existence of this link of attraction between similars, for we find that the restoration sometimes does not take place; cases occur where we fail to be struck with a similitude; the spark of resuscitation does not pass between the new impression and the old dormant one. Then it is that that we recognize differences between the different minds; one man tracing resemblance and making out identity better than another. Moreover, we can assign reasons connected with the culture of the individual, which partially explain superiority or inferiority in this important faculty; just as we have pointed out the conditions favorable to the rapid growth of the adhesive bond of proximity. The failure in reinstating an old impression by virtue of a present one like it, is solely ascribable to the want of perfect identity. When in some new presentation of an object, the old familiar form is muffled, obscured, distorted, disguised, or in any way altered, it is just a chance if we recognize it; the amount of likeness still remaining will have a tendency to revive the object, while the points of difference or unlikeness will operate against the revival, and tend to restore things of their own kindred. If we hear a musical air that we are accustomed to, the new impression revives the old as a matter of course; but if the air is played with complex harmonies and accompaniments which are strange to us, it is possible that the effect of these additions may be to check our recognition of the melody; the unlike circumstances may repel the reinstatement of the old experience more strongly than the remaining likeness attracts it. If our hold of the essential character of melody is but feeble, and if we are stunned and confounded by the new accompaniments, there is every probability that we shall not be put upon the old mental track made by the same air; in other words, we shall not identify the performance.

A few examples may next be given, to show the workings of this associating power, and the consequences thence arising. The intellectual operations known under the names Classification, Generalization, Induction, and Deduction, all proceed upon the discovery of likeness among things lying wide asunder in space and time, and very often veiled by diversity. Thus, in order to include in one list all the species of the *rose*, botanists have had to trace the characters of the genus through its various members, wherever they occur, and under the greatest differences in every other respect. It takes a keen identifying faculty—that is, a strong natural tendency for the resurrection of like to meet like—to see the resemblance of some of these species to the rest; and it has happened in many departments of knowledge that a class has remained incomplete for a time, purely from the disguised character of some of the individuals. So in the process termed *induction*, by which a general law is arrived at by comparing instances of it everywhere, there must be an attraction of similars, in order to bring together in the mind the collection of particulars that the

induction is based upon. Thus, Newton assembled in his view the various transparent bodies that he had found in the course of his experiments to refract or bend light strongly, his only intellectual instrument for doing so being the bond of likeness operating as a power of recall. Having looked at them in company, he saw that some were remarkable for their weight or specific gravity, and others for containing inflammable ingredients; upon which he raised the general induction, connecting these two properties with high refrangibility. Then, *deductively*, he applied this generalization to the diamond, which refracts light more than any other known substance; and as it is not a heavy material, he extended the other inference to it—namely, that it was made up of some inflammable material, an inference afterwards confirmed by the discovery that it is crystallized carbon. Many of the greatest discoveries in science have turned on the identification of modes of action never before supposed the same, as when Franklin was struck with the resemblance between the atmospheric thunder and lightning and the phenomena of common electricity.

Another wide field for the operation of the same principle, is the region of *illustrative comparisons*, whereby two things widely remote are brought together, in the view either to elucidate one another, or for the sake of ornament and poetic effect. Most men of genius in literature and poetry have contributed original illustrations, similes, metaphors, or comparisons in the course of their compositions. Shakspeare carries the palm in this faculty. The writings of Bacon are remarkably rich in those that serve the purpose of exposition. Science is with him the 'interpretation' of nature: final causes are 'vestal virgins;' they have no fruit: fallacies are 'idols.' Edmund Burke, another master of illustrative comparison, has termed revolutions the 'medicine' of the state, and regular government its 'food.'

If we inquire into the circumstances that render one mind more prolific in new identifications and comparisons than another, apart from difference of original capacity, we must refer mainly to the fact, that the one has had the greater previous familiarity with the class of things thus brought up by the attraction of similarity. A mathematician is the most likely person to bring up comparisons from mathematics; a botanist is prepared to identify plants; a traveled man provides illustrations from foreign countries; a historian, from history. The sailor is notoriously rich in nautical similes and illustrations. When any one not specially versed in a subject is yet prone to draw upon it profusely in the way of comparison, we must then refer to great natural endowment as the sole explanation. But our space does not allow us to dwell further on the subject. (For the full exemplification of both the associating principles and of the complications that they give birth to, see Bain on *The Senses and the Intellect.*)

The earliest known attempt to lay down the laws whereby thought succeeds to thought, is that contained in Aristotle's treatise on Memory. He enumerates three different principles of mental resuscitation—viz., Similarity, Contrariety, and Coadjacency. He has been followed by most other philosophers as regards all the three principles. It is now, however, clearly seen and generally admitted, that contrariety is not an independent associating force. When a thing suggests its opposite or contrary, it will be found that the two have been previously together in the mind, and have therefore acquired a mutual hold by contiguity. Such, for example, is black and white, wet and dry, health and sickness, prosperity and adversity, &c. Contraries, in fact, have a natural inseparability; they are of the class of relatives like father and son, which imply each other necessarily, and have no meaning except by mutual reference. It requires no new principle of our constitution to account for suggestion in this particular case. Moreover, when things are strongly contrasted with one another, as high position before a fall, the mind is greatly impressed with the shock of transition, and so retains a lively recollection of the sequence, having by that means a greater tendency to pass from the one to the other. Thus, then, the enumeration of Aristotle is reduced to the two principles that we have now expounded.

Hobbes recognized the principle of contiguity as the foundation of reminiscence; but the Aristotelian philosopher, Vives, who wrote in the 14th c., was the first to specify in minute detail the various circumstances that determine adhesive bond of recollection. Hume's enumeration is well known to have comprised the three principles of resemblance, contiguity, and causation, which he illustrates as follows: 'A picture naturally leads our thoughts to the original, [resemblance]. The mention of one apartment in a building naturally introduces an inquiry or discourse concerning the others, [contiguity]. And if we think of a wound, we can scarce forbear reflecting on the pain which follows it, [causation].' Causation, however, is merely a case of contiguity; so also we may say of Order in Place, and Order in Time, which have been given as distinct principles.

An attempt has been made to generalize Similarity into Contiguity, but without success. For a full and critical view of the history of these laws, see Sir W. Hamilton's edition of Reid.

ASSOUA'N, ESSUA'N, or ESWA'N, the ancient Syene, a town of Upper Egypt, on the east bank of the Nile, near the borders of Nubia, 110 miles south of Thebes, in lat. 24° 5′ 30″ N., and long. 32° 55′ E. There are few remains existing of the ancient city. Some granite columns present themselves among the ruins, but do not seem of an early date; and part of a temple still remains with a dilapidated portico. Of the town-wall, that part which lies to the south of the old town is still standing; and beyond it is the cemetery of A., where there are numerous tombs, mostly cenotaphs, with Arabic inscriptions. In the neighborhood there are several granite quarries, some of them remarkable for remains of ancient materials that had been cut from the rock, and partially hewn, and for antique inscriptions and tablets, announcing the removal of blocks and the reign of the Egyptian monarch by whose orders they had been quarried. The environs of A. are sterile and sandy; but the palm thrives, and the dates, which are excellent, form the staple of the trade. Some traffic is carried on in senna, henna, charcoal, wicker-baskets, and slaves.

The ancient name Syene is the Coptic word *souan* or *suan*, signifying 'opening;' and the modern one is formed by adding the Arabic *el*, 'the,' softened into *es*, viz., *Es-suan*, 'the opening.' A. and its vicinity are highly interesting to geologists and mineralogists; that kind of granite called syenite receives its name from the town.

ASSU'MPTION, a village and river of Lower Canada. About 8 miles below the village, the river flows into the St. Lawrence, or rather into the Ottawa, nearly opposite to the lower extremity of the island of Montreal.—A., or Asuncion, is also the name of the capital of Paraguay, on the left bank of the river of that name. It has a population of 40,000, and has a trade in hides, tobacco, timber, wax, and Paraguay tea. The city was founded in 1535 by the Spanish, and soon became a place of importance, though not of beauty, being ill built, dirty, and disagreeable. The surrounding country is rich in pastures, and also produces crops of wheat, maize, sugar, tobacco, honey, wax, &c.

ASSU'MPTION OF THE VIRGIN MARY. A festival of the Romish Church. In the 7th c., the idea originated that the soul and body of the Virgin had been carried up to heaven by Christ and his angels. The Roman Catholic Church, therefore, has, ever since that period, kept the 15th of August in memory of Mary's translation into glory; although, from the 4th c. until then, it had kept the same day in memory of her death. Liguori, in his *Glory of Mary*, gives a very minute account of the circumstances of her Assumption.

ASSU'RANCE. See INSURANCE.

ASSURANCE, COMMON, is described by Blackstone as the legal evidence of the translation of property, whereby every man's estate is assured to him, and all controversies, doubts, and difficulties are either prevented or removed. For an account of these common assurances or *conveyances*, as they are generally termed, see DEED and CONVEYANCE.

A'SSYNT, a mountainous, moorish, and very rugged district or parish, 25 miles long, and 15 broad, in south-west Sutherlandshire. It mostly consists of a net-work of rocky heights, interspersed with a multitude (200) of dark, motionless tarns or pools, of various sizes, with some larger lochs, the largest, Loch Assynt, being 10 miles long and 1 broad. The district consists of gneiss, Silurian rocks, and primitive limestone. There are a dozen mountains 3000—3500 feet high. Some of the mountains are covered with white bleached stones and protruding rocks like patches of snow. The mountains have frequently the form of artificial pillars and cairns, and are the remains of an enormous denudation of the nearly horizantal strata of the district. Suil Veinn is a perfect sugar-loaf, towering nearly 2000 feet above a rugged table-land of gneiss hills, 800 to 1000 feet above the sea. In Ardvreck Castle, on a promontory on the east side of Loch A., the famous Marquis of Montrose was confined in 1650.

ASSY'RIA (called Athura on Persian cuneiform inscriptions, and Assura on the Median) was the northermost of the three great countries that occupied the Mesopotamian plain. Bounded on the N. by the Niphates Mountains of Armenia; S. by Susiana and Babylonia; E. by Media; and W., according to some, by the Tigris, but more correctly by the water-shed of the Euphrates, for many Assyrian ruins are found to the west of the Tigris. It was about 280 miles long from north to south, and rather more than 150 broad from east to west. This plain is diversified by mountain-chains on the north and east, and watered by the Tigris and its affluents, between two of which—the Zab rivers—lay the finest part of the country, called Adiabené. As it was the boundary-land between the Semitic people and Iran, it became the scene of important political events. Its extraordinary fertility enabled it to support a large population. The high degree of prosperity and civilization reached by its inhabitants in very early times is attested not only by ancient writers, but by the extensive ruins of mighty cities, by the canals and contrivances for irrigation, and by the many proofs—furnished by re-

cent excavations—of an acquaintance with the art and sciences. The ruins of many cities are grouped around Nineveh; while lower down, the Tigris exhibits an almost unbroken line of ruins from Tekrit to Bagdad. Under the Mohammedans, this fine country is now almost a desert.

History.—Ancient authorities differ widely from each other respecting the rise and progress, the extent and the duration, of the Assyrian empire. Ctesias, a Greek of Cnidus, court-physician to Artaxerxes Mnemon, is quoted by various ancient writers; and his information, though utterly incredible and fabulous, has been followed by most classical historians, and by the whole series of ecclesiastical writers. Many ingenious but futile attempts have been made to reconcile his history with the Scripture narrative. Berosus, a priest of Bel at Babylon, who wrote about 268 B.C., and Herodotus, differ widely from Ctesias, but are confirmed in many important particulars by the Bible, and by the continually increasing evidence derived from cuneiform inscriptions.

In the Bible narrative, we are told that Nineveh was founded by Asshur from Babylon (Gen. x. 11). The latter city, therefore, must have been the capital of a more ancient empire, as Berosus asserts, and recent discoveries go far to prove, though Greek writers maintain the reverse. The next notice we have of A. does not occur till 770 B.C., when Pul, king of A., invaded Palestine, but was bought off by Menahem, king of Israel. Tiglath-pileser, who succeeded Pul (738 B.C.), conquered Syria, and carried off many of the Jews into captivity. Next, Salmanezer (730 B.C.) subdued Israel, which, at the instigation of the Egyptians, had refused to pay tribute. The next is Sennacherib (713 B.C.), who attacked Egypt, and threatened Judah under Hezekiah. He was slain by his two sons, and succeeded by his son Esarhaddon, who was also master of Babylon (2 Chron. xxxiii. 11), which, under Nabonassar, had been independent of Nineveh since 747 B.C. Very little credit is to be attached to the expedition of Holofernes recorded in the book of Judith.

After this, the empire appears to have gradually decayed, until at last, in the reign of Sardanapalus II., or Saracus, a league was formed for its destruction between Nabopolassar, governor of Babylon, and Cyaxares, king of Media, which was strengthened by the marriage of Nebuchadnezzar, son of the former, to Nitocris, daughter of the latter. The war and siege are said to have been interrupted by an invasion of the Scythians, which drew off Cyaxares; but at length Nineveh was taken and destroyed about 606 B.C., or, according to Rawlinson, 625. In the time of Darius Hystaspes, A. rebelled without success in conjunction with Media. In the time of Herodotus, the capital had ceased to exist; and when Xenophon passed it, the very name was forgot, though he testifies to the extent of the deserted city, and asserts the height of the ruined walls to be 150 feet. An inconsiderable town seems to have existed on its ruins in the reign of Claudius; and the last notice we have of Nineveh in the classics is in Tacitus.

According to the Greek legends, the Assyrian empire was founded by Ninus. To this monarch and his consort Semiramis are ascribed expeditions on an incredibly magnificent scale against Bactria, Ethiopia, and India. We are told that Semiramis led an army of 3,000,000 infantry, 500,000 cavalry, and 100,000 chariots, and a fleet of 2000 ships, and was encountered by forces more numerous still, and defeated; that she returned to Nineveh, where she soon afterwards died, and was reckoned among the gods, and was succeeded by her son Ninyas, an effeminate prince. The succeeding part of the history as related by Ctesias is equally false, though that writer managed to make the ancient world give credit to his narrative in preference to that of Herodotus. He gives a list of monarchs from Ninus to Sardanapalus, which is now considered to be a clumsy forgery. According to him, for thirty generations after Ninyas, the kings led a life of luxury and indolence in their palace; the last of them, Sardanapalus, made a vigorous defence against Arbaces, the rebel governor of Media, but finding it impossible to defend Nineveh, he set fire to his palace, and burnt himself with all his treasures; this event took place 1306 years after Ninus. Now, the above account represents Nineveh to have perished nearly three centuries before the real date, which was about 605 B.C., and is utterly incompatible with Scripture. Herodotus assigns to the empire a duration of 520 years, and Berosus of 526. In order to reconcile these conflicting accounts, historians have supposed that Nineveh was twice destroyed, but this supposition is now generally rejected. However, that Nineveh was actually destroyed by fire, is proved from the condition of the slabs and statues found in its ruins, which show the action of intense heat.

A. became a Median province, 605 B.C., and afterwards, in conjunction with Babylonia, formed one of the satrapies of the Persian empire. In 331 B.C., at Gaugamela, near Arbela, in A., Alexander defeated Darius Codomannus. In 312 B.C., A. became part of the kingdom of the Seleucidæ, whose capital was Seleucia, on the Tigris. It was afterwards subject to the Parthian kings, whose capital was Ctesiphon, and was more than once temporarily in possession of the Romans. When the Persian monarchy of the Sassanides was destroyed by the successors of Mohammed, A. was subject to the califs. Their seat was Bagdad from 762 A.D. till 1258. It has been under the Turks from 1638, at which period it was wrested from the Persians.

We shall now proceed to mention a few historical points that have been satisfactorily ascertained from the cuneiform inscriptions. For these we are indebted to Rawlinson's *Herodotus*.

It has not been ascertained when A. first became independent of Babylon (q. v.). The seat of government was first at Asshur (now *Kileh-Shergat*), on the right bank of the Tigris, 60 miles south of the later capital, Nineveh. At this place have been found the bricks and fragments of vases bearing the names of the earliest known Assyrian kings, for Ninus and Semiramis are to be considered as mere inventions of Greek writers. The earliest known king is *Bel-lush*, one of a series of four. These reigns probably occupy from 1273 to 1200 B.C. Of the next series of six, the names of five are recorded on the famous Kileh-Shergat cylinder, the earliest purely historical document as yet discovered in Mesopotamia.

Tiglathi-nin, the last of the Kileh-Shergat series, was succeeded by his son, Asshur-dani-pal, the warlike Sardanapalus I. of the Greeks. He made Calah, the modern *Nimrud*, his capital, lying 40 miles further north, on the left bank of the Tigris. His annals are very complete. Among other conquests, he mentions that he had taken tribute from Tyre, Sidon, and other Phœnician cities. He was the founder of the north-west palace at Nimrud, which, next to that of Sennacherib at Koyunjik, is the largest and most magnificent of all the Assyrian edifices. The greater portion of the sculptures now in the British Museum are from this building.

Sardanapalus I. was succeeded by his son Shalmanubar, whose deeds are briefly recorded on the black obelisk now in the British Museum, the full account being apparently reserved for the colossal bulls, which seem to have been the usual dedication after a victory. Of his campaigns, the most interesting to us are those in which he defeated Benhadad of Damascus, and his murderer and successor Hazael. According to his own account, Shalmanubar defeated Hazael, killing 16,000 of his fighting-men, and capturing more than 1100 chariots (884 B.C.). The obelisk also records the tribute paid by *Yahua, son of Khumri*, i. e., Jehu, son of Omri, king of Israel. Now Jehu was son of Jehoshaphat, and had done his utmost to extirpate the family of Omri; but probably Jehu, like other usurpers, was anxious to identify himself with the family which he had dispossessed, and of course the Assyrians accepted the title he gave himself.

Iva-lush, probably the Pul of the Scriptures, is recorded on a pavement-slab from Nimrud to have received tribute from Samaria, Tyre, Damascus, Idumæa, and Palestine, which assertion agrees with the account given (2 Kings xv.) of the 1000 talents paid by Menahem. With this king ends the first dynasty, in which we have 18 monarchs from Bel-lush to Iva-lush (1273—747 B.C.).

The later Assyrian empire begins with Tiglathpileser II. 747 B.C.), and ends with the destruction of Nineveh (625 B.C.). It is plain from Scripture that the empire was in a flourishing condition during the reigns of those kings who came in contact with the Hebrews, and this account exactly accords with the monuments, but contradicts Herodotus. Probably, on the accession of Tiglathpileser II., Babylon had revolted, and this partial rebellion had reached Herodotus in an exaggerated form. The annals of this prince exist only in a very fragmentary state. The name of his successor, Shalmaneser, has not yet been found on the monuments. The capture of Samaria is usually ascribed to this prince, but his successor, Sargon, expressly asserts that Samaria was taken by himself in his first year. Sargon's palace at *Khorsabad*, near Nineveh, furnished the valuable series of monuments now in the Louvre. Sargon was succeeded by his son Sennacherib. He fixed the seat of government at Nineveh, and employed the forced labor of 360,000 men to repair the great palace. Later in his reign, he built a new and more magnificent edifice, which he decorated with sculptures representing his various exploits. This is the palace excavated by Layard. It contained at least three spacious halls—one of them 150 feet by 125, and two long galleries, one of 200, the other of 185 feet, besides innumerable chambers. The excavated portion covers about eight acres. The annals of Sennacherib extend only to his eighth year. He relates at length his successful attack upon Babylon, his invasion of Judæa, the submission of Hezekiah, and his deportation of 200,000 Jews. This expedition is not to be confounded with the second invasion, in which he failed ignominiously, and which is not recorded on his monuments. His assassination very shortly after his return to Nineveh, after his second expedition, readily accounts for this silence.

Esarhaddon, his son and successor, held his court sometimes at Nineveh, sometimes at Babylon. Bricks bearing his name have been discovered at *Hillah*, and a tablet at Babylon dated in his reign. This explains how Manasseh was brought to him at Babylon, when he was led captive from Jerusalem (2 Chron. xxxiii.).

No record has as yet been discovered of this expedition against Palestine. His edifices are not inferior to those of his predecessors. He employed Greek and Phœnician artists, and to them probably we owe the beautiful bas-reliefs that adorn the edifices of his erection. The decline of the empire probably commenced with Asshur-banipal II. The arts of peace flourished, while the military vigor of the nation declined.

The sculptures of this reign are decidedly superior to the earlier in spirit, delicacy, and freedom from conventionality. The slabs show that hunting, not war, was this king's favorite pursuit. He was succeeded by his son Asshur-emit-ili, the last king of whom any records have yet been discovered. It is uncertain whether Nineveh was destroyed under him, or under a successor, the Saracus of Berosus, the effeminate Sardanapalus of the Greeks. The character usually given of this last king, as a debauchee throwing off his indolent habits, and after performing prodigies of valor, perishing by a glorious death, rather than surrender, is derived solely from Ctesias. All we distinctly know is that, finding himself betrayed to the Median king by Nabopolassar, governor of Babylon, he set fire to his palace and perished in the flames.

We may note a singularly important cuneiform discovery made by Mr. George Smith of the British Museum, and the substance of which was made public at a meeting of the Biblical Archæological Society in December 1872. While engaged on an examination of the collection of Assyrian tablets in the British Museum, Mr. Smith lighted upon a curious series of legends, including a copy of the story of the Flood. On discovering these documents, which were much mutilated, he searched over all the collections of fragments of inscriptions, consisting of several thousands of smaller pieces, and ultimately recovered 80 fragments of these legends. The tablets were originally at least 12 in number, forming one story or set of legends, the account of the Flood being on the 11th tablet. Of the inscription describing the Flood, there are fragments of three copies, containing duplicate texts. These texts belong to the time of Asshur-bani-pal (*circa* 660 B.C.), and were found in the library of that monarch in the palace at Nineveh. The original text, according to the statements on the tablets, belonged to the city of Erech, and appears to have been either written in or translated into the Semetic Babylonian at a very early period. Mr. Smith is of opinion that its composition cannot be placed later than the 17th c. B.C., while it may be much older. The Assyrian story of the Deluge is both like and unlike the Scripture narrative. The Flood is sent as a punishment for sin; the builder of the ark is called Sisit (the *Xisuthrus* of the Græco-Chaldæan Berosus); he gathers into the vessel all his male and female servants, all the sons of the army, and all the beasts of the field; the storm of rain lasts only six days, and yet submerges the whole earth; all life is destroyed; Sisit sends forth a dove which can find no resting-place, and returns; then a swallow, which is also forced to return; then a raven, which does not come back. The ark rests on a mountain, the animals are liberated, an altar is built by the grateful patriarch, and Bel, the Great God, makes a 'covenant' with Sisit.

The minuter details of this Assyrian legend diverge greatly from the Hebrew account, and lead to the conclusion that in each we have an independent tradition of some great natural catastrophe in the early ages of human history. Mr. Smith notices that the Biblical narrative is the version of an inland people; the name of the ark in Genesis means a chest or box, and not a ship; there is no notice of the sea or of launching, no pilots are spoken of, no navigation is mentioned. The inscription, on the other hand, belongs to a maritime people; the ark is called a ship, the ship is launched into the sea, trial is made of it, and it is given in charge to a pilot. This seems to point to the Persian Gulf as the birthplace of the old legend. Mr. Smith returned in 1874 from Chaldæa, and gave an account of his valuable discoveries in a work entitled *Assyrian Discoveries* (1875). Believing that many more legends and histories lay beneath the ruins of the ancient cities of Chaldæa, he was on his way to prosecute his third exploration, when he succumbed to the hardships and privations of the task, and died at Aleppo in August 1876.

Government.—The government was despotic, as suited the character of the people. The empire was a mere congeries of kingdoms bound to the supreme authority only by certain obligations of paying tribute, giving presents, and showing due respect. Each kingdom retained its own rulers, laws, and religion, although we do find some attempts to rule by satraps and collectors of tribute. Tigtath-pileser also boasts, in an inscription, of having punished and crucified the Chaldæans who refused to worship his gods. In consequence of this imperfect organization, the empire was exposed to frequent revolts of the subject nations, when such opportunities offered as a disputed succession, or want of energy in the ruling prince. Then the labor of conquest had to begin anew, and it was sought to diminish the danger of the central power by inflicting severe punishments on the rebels. The history of the Jews has made us familiar with one of these devices —viz., the wholesale deportation of the inhabitants of the offending district. It may be readily believed that such an empire, though imposing from the magnificence and wealth of the capital, yet, from the impoverishment and weakness of the subject states, was continually liable to fall to pieces, and was ill fitted to resist an attack from without. That A. did actually last for five centuries, was owing to a long succession of warlike princes, and to the energy of the population.

Religion.—The religion of the Assyrians was nearly identical with that of the Babylonians. It was a gross polytheism, their gods being thousands in number, and each village having its own particular deity. From thousands of theological tablets now in the British Museum, it is known that each divinity had many names, and some of them as many as fifty titles besides. Again, many deities that are prominent in the Babylonian pantheon are either unknown or occupy a subordinate position in the Assyrian. Besides, the same gods did not remain equally popular throughout. The supreme god was Asshur, probably the deified patriarch. His worship was confined to Assyria. He is generally associated in the inscriptions with *Nin* and *Nergal* (2 Kings xvii. 30), who are represented by the man-bull and the man-lion. The winged globe, so often seen in the sculptures, from which a figure with a horned helmet shoots his arrows, is supposed to be the emblem of Asshur. Next in rank is the governing triad, answering to the Pluto, Jupiter, and Neptune of the classical mythology; the next group corresponds to Æther, the sun and the moon; then five inferior deities, representing the five planets. Each god is associated with a goddess. Mylitta, or Beltis, is the 'queen.' The male and female powers of the sun are represented in the Scripture phrase, 'Adrammelech, and Anamelech, gods of Sepharvaim'—that is, of Sippara, a town a few miles above Babylon. *Bel-merodach* was originally an inferior deity, son of Héa, the fish-god; but under the later Babylonians, we find him monopolizing the greater part of the homage which used previously to be divided among several. Nisroch (2 Kings xix. 37) has not been yet ascertained. Nebo (Isaiah xlvi.) is one of the five planetary gods, and corresponds to Mercury. The systems of notation, divisions of time, the planets and stars, animals and metals, divination and astrology, were all more or less closely connected with theology.

Ethnology.—The Assyrians have been assigned by some ethnologists to the Aryan race, but it is now generally acknowledged that they were a branch of the Semitic family of nations, and therefore were members of the same grand division of the human race as the Syrians, the Phœnicians with their colonies, the Jews, and the modern Arabians. In the 20th c. B.C., Semitism, as a distinct ethnic element, appears to have first developed itself. The original races, variously called Scythic, Turanian, or Tatar, appear to have once been spread over the whole space from the Caucasus to the Indian Ocean, and from the Mediterranean to the mouths of the Ganges. Their type of language has continued to our time to exist in four-fifths of Asia, and in some of the remoter corners of Europe, as among the Finns, Lapps, Turks, and Hungarians. In Mesopotamia, and in the valley of the Nile, where natural advantages induced men early to form settled communities, the rude and inartificial type of language was developed into Hamitism, and afterwards still further improved into Semitism. Then seems to have commenced a series of migrations. Asshur went forth probably at this time from Babylon to A., Abraham and his followers to Palestine, the Joktanian Arabs to Arabia. From these seats, Semitism was afterwards carried to Cyprus, to the southern seaboard countries of Asia Minor, to Carthage, Sicily, Spain, and Western Africa.

The traditions of A. indicate a very early connection between Ethiopia, Arabia, and the cities on the Euphrates. Mesopotamia undoubtedly contained a large proportion of Arabians, and this accounts for the fact that Herodotus styles Sennacherib king of the Arabians and Assyrians. The Chaldæans, colonies of whom were planted in Armenia by the Assyrian kings, are supposed by some to have been a foreign tribe, which had immigrated from the north, and become a priestly caste. But the *Akkad* race, of which the Chaldæan is a tribe, is with more probability thought to have inhabited Babylonia from the remotest times, and by it the earliest civilization in Mesopotamia was originated. Probably the art of picture-writing was possessed by the Hamitic tribes who lived in the valley of the Nile, and passed eastward to the Euphrates. The *Akkad* language appears to have been formed before Semitism attained its peculiar development and organization. Long after Semitism had become predominant in Mesopotamia, the *Akkad* or Chaldæan alphabet continued to be the scientific language in which all the tablets relating to mythology, astronomy, or science, as well as most historical and official records, were written. This alphabet was adopted with certain modifications by the Semitic tribes, which became predominant in Assyria. The cuneiform characters were elaborated from the forms of natural objects, and gradually became phonetic from being symbolic, and for convenience of engraving, assumed the form of arrow-heads, instead of the rounded and flowing forms which are introduced by the use of the plastic materials. After the Aryan race had spread more ex-

tensively in Western Asia, the Persian monarchs, when they wished to make any communication to their subjects generally intelligible, found it necessary to publish it in three languages, belonging to the principle divisions of human speech; hence the trilingual inscriptions of Behistun, &c., which consist of an Indo-European, a Tatar, and a Semitic column. It is still necessary in many places to employ three tongues, representatives of the three families, Persian, Turkish, and Arabic.—See Lenormant, *La Langue Primitive de la Chaldée.*

Antiquities, Civilization, &c.—The excavations carried on by M. Botta, French consul at Mosul, and by Layard near Mosul, Khorsabad, and Koyunjik, have led, as we have partly seen, to very interesting discoveries. The palaces and buildings that have been laid open are full of sculptures, all covered with inscriptions, in deciphering which considerable progress has been made, and more may be expected. Among the most remarkable monuments now in the British Museum are two winged, human-headed lions, 12 feet high, and as many in length; winged human-headed bulls of similar dimensions with the lions; winged sphinxes; and the famous obelisk of black marble, sculptured on the four sides. On

Lion-hunt.
[From the North-west Palace at Nimrud.]

this last are represented a victory, a prisoner prostrate at the feet of the king, and foreign people offering tribute, and leading such animals as the Bactrian camel, elephant, lion, and rhinoceros—animals found only in lands far east of the Tigris. The bas-reliefs are very numerous, exhibiting especially war and hunting. The march, the onset, the pursuit, the siege, the passage of rivers, the submission and treatment of captives, secretaries noting the number of heads taken in battle, and the amount of spoil; the chase of the lion, of the antelope, of the wild ass, and other animals—such are the favorite subjects of the Assyrian sculptor. Nor are they treated in the conventional style of Egypt, but in the manner which, for grace, spirit, correctness and delicacy of execution, excels everything else known in Asiatic art. The artists sometimes follow modes of representation different from ours; for instance, a bull has five legs given him, in order that from all points of view he may be seen with four; a ladder stands edgeways against a wall, to show it is not a pole. But a truthful impression is always aimed at, and it is this that gives these sculptures their value. The labor bestowed on the careful finish of a priest's dress, and in the tasteful decoration of an article of furniture, proves them to be the work of an ingenious and painstaking people. From the bas-reliefs we gain but little information respecting the private life of the Assyrians. There are a few which represent the foddering of cattle, women riding on mules, &c.

It is natural to expect that Nineveh—a wealthy and luxurious city—imported many of the products of other countries, yet the manufactured goods would mainly be of home production. The jars, bronzes, glass bottles, carved ornaments in ivory and mother-of-pearl, engraved gems, bells, earrings, arms, utensils, are of excellent workmanship. The ornaments especially are in good taste, and evince no inconsiderable skill in the working of metals. Transparent glass was not unknown, nor the use of the lens as a magnifying agent. The Assyrians knew the principle of the arch, the use of the lever and roller, and the construction of aqueducts and drains. In the arts of peace, they appear to have been not inferior to any ancient nation; while their conquests, and the long duration of their empire, suffice to prove their capacity for war.—See Rawlinson's *Five Great Monarchies of the Ancient World, Chaldæa, Assyria, Babylonia, Media, and Persia*; George Smith's *Assyrian Discoveries* (1875), his *Assyria* (S.P.C.K.), and his *Babylonia* (new ed. by Sayce); and the article *Babylonia*, in the *Ency. Brit.*, 9th ed.

A'STACUS. See Crayfish and Lobsters.

ASTA'RTÉ (styled Ashtaroth in the Old Testament), the name of the chief female deity of the Phœnicians, Carthaginians, and Syrians (Syria Dea), also worshiped by the Jews in times when idolatry prevailed. A. was the original from which the Greeks borrowed their Aphrodite (q. v.). As Baal was god of the sun, A. was goddess of the moon. Her chief temples were in Tyre and Sidon. According to ancient accounts, her worship was of a licentious character. The oldest known image of her—that in Paphos—represented her simply under the form of a white conical stone. In Canaan and Phœnicia she was subsequently typified under the form of a cow, or sometimes she had only a cow's or bull's head; still later, her emblem became a star; and finally she was conceived of as the 'queen of heaven,' sitting on a lion, her head surrounded with rays, and in the one hand a thunderbolt, in the other a sceptre.

ASTA'RTÉ, a genus of Mollusca, with bivalve shells, the type of a family *Astartidæ*, very closely allied to the *Veneridæ* or Venus family. It is interesting chiefly with reference to geologic changes and the history of life and organization, because only a few species seem now to exist, and these limited to the North Atlantic and Aertic Oceans, whereas the fossil species are extremely numerous, commencing with the *lias* period, and distributed over the whole world. The Astartidæ may be regarded as having given place to the Veneridæ, which commenced with the oolitic period, and are among the most abundant bivalve mollusca of the present time.

A-STAY', the position of an anchor when, during heaving, the cable forms an angle with the surface of the water in line with the stays of the ship.

A'STER (Gr. a star, from the form of the flowers), a genus of plants of the natural order *Compositæ*, which Lindley has therefore chosen to call *Asteraceæ*. The ray and the disk are of different colors. The genus contains a great number of species, both herbaceous and shrubby, which have been arranged into six or seven groups, regarded by many as distinct genera. One species only, *A. Tripolium* or *Tripolium vulgare*, the Sea Starwort, is a native of Britain. It is common in salt marshes. A number of perennial species are in cultivation as garden-flowers, of which the New-England A. (*A. Novæ Angliæ*) and the Michaelmas Daisy (*A. Tradescanti*), both natives of North America, are perhaps the most common, and, with some of the other species, are prized as among the comparatively few flowers to be seen at that dull season when autumn is giving place to winter. But the best known and most valued of all the asters is the China A. (*A. Chinensis*), a summer annual, of which many varieties are in cultivation, and new ones are continually introduced. It was brought from China in the earlier part of the 18th c. The varieties exhibit great diversities of form and color. The plant delights in a rich free soil. In the northern parts of Britain, the seed is generally sown in April in a hot-bed, or in pots under a frame, and the young asters are planted out in the open air in May. They flower from July to the end of autumn, and contribute much to the liveliness of the flower-garden. —*A. argophyllus*, or *Haxtonia argophylla*, is a shrub, a native of Van Diemen's Land, smelling strongly of musk. The whole plant has a whitish aspect. It grows to a considerable size, but succeeds in the open air only in the very south of England.

ASTERABA'D. See Astrabad.

ASTE'RIAS and ASTERI'ADÆ. See Star-fish.

A'STERISK (Gr. a little star), a sign or symbol (*), used in writing or printing either as a reference to a note at the bottom or on the margin of the page. The obelisk (q. v.), or dagger (†), and many other marks are similarly employed; but when there are several references on the same page, it is now common to use the numerals 1, 2, 3, &c. The A. and other similar signs may have any arbitrary meaning assigned to them at the will of the writer, an explanation being previously given what the signification is to be. The Greek grammarians, or critics, used the A. to mark a passage that had been unjustly suspected, but was to be held as genuine, or a passage in any way remarkable; the obelisk, again, marked an interpolated or an objectionable word or passage.

ASTEROI'DS. See Planetoids.

ASTEROPHY'LLITES (Gr. *aster*, a star, and *phyllon*, a leaf), a generic name, under which are included many of the most abundant fossil plants of the coal-measures. The leaves are arranged in a stellated manner around the stems or branches. The A. are ranked among the exogenous or dicotyledonous fossils, but they are of doubtful affinity, and the exact determination of their place in the system has not yet been accomplished.

A'STHMA is a disease characterized by the breathing, previously natural, becoming difficult, and accompanied by wheezing and a distressing sense of tightness in the chest. A. generally appears at first after some inflammatory affection of the respiratory mucous membrane, and more especially in those who have led dissipated lives. In others, it is clearly hereditary, and frequently affects several members of the same family. A. may be habitual, or may occur in spasms, generally preceded by some premonitory symptoms, as in some by great drowsiness; others, says Dr. Hyde Salter, 'know by extreme wakefulness and unusual mental activity and buoyancy of spirits; and I knew one case in which an attack of ophthalmia occurred.'

The spasms may occur at any hour; but in nineteen out of twenty cases they waken the patient from sleep between three and four in the morning. The horizontal position facilitating the

flow of blood to the right side of the heart, and therefore to the lungs, the disadvantage at which the muscles of respiration are placed, and the greater readiness with which sources of irritation act during sleep, explain this fact.

Persons subject to A. scarcely dare fall asleep after any imprudence of diet; if they continue awake till their supper is fairly digested, and the stomach empty, they may go to sleep fearlessly, and have a good night's rest. The asthmatic paroxysm is thus described by Dr. Salter, the latest authority on this common but terrible disease: 'The patient goes to bed and sleeps two or three hours, becomes distressed in his breathing, and begins to wheeze, so as to waken those in adjoining rooms. He awakes, changing his position, falls asleep again and again, and the miserable fight between A. and sleep may go on, till the increased suffering does not allow the patient longer to forget himself for a moment; he becomes wide awake, sits up in bed, throws himself forward, plants his elbows on his knees, and with fixed head and elevated shoulders, labors for breath like a dying man.'

If the spasm is protracted, the oxygenation of his blood is imperfectly performed, owing to the scanty supply of air, and his extremities get cold and blue, but at the same time the violent muscular efforts at respiration cover him with sweat. The pulse is always small. The muscles of the back and neck attached to the ribs, act as extraordinary muscles of respiration. The chest enlarges during the paroxysm, but in it there is almost perfect stagnation of air. The respiratory tubes affected are very small, and the parts at which they are so constricted are constantly shifting.

The remedies for A. are numerous, but not to be depended on. They consist in paying attention to the digestive system, and in anti-spasmodics, either taken internally or by inhalation.

A'STI (*Asta Pompeia*), a city of Piedmont, in the government of Alessandria, lies on the left bank of the Tanaro, on the railway from Turin to Genoa, 26½ miles E.S.E. of Turin. Pop. (1881) 17,340. It is a large town, with walls considerably dilapidated, and the streets generally very narrow and irregular. It is the seat of a bishop, and has a court of justice and a royal college. There is carried on a considerable trade in silk and woollen fabrics, leather, and hats, as well as in wines and agricultural produce. A. is a town of high antiquity, having been famous for its pottery before its capture by the Gauls in 400 B.C. On the occasion of its being again taken and destroyed in an irruption of the Gauls, it was rebuilt by Pompey, and received the name of Asta Pompeia. In the middle ages, A. was one of the most powerful republics of Upper Italy. It was captured and burnt by the Emperor Frederick I. in 1155; and after a series of vicissitudes, it came into the possession of the Visconti of Naples, by whom it was ceded to the French, in whose hands it remained till the middle of the 16th c., when it came into the possession of the Dukes of Savoy, as it still remains. Alfieri was born here, 1749.—The district of Asti, one of the six subdivisions of the government of Alessandria, is bounded on the W. and N. by the province of Turin, S. by Alba, S.E. by Alessandria Proper, and N.E. by the province of Casale. The surface is hilly and picturesque. The soil rests upon limestone abounding in fossils, and is fertile, producing corn, fruit, and wine. It is celebrated for a fine white wine resembling champagne, called *vino d'Asti*. Silk is one of its most important products.

ASTON, LUISE, a German authoress of some note, but principally known for her zeal in behalf of the 'rights of women.' She was born about 1820, in the vicinity of Halberstadt, and at an early age was married to a wealthy English manufacturer. Their union was not happy; perhaps her peculiar views of society and of the proper position of her sex contributed to the estrangement of their sympathies. After separating from her husband, she attracted public attention, especially in Berlin, by appearing on the streets in man's dress, smoking cigars, &c. This conduct brought her into several collisions with the police, and she was twice forced to leave the city. During the Slesvig-Holstein war, however, she found a nobler sphere for her woman's nature, and displayed the greatest heroism and self-sacrificing devotion as an hospital nurse. She has written various books, the principal are—*Wild Roses* (1846), and *Frieschärler-Reminiscenzen* (1849), each of which contains 12 lyrical poems, none very able; *Meine Emancipation, Verweisung, und Rechtfertigung* (1846); a novel, *Aus dem Leben einer Frau* (1847); *Revolution und Contre-revolution* (1849). In 1851, she married Dr. Meier of Bremen.

ASTOR, JOHN JACOB, an enterprising merchant, founder of the 'American Fur Company,' was born in a village near Heidelberg, in Germany, 1763. After spending some years in London, he sailed to America in 1783, and soon invested his small capital in furs. By economy and industry, he so increased his means that after six years he had acquired a fortune of 200,000 dollars. Although the increasing influence of the English Fur Companies in North America was unfavorable to his plans, he now ventured to fit out two expeditions to the Oregon territory—one by land, and one by sea—the purpose of which was to open up a regular commercial intercourse with the natives. After many mishaps, his object was achieved in 1811, and the fur-trading station of Astoria (q. v.) was established; but the war of 1812 stopped its prosperity for a time. From this period A.'s commercial connections extended over the entire globe, and his ships were found in every sea. He died in 1848, leaving property amounting to 30,000,000 dollars. He left a legacy of 350,000 dollars for the establishment of a public library in New York. (Washington Irving's *Astoria*.)—His wealth was mainly inherited by his son, WILLIAM, who continued to augment it till his death in 1875, when he is said to have left £10,000,000. He added £40,000 to his father's bequest for a public library. He was known as the 'landlord of New York' from the extent of his property in that city. See *Chambers's Journal*, No. 632, fourth series.

ASTO'RGA, EMANUELE D', a musician, celebrated partly on account of his personal history, was born in Sicily in 1680. His father, a baron of Sicily, in the contest respecting the annexation of the island to Spain, was delivered over to the enemy by his own mercenary soldiers, and was executed in 1701; while his wife and son (Emanuele) were barbarously compelled to witness the tragedy. The wife died on the spot, and the son fell into a state of unconsciousness. Afterwards, through the interest of the Spanish Princess Ursini, he was educated in a monastery at Astorga in Leon, from which he derived his name. Here he especially devoted himself to music, and made such progress that he was invited to the court of the Duke of Parma. His patron, erroneously suspecting that his daughter was receiving his addresses, sent him away to the court of the Emperor Leopold. After Leopold's death, A. traveled through Europe, and is supposed to have died in a Bohemian monastery. His best work is the *Stabat Mater*, a masterly composition, of which the original score is preserved in Oxford.

ASTO'RIA, originally a fur-trading station on the left bank of the Columbia, near the Pacific, named from its founder, John Jacob Astor. It demands notice here chiefly as having been a main point in the American claim to the Oregon Territory (q. v.).

ASTRABA'D, a town in the north of Persia, capital of the province of the same name, is built at the foot of the northern slope of the Elbruz Mountains, on a small river which runs into A. Bay, at the south-east extremity of the Caspian, from which it is distant 20 miles. Lat. 36° 50′ N., long. 54° 31′ E. It was long the residence of the Kajar princes, from whom the present Shah of Persia is descended; but on account of its situation in a remote corner of the kingdom, it was not advanced to the dignity of the metropolis of Persian Teheran, at the foot of the chain of mountains which separates Iran from Mazanderan, became the capital; and since then the importance of A. has considerably sunk. It is still enclosed by a dry ditch and mud-wall, 3 miles in circumference, but its great towers have disappeared. Trade has increased since the establishment of a Russian consulate. The causeway constructed by Shah Abbas is kept in good repair, and connects A. with Khorassan, Afghanistan, &c. Pop. 6000 to 8000. The town is a very unhealthy residence during the summer rains.

ASTRÆ'A, daughter of Zeus and Themis, or of Astræus and Aurora, was the goddess of justice, the last of all the goddesses who left the earth when the golden age had passed away and men began to forge weapons and perpetrate acts of violence. She took her place in heaven as the constellation Virgo in the zodiac.—Greek art usually represented her with a pair of balances in her hand, and a crown of stars on her head.—A. is also the name of one of the Planetoids (q. v.).

ASTRÆ'A. See CORAL and MADREPORE.

ASTRA'GALUS, a bone of the foot, which by a convex upper surface and smooth sides, forms, with leg-bones, the hinge of the ankle-joint. Its lower surface is concave, and rests on the *os calcis*, or heel-bone, to which it is attached by a strong ligament. In front, it has a round head, which rests in the concavity of the scaphoid, another bone of the tarsus, and upon an elastic ligament, its pressure upon which gives in a great measure the necessary elasticity to the foot: it is at this joint that inversion and eversion of the foot take place. It will be seen that the A. is a bone of great importance to the member, as it supports the weight of the body in standing, and enters into most of the movements of the foot. It is occasionally displaced, generally in front of the outer ankle.

ASTRA'GALUS, a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*. The pod is more or less perfectly 2-celled. The leaves are pinnate, with a terminal leaflet. The species are numerous, natives chiefly of the temperate and colder parts of the Old World, shrubby, and often spiny, or unarmed and herbaceous. A number of the shrubby species yield the substance called Tragacanth (q. v.), or Gum Tragacanth.—*A. Bœticus*, an

annual, native of the south of Europe, with upright branching stems, is cultivated in Hungary, Germany, and other parts of Europe, for its seeds, which are roasted, ground, and used as a substitute for coffee, or mixed with it to improve its flavor.—The Sweet Milk-vetch, or Wild Liquorice (*A. glycyphyllos*), a native of Britain and other parts of Europe, perennial, with long and very thick roots, which penetrate deep into the soil, and almost prostrate stems, three feet in length, is occasionally cultivated for food of cattle, yielding a very abundant herbage. Cattle are not fond of it at first, but are said to become fond of it after being accustomed to it for some time. The roots have somewhat of the sweetness of liquorice.

Astragalus Boëticus.

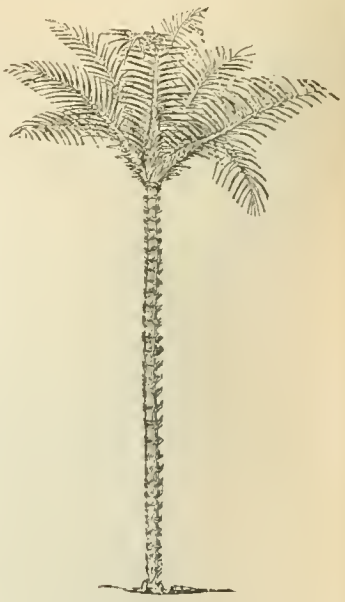
ASTRAKHA'N, originally a province of the Mogul empire, but united with the Russian empire in 1554. At present, A. forms one of the south-east governments of Russia in Europe, and is bounded on the S. by the Caspian Sea and the Caucasus; on the W., by the country of the Don Cossacks; on the N., by the government of Saratov; and on the E., by Orenburg. Area, 50,000 sq. m.; pop. (1880) 688,750. The province of A. is almost entirely a barren waste, the only fertile portions being the banks of the Volga, which divides the province into two equal parts. Salt is procured from the marshes of the steppes; considerable numbers of cattle are reared, and the annual value of the sturgeon-fishing in the Volga is as much as 2,500,000 rubles (about £400,000). The climate varies from 70° F. in summer, to 13° in winter. The population is composed of diverse elements—Russian, Tatar, Georgian, Armenian, Bokharese, Persian, and Hindu.

ASTRAKHA'N, the chief town of the government of the same name, is situated on an island of the Volga, and near the Caspian Sea, in lat. 46° 21′ N., and long. 48° 4′ E. It is the seat of a Greek archbishop and an Armenian bishop; has thirty-seven Greek, two Roman Catholic, one Protestant, and two Armenian churches; fifteen mosques, an Indian temple, a gymnasium, a seminary for priests, a botanical garden, and many manufactories. Pop. (1880) 57,700. The houses are mostly of wood, and irregularly built. The fisheries in the Volga supply occupation to great numbers of the inhabitants of A. and its neighborhood. The principal exports are leather, linen and woollen goods, salted sturgeon, caviar and isinglass. Imports consist chiefly of gold-embroidered silken goods from Persia, silk stuffs, woollen goods, rice, rhubarb, raw silk, drugs, &c. From July to October, the neighborhood of A. is frequently visited by swarms of locusts.—A. is the name of a fine description of fur, the produce of a variety of sheep found in Bokhara, Persia, and Syria.

A'STRAL SPI'RITS. The star (Gr. *astron*) and fire worship of the eastern religions rested on the doctrine, that every heavenly body is animated by a pervading spirit, forming, as it were, its soul; and this doctrine passed into the religio-physical theories of the Greeks and Jews, and even into the Christian world. In the demonology or spirit-systems of Christendom in the middle ages, A. S. are conceived of sometimes as fallen angels, sometimes as souls of departed men, sometimes as spirits originating in fire, and hovering between heaven, earth, and hell, without belonging to any one of these provinces. Their intercourse with men and their influence were variously represented, according to the notion formed of their nature. As the belief in spirits and witchcraft reached its height, in the 15th c., the demonologists, or special students of this subject, systematized the strange fancies of that wild period; and A. S. were made to occupy the first rank among evil or demoniacal spirits. Paracelsus, however, and others attributed to every human being an astral spirit, or sidereal element, in which the human soul, or spirit proper, is thought to inhere, and which lives for a time after the person dies.

ASTRI'NGENTS, medicines employed for the purpose of contracting the animal fibres and canals, so as to check fluxes, hæmorrhage, and diarrhœa. The drugs most commonly used as A. are alum, catechu, oak-galls, rhatany-root, &c. Many of the vegetable A. owe that property, in whole or in great part, to tannin. A severe degree of cold is a powerful astringent.

ASTROCA'RYUM (from the Gr. *astron*, a star, and *karyon*, a nut), a genus of Palms, of which about sixteen species are known, natives of tropical America, remarkable for the abundance of acute and formidable spines—in some cases, a foot long—with which almost every part—stem, leaves, spathe, and fruit-stalk—is armed. They have beautiful pinnated leaves; some of them are lofty, others are of very moderate height, as 8—15 feet, whilst some are almost or altogether stemless. The fruit of some species is eatable—a juicy pulp covering a stony seed—as the fruit of the MURUMURU palm (*A. Murumuru*), the pulp of which is said to resemble a melon in flavor, has a sort of musky odor, and is highly esteemed. It is a palm of only about 8—12 feet high, abundant about Pará and elsewhere on the Amazon. Cattle roam the forests in quest of its fruit, and swine fatten on the seed, which they crush with their teeth, although to break it requires a smart blow of a hammer, and in hardness it almost resembles vegetable ivory. Another edible fruit is that of the TUCUMA palm (*A. Tucuma*), abundant in the same regions. These fruits are about an inch long, the Murumurú ovate, the Tucumá almost globular. The Tucumá palm is 30—40 feet high, the stem encircled with narrow rings of black spines, which are disposed with beautiful regularity. The TUCUM palm (*A. vulgare*), a species quite distinct from the Tucumá, and more lofty, is of great importance to the Indians, and in places where it is not indigenous, is cultivated with care for the sake of the epidermis of its unopened leaves, of which they make cordage, very useful for bow-strings, fishing nets, &c. The fibre is at once fine, strong, and durable, and may yet perhaps become important as an article of commerce. Beautiful hammocks are made of tucum thread, which are sold at about £3 each, or if ornamented with feather-work borders, at twice that sum. Martius, in his great work on Palms, has, by mistake, represented the Tucumá instead of the Tucum palm as yielding this fibre. See Wallace, *Palm Trees of the Amazon*. Lond. 1853. The fibre is obtained by cutting down the terminal bud or column of unopened leaves which rises from the center of the crown of foliage. The tender leaflets are then carefully stripped of their epidermis, in pale, ribbon-like pellicles which shrivel up almost to a thread. These are tied in bundles, and dried, and are afterwards twisted into thread, or made into thicker cords, by mere rolling and manipulation.



Tucúm Palm (*A. vulgare.*)

Stemless Palm (*A. acaule*).
b, spadix, with spathe forming a hood over fruit; *c*, fruit, about one-fifth natural size.

A'STROLABE (from two Greek words signifying 'to take the stars'), the name given by the Greeks to any circular instrument for observing the stars. Circular rings, arranged as in the Armillary sphere (q. v.), were used for this purpose. A projection of the sphere upon a plane, with a graduated rim and sights for taking altitudes, was known as an A. in the palmy days of astrology, and was the badge of the astrologer. The A. has been superseded by the more perfect instruments of modern astronomy.

ASTRO'LOGY meant originally much the same as *astronomy*, 'the knowledge of the stars,' but was at length restricted to the science of predicting future events, especially the fortunes of men, from the positions of the heavenly bodies. This was considered the higher, the real science; while the mere knowledge of the stars themselves, their places and motions (astronomy), was, till a very

recent period, cultivated mostly with a view to (judicial) astrology. A. is one of the most ancient forms of superstition, and is found prevailing among the nations of the East (Egyptians, Chaldæans, Hindus, Chinese) at the very dawn of history. The Jews became much addicted to it after the captivity. It spread into the West and to Rome about the beginning of the Christian era. Astrologers played an important part at Rome, where they were called Chaldæans and Mathematicians; and though often banished by the senate and emperors under pain of death, and otherwise persecuted, they continued to hold their ground. The Roman poet, Manilius, author of an astronomical poem still extant, was addicted to A.; and even Ptolemy the astronomer did not escape the infection, which in his time had become universal. It accords well with the predestinarian doctrines of Mohammedanism, and was accordingly cultivated with great ardor by the Arabs from the 7th to the 13th c. Some of the early Christian fathers argued against the doctrines of A., others received them in a modified form. In its public capacity, the Catholic Church several times condemned the system; but many zealous Catholics, even churchmen, have cultivated it. Cardinal d'Ailly, 'the Eagle of the doctors of France' (died 1420), is said to have calculated the horoscope of Jesus Christ, and maintained that the deluge might have been predicted by A. For centuries the most learned men continued devoted to this delusive science; Regiomontanus, the famous mathematician Cardan, even Tycho Brahé and Kepler could not shake off the fascination. Kepler saw the weakness of A. as a science, but could not bring himself to deny a certain connection between the positions ('constellations') of the planets and the qualities of those born under them. The Copernican system gave the death-blow to A. When the earth itself was found to be only one of the planets, it seemed absurd that all the others should be occupied in influencing it. The argument has really little force, but it produced the effect. Belief in A. is not now ostensibly professed in any Christian country, though a few solitary advocates have from time to time appeared, as J. M. Pfaff in Germany, *Astrologie* (Bamb. 1816). But it still holds sway in the East, and among Mohammedans wherever situated. Even in Europe the craving of the ignorant of all countries for divination is still gratified by the publication of multitudes of almanacs containing astrological predictions, though the writers no longer believe in them.

Many passages of our old writers are unintelligible without some knowledge of astrological terms, numbers of which have taken root in the language. In the technical rules by which human destiny was foreseen, the heavenly *houses* played an important part. Astrologers were by no means at one as to the way of laying out those houses. A very general way was to draw great circles through the north and south points of the horizon, as meridians pass through the poles, dividing the heavens, visible and invisible, into twelve equal parts—six above the horizon, and six below. These were the twelve houses, and were numbered onward, beginning with that which lay in the east immediately below the horizon.

The first was called the house of life; the second, of fortune, or riches; the third, of brethren; the fourth, of relations; the fifth, of children; the sixth, of health; the seventh, of marriage; the eighth, of death, or the upper portal; the ninth, of religion; the tenth, of dignities; the eleventh, of friends and benefactors; the twelfth, of enemies, or of captivity. The position of the twelve houses for a given time and place—the instant of an individual's birth, for instance—was a *theme*. To construct such a plan was to *cast* the person's nativity. The houses had different powers, the strongest being the first; as it contained the part of the heavens about to rise, it was called the *ascendant*, and the point of the ecliptic cut by its upper boundary was the *horoscope*. Each house had one of the heavenly bodies as its *lord*, who was strongest in his own house.

ASTRO'NOMY (Gr. *astron*, a star, *nomos*, a law) teaches whatever is known of the heavenly bodies. A. may be properly divided under three heads. 1. *Geometrical or Mathematical A.*, including the exact determination of the numerical and geometrical elements of the heavenly bodies—that is, their distances, shapes, magnitudes, the figures they describe in their motions, &c. 2. *Physical A.*, or the nature of the powers or forces that carry on the heavenly motions, the laws that they observe, and the calculation of the motions from a knowledge of these laws. 3. *Sidereal A.*, or whatever is ascertained regarding the universe of the fixed stars. *Practical A.* might form another division, which would include a knowledge of the various astronomical instruments; and a familiarity generally with the rules and calculations by which the requisite results are deduced from observations.

Such parts of this extensive subject as are deemed suited to the present work, will be found under their appropriate heads, such as ABERRATION OF LIGHT, AEROLITES, CIRCLE, COMET, ECLIPSES, EQUATOR, LIBRATION, METEORS, MOON, NEBULÆ, PARALLAX, PLANETOIDS, PLANETS, PRECESSION, REFRACTION, SOLAR SYSTEM, STARS, SUN, TRANSIT INSTRUMENT, &c.

A brief sketch of the history of astronomical discovery is all that can be attempted in the present article.

The history of A. dates from a very early period. It is the most ancient of all the sciences. The Chinese, Hindus, Chaldæans, Egyptians, and even the Greeks, are known to have investigated the heavens very long before the Christian era. But with the first four nations, A. may be said to have been a sentiment rather than a science—a vague notion built up out of crude speculations, rather than a correct theory founded on systematic observation. In China, A. was intimately associated with state politics; the Indians, Chaldæans, and Egyptians made it a matter of religion; and each of these nations applied it to astrological purposes. In Greece alone was it prosecuted for its own sake.

The Chinese, Chaldæans, Hindus, and Egyptians each claim the honor of having been the first students of A., and each has had advocates to support its claim. The Tirvalore tables (asserted by the Hindus to belong to an epoch of 3102 years B.C.—the commencement of the Cali-yug, or iron age, of their mythology—at which period a conjunction of the sun, moon, and planets is said to have occurred) are, so far as their date is concerned, altogether unreliable. Modern calculations have conclusively proved that no such conjunction could possibly have taken place at the time specified; and the elements of the tables are, in the general opinion of scientific men, of a character far in advance of the actual observations of that period. There is no doubt that the epoch is fictitious—that the date of these tables is fixed much earlier than their internal evidence justifies; but it is matter of dispute whether they were the result of the observations of Hindus themselves at some later period before the Christian era, or whether they were constructed after that era from data furnished to them by the Arabs or Greeks. Those who hold the former view, quote the well-known mathematical attainments of the Indians, and their aversion to intercourse with foreigners, as arguments in its favor; those who support the latter, point out that the tables are a mean between those of Ptolemy and Albategnius, or Al Batani, a distinguished Arabian astronomer, and therefore likely to have been derived from these two sources. Those who are interested in the question of the originality of these tables, may refer to Delambre, and to Bailly's *Hist. de l'Astronomie Indienne*.

The Chinese have astronomical annals claiming to go back 2857 years B.C. In these there is little record of anything but of the appearance of comets and solar eclipses; and regarding the latter phenomena, they tell nothing, save the fact and date of their occurrence. Professional astronomers were compelled to predict every eclipse under pain of death.

The popular idea was, that an eclipse was a monster having evil designs on the sun, and it was customary to make a great noise, by shouting, beating of gongs, &c., in order to frighten it away from its solar prey. The many eclipses which the Chinese report have been recalculated, but not more than one anterior to the time of Ptolemy could be verified. At an early period, however, the Chinese appear to have been acquainted with the luni-solar cycle of nineteen years (introduced into Greece by Meton, and since known as the Metonic Cycle), and they had also divided the year into 365¼ days. Solstitial observances are said to have been made by a gnomon in the 11th c. B.C. To the burning of all scientific books by one of their princes (Tsin-Chi-Hong-Ti), 221 B.C., the Chinese attribute the loss of many theories, or methods previously in use. The precession of the equinoxes was not known to the Chinese until 400 A.D., but long prior to that they were familiar with the motion of the planets.

The mass of evidence seems in favor of the plains of Chaldæa being the primal seat of observative A. The risings and settings of the heavenly bodies and eclipses were subjects of observation and notation by their priests at a very remote period. Simplicius and Porphyry mention that Aristotle had transmitted to him from Babylon, by order of Alexander the Great, a catalogue of eclipses observed during 1903 years preceding the conquest of that city by the Macedonians. Ptolemy gives six of the eclipses from this catalogue, but the earliest does not extend further back than 720 B.C. The probability therefore is, that the statement of Simplicius, as to their early date, is an exaggeration. In these observations, the time is only given in hours, and the part of the diameter eclipsed within a quarter; but rough as they are, they are the earliest reliable observations extant; and a comparison of them with modern observations, led Halley to the discovery of the doctrine of the moon's acceleration—that is, that she now moves round the earth with greater velocity than formerly. It is remarkably illustrative of their habit of diligent observation, that the Chaldæans were acquainted with the cycle of 6585⅓ days, during which the moon makes about 223 synodical revolutions, and experiences the same number of eclipses, alike, too, in order and magnitude, comparing cycle with cycle. The clepsydra as a clock, the gnomon for determining the solstices, and a hemispherical dial for ascertaining the positions of the sun, were used by the Chaldæans, and they have the credit of the invention of the zodiac and the duodecimal division of the day.

The Egyptians, it is supposed, were the first instructors of the Greeks in A. They do not, however, appear to have observed much for themselves. The meaning of what data they have left behind them can be guessed at only in a few instances. No mention is made by Ptolemy of the idea ascribed to them, that the planets Mercury and Venus moved round the sun; the probability therefore is, Ptolemy not being likely to overlook such a novel theory, that they entertained no such notion at the time of his visit, but that is an after-thought of more recent ages. From the accuracy with which some of the pyramids face the cardinal points, there is a supposition that they must have been erected for astronomical purposes; but if it be true, as is stated, that Thales taught the Egyptians how to find the height of the pyramids by the shadow, and that the latter informed Herodotus that the sun had twice been seen to rise in the west, the conclusion is that the A. of the ancient Egyptians was very meagre and absurd.

Up to this time, A. is little else than tradition. The Greeks have the honor of elevating it into a reliable history, and to the dignity of a science. Thales (640 B.C.), the founder of the Ionic school, laid the foundation of Greek A. He it was who first propagated the theory of the earth's sphericity. The sphere he divided into five zones. He predicted the year of a great solar eclipse, but this it is now supposed he must have casually succeeded in doing—the Greeks at this time having no observations of their own to guide them—by means of the Chaldæan Saros, or period of eighteen years and ten days, which gives a regular recurrence of eclipses. He made the Greeks, who, prior to his time, were content to navigate their vessels by the Great Bear—a rough approximation to the north—acquainted with the lesser constellation of that name, a much better guide for the mariner. His system, however, contained a good deal of absurdity. Among other things, he held that the stars were composed of fire, and that the earth was the center of the universe. The successors of Thales held opinions which in many respects are wonderfully in accordance with modern ideas. Anaximander, it is said, held that the earth moved about its own axis, and that the moon's light was reflected from the sun. To him is also attributed, on somewhat slender authority, the belief in the grand idea of the plurality of worlds. Anaxagoras, who transferred the Ionic school from Miletus to Athens, is said to have offered a conjecture that, like the earth, the moon had habitations, hills, and valleys.

Pythagoras (500 B.C.), who was the next astronomer of eminence, was very far in advance of his predecessors. He promulgated, on grounds fanciful enough, the theory, the truth of which, however, has been since established, that the sun is the center of the planetary world, and that the earth circulates round it. Pythagoras also first taught that the morning and evening star were in reality one and the same planet. But the views of Pythagoras met with little or no support from his successors until the time of Copernicus. Between Pythagoras and the advent of the Alexandrian school, nearly a couple of centuries later, the most prominent names in astronomical annals are those of Meton (432 B.C.), who introduced the luni-solar cycle, as already intimated, and in conjunction with Euctemon, observed a solstice at Athens in the year 424 B.C.; Callippus (330 B.C.), who improved the Metonic cycle; Eudoxus of Cnidus (370 B.C.), who brought into Greece the year of 365¼ days, and wrote some works on A.; and Nicetas of Syracuse, who is reported to have taught the diurnal motion of the earth on its axis.

To the Alexandrian school, owing its existence to the munificent Ptolemies, we are indebted for the first systematic observations in A. Hitherto the truths of A. rested on no better evidence than the conjectures of sagacious minds, and these being opposed to the testimony of the senses, met with but little acceptance from the world. The Alexandrian school originated a connected series of observations relative to the constitution of the universe. The positions of the fixed stars were determined, the paths of the planets carefully traced, and the solar and lunar inequalities more accurately ascertained. Angular distances were calculated with instruments suitable to the purpose by trigonometrical methods, and ultimately the school of Alexandria presented to the world the first system of theoretical astronomy that had ever comprehended an entire plan of the celestial motions. The system we know to be false, and inferior to the Pythagorean notions; but it had the merit of being founded upon a long and patient observation of phenomena, a principle, which finally brought about its own destruction, while the previous theories were the results of pure hypothesis.

The most interesting circumstances connected with the early history of the Alexandrian school are the attempts made to determine the distance of the earth from the sun, and the magnitude of the terrestrial globe. Aristarchus of Samos—the pioneer of the Copernican system, as Humboldt calls him—is the author of an ingenious plan to ascertain the former. See ARISTARCHUS OF SAMOS.

Among other eminent members of this school were Timocharis and Aristyllus, who made the observations, which, together with observations of his own, enabled Hipparchus (q. v.) to discover the precession of the equinoxes; Eratosthenes (q. v.) who was the first who attempted to determine on true principles the magnitude of the earth, and to clear, as Humboldt expresses it, 'the description of the earth from its fabulous traditions;' and Autolycus, whose books on A. are the earliest extant in the Greek language.

We have now arrived at by far the greatest name we have yet met in astronomical science—that of Hipparchus of Bithynia (160—125 B. C.), and here may be said to begin the real written history of scientific A.; for not until his era were there facts correct enough and sufficient in number upon which to build a system. Hipparchus was at once a theorist, a mathematician, and an observer. He catalogued no less than 1081 stars. This is the first reliable catalogue we have. He discovered, as we have already mentioned, the precession of the equinoxes; he determined with greater exactitude than his predecessors had done, the mean motion, as well as the inequality of the motion of the sun; and also the length of the year. He also determined the mean motion of the moon, her eccentricity, the equation of her center, and the inclination of her orbit; and he suspected the inequality afterwards discovered by Ptolemy (the evection). He invented processes analogous to plane and spherical trigonometry, and was the first to use right ascensions and declinations, which he afterwards abandoned in favor of latitudes and longitudes.

For more than two centuries and a half after the demise of this indefatigable astronomer, we meet with no name of note. Ptolemy (130—150 A. D.) is the next who rises above the mass of mediocrities. Besides being a practical astronomer, he was accomplished as a musician, geographer, and mathematician. His most important discovery in A. was the libration or evection of the moon. He also was the first to point out the effect of refraction. He extended and improved many of the theories of Hipparchus, and was the founder of the false system known by his name, and which was universally accepted as the true theory of the universe, until the researches of Copernicus exploded it. The Ptolemaic system, expounded in the *Great Collection*, or, as it was called by the Arabs, the *Almagest*—from which source most of our knowledge of Greek A. is derived—placed the earth immovable in the center of the universe, making the entire heavens revolve round it in the course of twenty-four hours.

With Ptolemy closes the originality of the Greek school. His successors were men of no mark, confining themselves for the most part to astrology, or to comments on earlier writers. It is to the Arabs that we owe the next advances in A. They commenced making observations 762 A.D., in the reign of the Caliph Al Mansur, who gave great encouragement to science, as did also his successors, the 'good Haroun Alraschid' and Al Mamoum, both of whom were themselves diligent students of A. For four centuries, the Arabs prosecuted the study of the science with assiduity, but they are chiefly meritorious as observers. They had little capacity for speculation, and throughout held the Greek theories in superstitious reverence. They, however, determined with much more accuracy than the Greeks had done the precession of the equinoxes, the obliquity of the ecliptic, and the solar eccentricity; and the length of the tropical year was ascertained within a few seconds of the truth. The most illustrious of the Arabian school were Albategnius or Al Batani (880 A.D.), who discovered the motion of the solar apogee (see ANOMALISTIC YEAR), and who was also the first to make use of sines and versed sines instead of chords; he corrected the Greek observations, and was altogether the most distinguished observer between Hipparchus and the Copernican era; and Ibn-Yunis (1000 A. D.), an excellent mathematician, who made observations of great importance in determining the disturbances and eccentricities of Jupiter and Saturn, and who was the first to use cotangents and secants.

In the northern part of Persia, an observatory was erected by a descendent of the renowned warrior Genghis Khan, where some tables were constructed by Nasir-Eddin; and at Samarcand, Ulugh Beg, a grandson of Timur, made, in 1433 A.D., many observations, and the most correct catalogue of stars which, up to his time, had been published.

In the 13th c., A. was again introduced into Western Europe, the first translation from the *Almagest* being made under the Emperor Frederick II. of Germany, about 1230; and in 1252 an impulse was given to the science by the formation of astronomical tables under the auspices of Alfonzo X. of Castile. An Englishman, named Holywood (Sacrobosco), in 1220 wrote a book of great repute in its day on the spheres, chiefly abridged from Ptolemy; and among others who did much to promote a taste for A. were Purbach (1460), Regiomontanus (John Muller), who died in 1476, and Waltherus, a pupil of the latter, who made numerous observations of merit.

We now come to the illustrious name of Copernicus (b. 1473, d. 1543), to whom was reserved the grand honor and the danger -for there is ever danger in bringing old notions into disrepute by introducing new systems of truth—of exploding the Ptolemaic idea, and of promulgating a correct though inperfect theory of the universe. His system is in some part a revival and systematic appli-

cation of the opinions said to have been held by Pythagoras. It makes the sun the immovable center of the universe, around which all the planets revolve in concentric orbits, Mercury and Venus within the earth's orbit, and all the other planets without it. In the Copernican theory, there were many of the old notions which have since been exploded. It is a current belief that Copernicus, afraid to state boldly such heterodox views of the universe, as those he entertained, gave them forth in the form of an hypothesis. Humboldt, in his second volume of *Cosmos* (p. 345), denies that he did so. This distinguished authority says: 'The language of Copernicus is powerful and free, and bursts forth from his inmost convictions, and thus sufficiently refutes the ancient opinion, that he has brought forward the system which is immortalized by his name, as an hypothesis made for the convenience of calculating astronomers, or for one which has but a probable foundation.' The same author also refutes the popular notion that Copernicus died a few hours after receiving a printed copy of his book. He was broken down in body and mind when his work *On the Revolutions of the Heavenly Bodies* was brought to him, but he did not die until 'many days afterwards, on the 24th May 1543.'

Among the contemporaries of Copernicus were Rheinhold, who constructed the Prutenic tables; Recorde, who was the first to write on A. in English; and Nonius, a Portuguese, who invented a method for dividing the circle. The study of A. was also much aided about this time by the liberality of the Landgrave of Hesse-Cassel, William IV.

Decidedly the most industrious observer and eminent practical astronomer from the time of the Arabs to the latter half of the 16th c. was Tycho Brahé (b. 1546, d. 1601). Considerable odium attaches to him on account of his repudiation of the Copernican system, but it should not be forgotten that in the time of Tycho that system was not supported by the conclusive evidence we are now in possession of. Tycho's system, which made the sun move round the earth, and all the other planets round the sun, they moving with it round the earth, explained all natural phenomena then observed equally well, while it must have appeared more probable than the crude and, at that era, undemonstrable theories of Copernicus. Tycho Brahé compiled a catalogue of 777 fixed stars, more perfect than any that had previously appeared. He made the first table of refractions, and discovered the variation and annual equation of the moon, the inequalities of the motion of the nodes, and the inclination of the lunar orbit, and rejected the trepidation of the precession, which had hitherto injuriously affected all tables. He also made some interesting cometary investigations.

To his researches are mainly due the discovery by Kepler (b. 1571, d. 1631) of those famous laws which have rendered his name immortal. See KEPLER. To Kepler is due the credit of divesting the Copernican system of its absurdities. Kepler is also said to have had some notion of the law of gravitation.

Galileo Galilei (b. 1564, d. 1642) first applied the telescope (which he made from a general description of the instrument of Hans Lipperhey of Holland, who was the first inventor of the telescope) to the investigation of the heavens. He was rewarded by the discovery of the inequalities on the moon's surface. The important discoveries of the four satellites of Jupiter, the ring of Saturn—not then distinctly recognized as a circle—the spots on the sun, and the crescent form of Venus, followed in quick succession. For propagating the Copernican doctrine of the world, Galileo incurred the displeasure of the priests, and was compelled by the Inquisition to retract his opinions.

But the eternal laws of nature are not to be suspended by the recantation of a philosopher forced by the tyranny of priestcraft. The earth moved grandly on round the sun in spite of both; and scientific truth was now too old to remain in the restrictive leading-strings of any ecclesiasticism.

The next great epoch in the history of A. brings us to England and Newton (b. 1642, d. 1727). In the interval, practical A. had profited largely by the logarithms of Napier; the mathematical researches of Descartes; the application of the telescope to the quadrant by Gascoigne, an Englishman, and afterwards by Auzout and Picard; by Römer's discovery of the progressive motion, and measurement of the velocity, of light; by the invention of Venier; and the application of the pendulum to clocks by Huygens, who also brought into use the spiral spring, and made some valuable observations on the ring and satellites of Saturn; as well as by the investigations of Norwood, Horrocks, Hooke, Hevelius, Gilbert, Leibnitz and Dominicus Cassini, to the last of whom especially the scientific world owes much. Among a variety of other valuable observations and discoveries may be mentioned his thorough investigation of the zodiacal light, his determination of the rotations of Jupiter and Mars, and of the motions of Jupiter's satellites from their eclipses, his discovery of the dual character of Saturn's ring, and also of four of his satellites. Newton's fame rests upon his discovery of the law of gravitation, upon which the common belief is he was led to speculate by the fall of an apple. Newton announced his discovery in the *Principia* in 1687, which was briefly that every particle of matter is attracted by, or gravitates to, every other particle of matter, with a force inversely proportional to the squares of their distances. The first gleam of this grand conclusion is said to have so overpowered Newton that he had to suspend his calculations, and call in a friend to finish the few arithmetical computations that were incomplete. The discovery is perhaps the grandest effort of human genius of which we have any record. Newton also made the important discovery of the revolution of comets round the sun in conic sections, proved the earth's form to be an oblate spheroid, gave a theory of the moon and tides, invented fluxions, and wrote upon Optics.

While the foundations of physical A. were thus broadly laid by Newton, Flamsteed—the first astronomer royal at Greenwich, to whom, until recently, scant justice has been done—and Halley were greatly improving and extending the practical department of the science. To the former we are indebted for numerous observations on the fixed stars, on planets, satellites, and comets, and for a catalogue of 2884 stars. His *Historia Cœlestis* formed a a new era in sidereal A. Dr. Halley, who succeeded Flamsteed as astronomer royal, discovered the accelerated mean motion of the moon, and certain inequalities in Jupiter and Saturn, but he is most famed for his successful investigations into the motions and nature of comets. His successor was Dr. Bradley, who, in the year of Newton's death, made the important discovery of the aberration of light, which furnishes the only direct and conclusive proof we have of the earth's annual motion. To him also we are indebted for our knowledge of the nutation of the earth's axis. He was, besides, an unwearied observer, and left behind him at his death upwards of 60,000 observations. Altogether, Bradley's is deservedly one of the most honored names in modern A. Dr. Maskelyne, who was appointed to the observatory after Bradley, originated the *Nautical Almanac*.

Merely to mention the names of men who from the death of Bradley to the present time have added, by theory or practice, to our knowledge of A., would extend this synopsis much beyond the limit necessarily assigned to it. If the 18th c. opened with lustre derived from the physical demonstrations of Newton, it closed magnificently with the telescopic discoveries of Sir William Herschel, who added to our universe a primary planet (Uranus) with its satellites, gave two more satellites to Saturn, resolved the milky-way into countless myriads of stars, and unraveled the mystery of nebulæ and of double and triple stars. Laland, Lagrange, Lacaille, and Delambre, in the latter half of the 18th c., did much by their researches and analysis to systematize and improve the science of A. The instrumental means of observation were also, during that time, brought to high perfection. Laplace, in his great work the *Mécanique Céleste* (1799—1808), gave what further proof was needed of the truth and sufficiency of the Newtonian theory.

The 19th c. opened with the discovery of the four small planets —Ceres, in 1801, by Piazza; Pallas and Vesta by Olbers—the former in 1802, and the latter in 1807; and Juno, by Harding, in 1804. In 1845, Hencke discovered the fifth of this group revolving between Mars and Jupiter, to which the name of Astræa was given; and by the end of 1881, 220 Planetoids (q. v.) had been discovered. The greatest event of the century has been the discovery of the planet Neptune in 1846.

Observations upon Uranus had shown the motions of that planet to present great irregularities, which could not be explained by the action of Jupiter and Saturn; and after carefully examining the analytical theory of Uranus, Leverrier, a young academician of France, in the summer of 1846, published the elements of an undiscovered planet, the cause of the perturbations. He boldly predicted its existence, calculated its mass, and referred to its place in the heavens; and scarcely a month afterwards, on the 23d of September, the hitherto concealed object (Neptune) was found by M. Galle of Berlin. But it has only been by accidental circumstances that France has the honor of this remarkable achievement. Mr. Adams of Cambridge had arrived at results more perfect than those of Leverrier, and had communicated them to Mr. Challis, professor of A. at Cambridge in September 1845, a year before the discovery of the planet, and nearly a year before the publication of Leverrier's final calculations. Mr. Challis, it appears, commenced a search for the planet on July 29th, and on August 4th and 12th, he actually seized the planet, and recorded two positions of it, but did not recognize it, through not comparing his observations, which a pressure of occupation, and an impression that the discovery required a much more extensive search, prevented. But for this, and the non-publication of the Cambridge mathematician's results at the time they were forwarded to Sir George Airy in October 1845, the honorable position of M. Leverrier would have been occupied by Mr. Adams, and that of M. Galle by Mr. Challis.

The century, however, has been chiefly remarkable for its laborious efforts to correct, systematize, and extend the results of former discoveries. Admirable and extensive catalogues of stars and double stars, and of nebulæ, have been made; and optical and other instruments have been brought to what appears almost a

state of perfection, Lord Rosse's reflecting telescope, with a speculum six feet in diameter, being the triumph of modern mechanical and mathematical skill. In more recent years, research has been directed chiefly towards the physical nature of the sun and other heavenly bodies by means of spectrum-analysis. See SPECTRUM; SUN.

A'STUR. See FALCONIDÆ and GOSHAWK.

ASTU'RIAS, a northern province of Spain, bounded on the E. by Santander, on the S. by Leon, on the W. by Galicia, and on the N. by the Bay of Biscay. The low hills of Leon and Old Castile rise gradually to the mountain-chain which forms the south boundary, and towers to a height of about 11,000 feet in the summit *Peña-de-Peñaranda*. The main road from Leon to Oviedo passes over the mountain-chain at Pajares. The northern slopes are broken by steep and dark valleys or chasms, which are among the wildest and most picturesque in Spain. The summits of the mountains are covered with snow even as late in the year as August. The climate is damp; clouds hang almost continually about the peaks, gathering to them the fogs of the Atlantic. From the mass of calcareous rock, marble crags rise from 200 to more than 400 feet. The principal kinds of wood are oak, chestnut, silver and Scotch firs. Some of the forests in the remoter districts are very superb. Alpine pasturage decks the slopes, and a richer covering of green is found in the narrow valleys. In the wider valleys, the soil yields barley, wheat, maize, figs, olives, grapes, oranges. The coasts have good fisheries. The chief minerals of the province are copper, iron, lead, cobalt, arsenic, antimony, and coal. The pasturage of the higher valleys supports an excellent breed of horses, with numerous horned cattle.

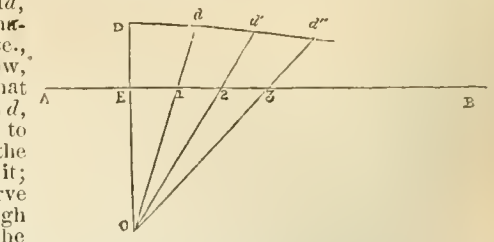
A. was never firmly occupied by the Arabs, but afforded a place of refuge to the Goths in the 8th c. Here the famous Pelayo was made king in 718 A.D.; and his successors, after contending successfully against the Arabs, were made kings of Leon in the 10th c. The Asturian still boasts of his independence as a free hidalgo, and is simple in manners and brave, but less industrious and sociable than his neighbors in Biscay and Galicia. Many Asturians leave their province to seek a livelihood in other parts of Spain, and after saving money, return to dwell among their native hills and valleys. They have been termed the Swiss of Spain; and they are equally faithful and fond of money. Among them, the *Vaqueros* form a distinct caste, intermarrying among themselves, and leading a nomadic course of life, spending the winter on the sea-coast, and the summer on the hills of Leytariegos. OVIEDO, the capital of A., has, since 1833, given its name to the whole province. Area of A., 3686 square miles; pop. (1877) 576,352.

The eldest son of the Spanish king has the title of Prince of A., professedly an imitation of the English Prince of Wales, having been taken at the solicitation of the Duke of Lancaster in 1388, when his daughter married the eldest son of Juan I.

ASUNCION, capital of Paraguay. See ASSUMPTION.

ASY'LUM, a place of refuge. In ancient times, sacred places, especially the temples and altars of the gods, were appointed as asylums to which criminals, as well as persecuted individuals, might flee for refuge; and to molest them in such places was regarded as an impiety. An analogous institution is found in the laws of the Jews as described in the 35th chapter of Numbers, where six 'cities of refuge' are appointed for persons guilty of manslaughter. Among the Greeks in early times, these asylums might be sometimes useful in preventing hasty retribution; but in the course of time they were so much abused that their sanctity was in a great measure disregarded. Thus Pausanias, who fled to the altar of Minerva, was taken and slain there by the Lacedæmonians, and in other cases the refugee was compelled to leave the A. by fire or starvation. In Rome, the Emperor Tiberius abolished all such places of refuge from law, excepting those in the temples of Juno and Æsculapius. The custom of allowing to real or supposed criminals a place of safety in temples, was also adopted by the Christian Church. In the time of Constantine the Great, the churches were made asylums; and Theodosius II. extended the privilege to all courts, alleys, gardens, and houses belonging to the church. In 681 A.D., the synod of Toledo extended the privilege of A. to a space of 30 paces around every church. In the lawless periods of the middle ages, the influence of the church often prevented deeds of gross injustice and violence; but the sanctity of churches was abused by criminals; and this led to several modifications which gradually destroyed the privilege of Sanctuary (q. v.). In England, it was abolished by acts passed in 1534 and 1697. The word A. is now applied to places of shelter for unfortunate or destitute persons, and especially to hospitals for the insane. See LUNACY.

A'SYMPTOTE (Gr. not coinciding), a line that approaches nearer and nearer to some curve without ever meeting it. An example of an A. will be seen under HYPERBOLA. As another illustration, let AB be a straight line which can be produced to any length towards B. Take any point, C, without the line, and draw a perpendicular reaching to any distance, D, beyond the line; set off any equal distances, E—1, 1—2, 2—3, &c., along AB; and draw C1*d*, C2*d'*, C3*d''*, &c., making 1*d*, 2*d'*, 3*d''*, &c., equal to ED. Now, it is evident that each of the points *d*, *d'*, &c., is nearer to the line AB than the one to the left of it; if, therefore, a curve is traced through these points (the curve is called the *conchoid*), it must continually approach the line AB. On the other hand, it is evident that the curve can never meet AB; for a line drawn from C to any point in AB, however distant that point, must, when produced, cross AB. AB is thus an *A.* to the curve. To the senses, indeed, the curve and line soon become one, because all physical or sensible lines have breadth. It is only with regard to *mathematical* lines (see LINE) that the proposition is true; and the truth of it has to be conceived by an effort of pure reason, for it cannot be represented.



Asymptote.

ATA'CAMITE, an ore of copper, found as a crust on the lavas of Vesuvius and Etna, especially on those of Vesuvius, erupted in the years 97, 1804, 1820, and 1822. It occurs abundantly in some parts of South America, as at Atacama in Peru, from which it derives its name; at Remolinos, Santa Rosa, and other districts in Chili; and at Sarapaca in Bolivia, where it is associated in veins with ores of silver. The natural varieties of A. are crystallized, massive, and pulverulent or granular. The massive or compact variety is usually reniform, with a fibrous structure. The crystals are short and needle-shaped; the primary form is a rhombic prism. It has been sometimes described as a chloride of copper, but incorrectly; and sometimes as a hydrochlorate (muriate) of copper; it is rather to be regarded as a combination of protoxide of copper with chloride of copper. It is a rich and productive ore, containing about 55 to 60 per cent. of copper. The percentage composition of various specimens of A. is as follows:

	Copper Protoxide.	Muriatic Acid.	Water.	Total.
Compact atacamite, . .	72·0	16·3	11·7	100
" " . . .	76·5	11·0	12·5	100
Sandy atacamite, . . .	70·5	11·5	18·0	100
Crystallized atacamite, .	73·0	16·2	10·8	100

A. often forms on the surface of copper exposed to the air or sea-water; and the greenish incrustation observed on antique bronze utensils, weapons, and other articles, and commonly known as the *ærugo nobilis*, is composed of this salt. On some antique bronzes from Egypt the A. is crystalline. Atacamite is worked in South America as an ore of copper; and considerable quantities are sent to England to have the metal extracted therefrom. See COPPER.

ATAHUALPA, the favorite son of Huayna Capac, Inca of Peru, who died in 1525, about seven years before Pizarro's arrival in Peru. The mother of A. not being of the pure Inca blood, her son was formally excluded from inheriting the throne; but his handsome figure, bold spirit, and quick intelligence so won upon the affections of his father, that on his death-bed he declared it to be his will that A. should receive as his portion the ancient kingdom of Quito (recently conquered), while Huascar, his eldest son, should possess Peru. For five years the brothers lived on terms of real or apparent friendship; but at length the restless ambition of A., who was constantly aspiring to new conquests, excited the uneasiness of Huascar, who, in an evil hour, was induced to send an envoy to his brother, with instructions to require him to render homage for his kingdom of Quito. A. fired at the proposal, and war was instantly declared. Placing himself at the head of the army of veterans which his father had left him, he invaded Peru, and in the spring of 1532 completely defeated Huascar on the plains of Quipaypan, in the neighborhood of Cuzco, the native Peruvian metropolis, only a few months before the arrival of the Spaniards. Huascar was taken prisoner, and confined in the strong fortress of Xauxa. Then followed, according to Garcilasso de la Vega, a series of atrocious massacres of all in whose veins ran the blood of the Incas; but his statements are so monstrous, and possess so little congruity, that they are rejected by Prescott as intrinsically incredible. In the meantime, the Spaniards had disembarked at Tumbez; and after a long, brave, and perilous march through the unknown country, Pizarro, at the head of his two hundred cavaliers, approached the victorious camp of A., where he found some fifty thousand men assembled. By a daring but diabolical stratagem, Pizarro obtained possession of the person

of the king, who had come to visit him in a friendly spirit. While a priest was explaining the Christian religion, and the power of the pope over all the kingdoms of the earth, and how the pope had presented Peru to the Spanish monarch, in whose name they had come, A., indignantly interrupting him, told him that the pope (whoever he was) must be a crazy fool to talk of giving away countries which were not his own. When he inquired on what authority such claims were made, the priest pointed to the Bible, on which A. dashed the book on the ground, and the fields began to fill with Indians. The moment was critical. The crime which Pizarro had resolved upon the night before must be executed then or never.

He waved a white scarf, which was the signal agreed upon. The mysterious artillery poured sudden death into the terrified masses of Peruvians, while the Spanish cavalry rode them down with merciless fury. Confusion seized the natives; they submitted—being unarmed—to this horrible butchery, only anxious to save their sacred Inca; but all their efforts to accomplish this proved unvailing, and after exhausting hours in the miserable work of murder, the inhuman Spaniards succeeded in capturing him. A. was treated with a great show of kindness at first, and more especially when he offered, as a ransom, 'not merely to cover the floor, but to fill the room in which he stood with gold as high as he could reach.' When A.'s brother, Huascar, who was still a prisoner, heard of this, he offered still more advantageous terms for himself. To prevent this, A. had him secretly assassinated. The golden treasure which was to constitute the ransom of A. now began to pour in, and at length A. demanded his freedom. This Pizarro refused to grant, and accused A. of plotting against him. The result, after much base treachery on the part of the Spaniard, was a mock-trial, in which A. was condemned to be burned. On the 29th of August 1533, he was led to the stake, but on agreeing to be 'baptized,' his sentence was commuted to death by strangulation.

ATALA'NTA, a mythical personage, the daugther of Jasus and Clymene, was born in Arcadia, and celebrated as a huntress, well skilled in the use of the bow and arrow. Her father, who had wished a son, exposed her, while an infant, on Mount Parthenios, where she was found near the entrance of a cave by hunters, who are said to have brought her up, and afterwards restored her to her parents. While living as a wild mountain-maiden, she slew the centaurs Rhœcus and Hylæus. Afterwards, she sailed with the Argonauts (q. v.) to Colchis, and took a prominent part in the chase of the Calydonian boar (q. v.). She had many suitors, but was merciless in the conditions which she imposed on them. Being the swiftest of mortals, she offered to become the wife of him that should outstrip her—the penalty of defeat being death. At length she was conquered by a trick of one Meilanion, whom she was compelled to marry. He obtained from Venus a gift of three golden apples, which he successively dropped in the race; and A. was so charmed by their beauty, that she could not refrain from stooping to gather them, and so lost.—Mention is made of another A. in Greek antiquity, to whom a different parentage is assigned, but regarding whom the myth is essentially the same.

ATARAIPU', a term signifying *Devil's Rock*. It is applied to one of the most singular eminences in the world, a granite pyramid in British Guiana, which rises abruptly from the plain about 900 feet, wooded for rather more than one-third of the height, but bare thence to the peaked summit.

ATCHAFALAY'A, a branch of the Mississippi at its delta. It forms so large an angle with the main river, that, after a course of only 130 miles, it enters the Gulf of Mexico, 120 miles west of New Orleans. From the Red River, which enters the Mississippi just above its own point of departure, the A. had received so much drift-wood, as formed at last a stationary raft 10 miles long, 220 yards broad, and 18 feet deep—an obstacle to navigation which the state of Louisiana required four years to remove.

ATCHEE'N, a kingdom forming the north-west part of Sumatra; area, 2260 sq. m.; pop. 500,000; in 95° 20'—97° 40' E. long., and 2° 50'—5° 40' N. lat. The interior is mountainous—Abong Abong, 11,000 feet; Loose, 11,000; the Golden Mountain, 6460; Batu Gapit, 6155; Tampat Tuan, 4020. The natives are well made, industrious, intelligent, treacherous. In 1873, the Dutch declared war, and though at first repulsed, may now be said to have conquered the country. A., the capital, lies on both sides of the river in 5° 35' N. lat., and 95° 26' E. long., in a large valley formed by ranges of hills, of which the Golden Mountain is the highest. Pop. 36,000. They barter for opium with Penang and Singapore, pepper, edible nests, gold-dust, camphor, benzoin, sulphur, satin-wood, betel-nuts, &c.

ATCHE'VEMENT is a term nearly equivalent to armorial bearings, and is often used of a funeral escutcheon. See HATCHMENT.

ATCHISON, a city of Kansas, U.S., on the left bank of the Missouri. It is an important railway center. Pop. (1870) 7054; (1880) 15,106.

A'TÉ, according to Homer, the daughter of Jupiter—or of Eris, as Hesiod says—was a vengeful goddess, ever attending *dysnomia*, or transgression of law, though she herself prompted men to such. She was banished from Olympus by Jove, whom she had incited to take an oath of which he subsequently repented. She then traveled to and fro over the earth with great rapidity, always intent on exercising a pernicious influence upon mankind. But her steps were followed by the goddesses *Litai* (prayers), benevolent daughters of Jove, who healed those who had been afflicted by A. The tragic writers describe A. as the goddess of retribution. Their representations almost identify her with NEMESIS and ERINNYS.

A'TELES (Gr. incomplete), a genus of American monkeys, of the division with long prehensile tails, to which the name SAPAJOU (q. v.) is sometimes collectively applied. In the genus A., the head is round, and the facial angle about 60°; the limbs are remarkably long and slender, upon which account the English name SPIDER MONKEY (q. v.) is sometimes used as a generic designation; and the fore-limbs are either entirely destitute of a thumb, or have a mere rudimentary one, a peculiarity in allusion to which the name *A.* was given. The name Coaita or Quata is frequently given to some of the species of A., but is sometimes limited to *A. Paniscus*, as Spider Monkey sometimes is to *A. arachnoides*. One of the best known species is the Marimonda (*A. Belzebub*), a common monkey of Guiana, and which occurs in immense numbers on the banks of the Orinoco.

ATELIERS NATIONAUX, or NATIONAL WORKSHOPS, a term under which such institutions became renowned in connection with the French revolution of 1848. In almost all countries and ages, there have been projects for organizing labor under public authority, designed generally for the benevolent purpose of obviating the distress caused by casual depressions in trade. However distinctly the laws of political economy were laid down on the point, it could always be said that these were merely theoretic, and therefore, this one instance of practical experiment, however calamitous in its day, left behind it a valuable lesson. The principles of political economy on this matter are—that competition only can fix the extent to which labor is required in any department, and the rate at which it must be remunerated; that it is this competition which gives the workman a stimulus to labor effectively and profitably; and that if this stimulus were withdrawn, and all were paid alike, whether they worked well or ill, all would work ill, the public would be losers, and the large fund out of which laborers are supported under the competitive system would cease to exist. Immediately on the formation of the Provisional Government in February 1848, a permanent department was established called *The Committee of the Government for the Workmen*. This establishment acted on the doctrine, that all workmen were entitled to have a living provided for them on a certain uniform scale. They did not forcibly abolish private employment, but they held out inducements which made workmen leave and employers break up the existing establishments. Consequently, nearly all the Parisian workmen threw themselves on the government, and others flocked in from other quarters in alarming numbers. It was found that these crowds of men, who claimed the privilege of employment by the state, had very little idea of the duty of working, even were there distinct employment for them. But when the body had increased to considerably above a hundred thousand the government found that they had this ever increasing mass to feed, and nothing to feed them with, since trade thus meddled with was in reality ruined. It was consequently found necessary to put an end to the system, and the result was the bloody battle of Paris, which brought about the restoration of despotism. One incidental experiment will perhaps best explain the ruinous tendency of the whole system. In the Hôtel Clichy, 1500 tailors were assembled to make uniforms for the new *garde mobile*. The men were to receive among them for the completed work as much as an army-contractor would have demanded. In the meantime, they were paid two francs a day of subsistence money; the rest was to be divided among them at the end. The men were buoyed up with the notion that they were to receive not only their own proper wages, but the indefinite and enormous sum which they supposed to form the profit of the contractor, forgetting that such profit seldom exceeds about 3 per cent. Their disappointment was great when they found nothing to divide. There was, in fact a loss. When paid their two francs—not much more than half of what they obtained when employed by a contractor—they were paid more than the value of their labor and the profit of the transaction to boot. The reason is pretty obvious. Each man working for himself, and paid for his work on the competitive system, exerted himself; but when one man's exertions went virtually for nothing, unless he got the 1499 others to exert themselves to the same amount, all were alike lazy.

ATELLA'NÆ, *Fabulæ Atellanæ* (also styled *Ludi Osci*), a kind of popular drama in Rome, first introduced from Atella, a town in Campania, between Capua and Naples. After the Greek drama had been brought to Rome by Livius Andronicus, the old *Fabulæ Atellanæ* were still retained as interludes and after-pieces. They are not to be confounded with the Greek satiric drama, although the character of both was to some extent the same. In the latter, satyrs figured; while the former personated real Oscan characters. The *Macchus* and *Bucco* of the *Fabulæ Atellanæ* may be considered the origin of the modern Italian arlecchino (harlequin), and other characters of the same stamp. They were the favorite characters; spoke the Oscan dialect, and excited laughter by its quaint old-fashioned words and phrases. The A. were neither so dignified as the *comœdia prætextata*, nor so low as the *comœdia tabernaria*, but indulged in a kind of genial and decent drollery. The caricature was at first always pleasant, and though quizzical, it did not lapse into obscenity, like the *mimi*. Respectable Roman youths, who could not appear as actors in the regular Greek drama without losing *caste*, were allowed to take part in the *A*. A few fragments of these popular farces have been collected by Bothe in his *Poetarum Latinorum Scenicorum Fragmenta* (Leip. 1834). See also Munk, *De Fabulis Atellanis* (Leip. 1840).

A TE'MPO (Ital.), in time. A term used to denote that, after some short relaxation in the time, the performer must return to the original degree of movement.

A TE'MPO GIU'STO (Ital.), in correct time. A term used to denote that, after a recitative, the performer should keep the music true and correct, which, during the recitative, had been altered to suit the action and passion of the scene.

A'TESHGA (the Place of Fire), a spot on the peninsula of Apsheron, on the west coast of the Caspian Sea. It is considered sacred by the Guebres, or Persian Fire-worshipers, who visit it in large numbers, and bow before the holy flames which issue from the bituminous soil. It is about a mile in diameter, and from its center, in clear dry weather, creeps forth a blue flame (caused by the ignition of the naphtha), which shines with great brightness by night.

ATE'SSA, a town of south Italy, in the province of Chieti, and 23 miles south-south-east from Chieti. It has a beautiful collegiate church, and several other churches and convents. Pop. (1881) 5197.

ATEU'CHUS. See BEETLE and SCARABÆUS.

ATH, or AATH, a strongly fortified town in the province of Hainault, Belgium, situated on the Dender, in lat. 50° 36′ N., long. 3° 46′ E. It has an arsenal, hospital, and college, and important manufactures of linen, calicoes, lace, gloves, cutlery, large hammers, &c., and carries on a brisk trade. Pop. 8260. The ancient church of St. Julien in A. is noted for its extraordinarily high tower. The town has been several times besieged and taken: in 1697, by Catinat and Vauban; in 1706, by the allied forces under the Dutch general Owerkerke; in 1745, by the French after a short siege; and in 1792, by the forces of the Republic under Berneron.

ATHABA'SCA, a river and lake in the northwest of America, forming part of the great basin of the Mackenzie, and lying, therefore, in the Northwest Territory of the Canadian Dominion. The *river* rises in the Rocky Mountains near Mount Brown, the highest point in the range. Its actual source is the small lake, already mentioned under the head of AMERICA as the Committee's Punch Bowl, which sends its tribute at once through the A. to the Frozen Ocean, and through the Columbia to the Pacific. Its general course is north-east, till, after passing through A. Lake, or rather crossing its west end, it turns towards the north-west, and, after a course of 30 or 40 miles, unites with the Peace River, from beyond the Rocky Mountains, to form the Slave River, which, again, after passing through Great Slave Lake, takes the name of the Mackenzie.—*Lake* A. receives nearly all its waters from the A. river, and is probably unique in this, that its principal feeder traverses not its length but its breadth, and that not in its middle, but at its extremity. The lake's single outlet is the river A.—A. is the name of a new division of the Canadian North-west, between British Columbia and the A. River. It contains the fertile Peace River districts.

ATHALI'AH, the daughter of Ahab, king of Israel, married Jehoram, king of Judah, who died 885 B.C. After the death of her son Ahaziah, who succeeded him, but reigned for only one year, she paved her own way to the throne by putting to death (as she supposed) all the seed-royal. 'But Jehosheba, the daughter of king Jehoram, sister of Ahazia, took Joash, the son of Ahaziah, and stole him from among the king's sons, who were slain.' The young prince thus rescued was privately educated in the temple, and, after A. had reigned six years, the high-priest Jehoiada placed Joash on the throne (878 B.C.). A., hearing the noise attending the coronation, hastened to the temple, where the people were shouting, 'God save the king!' As she looked round in astonishment on the young king, whom she had supposed to be dead, surrounded by priests, Levites, rulers, captains, and a rejoicing multitude, she 'rent her clothes, and cried, "Treason! treason!"' By the command of the high-priest, she was led out of the temple, and slain in the gateway of the palace. The house of Baal, with its altars and images, was broken down. This narrative (2 Kings xi.; 2 Chronicles xxi. 6, xxii. 10—12, xxiii.) is the subject of Racine's drama *Athalie*.

ATHA'NARIC, a king of the Western Goths, whose settlements lay on the north bank of the Lower Danube, in the 4th c. Having taken advantage of the weakness of the Roman empire when the imperial armies were engaged in suppressing the rebellion of Procopius, war was declared against him by the Emperor Valens. A. acted strictly on the defensive during two campaigns, in which the Romans gained no advantage over him; but in the third year of the war (369 A.D.), he hazarded a general battle, and was defeated, whereupon he sued for peace, and, with that object, had a conference with Valens in a boat on the Danube. Peace was concluded, and A. had his attention occupied in settling dissensions arising out of the Arian controversy which then agitated his people, when the first advance of the Huns on Europe alarmed the Gothic nation. A. attempted to secure the eastern borders of his kingdom; but the Huns forced the passages of the Dnieper, defeated the Goths, and advanced in great force into the plains of Dacia. When, in 374, the Western Goths were received by the Romans as allies, and had settlements granted them on the south of the Danube, A., with a part of his people, refused to accompany them, removing to the west, and fortifying himself against the new enemy. In 380, however, he was obliged to retire, when he accepted the hospitality of the Empire, and removed to Constantinople, where he met with a cordial and honorable reception by the Emperor Theodosius. At this time died Fritigern, the king of the Goths that had settled on the south of the Danube; and A. being made king of the whole Western Gothic nation, concluded a treaty of peace, in behalf of the whole, which had the effect of incorporating that people with the other subjects of the empire. He died at Constantinople in 381.

ATHANA'SIAN CREED, the third of the three œcumenical symbols, derived its name from its composition being attributed to Athanasius; it is also known, from its initial words in Latin, as the creed *Quicunque Vult*. The first part of this creed contains a detailed exposition of the Trinity; the second, the doctrine of the incarnation. Modern criticism has called in question the title of Athanasius to be considered the author of this creed. It was known as early as the beginning of the 6th c., but not under its present name. It is spoken of as 'Athanasius's Tract on the Trinity,' in some Articles of the middle of the 8th c., and is supposed to be alluded to, 'as the Faith of the holy prelate Athanasius,' in the Council of Autun, about 670. Athanasius himself makes no mention of this creed, although its doctrines are essentially his; nor do any of the church fathers. Other two circumstances speak against its authenticity: it is in Latin, and Athanasius wrote in Greek; the expressions, again, are different from those used by Athanasius in speaking of the same things. By Protestants, therefore, and even by most Catholics, its Athanasian origin has been given up, and its production has been assigned with most probability to the 5th c., and to Gaul; Hilary, Archbishop of Arles (about 430), being conjectured to be the author. The title of Athanasian probably became attached to it during the Arian controversy in Gaul, as being an exposition of the system of doctrine which was opposed to the Arian system, and which would naturally be called Athanasian from its chief propounder. It was received into the public offices of the Gallic Church in the 7th c., and by the middle of the 10th c. it was adopted at Rome and all over the West. In Britain it was probably in use as early as 800. The Greek Church was late in receiving it, and even then not without altering the article concerning the 'Procession of the Holy Ghost.' The Reformers adhered to the A.C., and Luther called it 'a bulwark of the Apostles' Creed.' Even those Churches that do not in any way acknowledge it as a symbol (as the Presbyterian Churches of Britain and America, as well as the Independents) generally accept its doctrines.

The A. C. is the most rigid and intolerant of the Catholic symbols, and has given rise to much controversy; and though still generally received by Protestants as well as Catholics, the regard once had for it has declined. The points in this creed that give offence to some are defended by others, on the plea that it was not drawn up for the sake of gratuitously dogmatizing on abstruse speculative truths, but to counteract other dogmas which were held to be dangerously heretical. Waterland, in his *Critical History of the Athanasian Creed*, says: 'The use of it will hardly be thought superfluous so long as there are any Arians, Photinians, Sabellians, Macedonians, Apollinarians, Nestorians, or Eutychians, in these parts.' (See Articles under these heads.) With respect to what are called the 'damnatory clauses' (the clauses, namely: 'Which Faith except every one do keep whole and undefiled, without doubt he shall perish everlastingly;' and: 'This

is the Catholic faith, which except a man believe faithfully, he cannot be saved'), the churches which adopt the creed, do not mean by them to imprecate curses, but to declare, as a logical sequence of a true faith being necessary to salvation, that those who do not hold the true faith are in danger of perishing; as it is said, Mark xvi. 16, 'He that believeth not shall be damned.' These clauses are also held to apply to those who deny the substance of the Christian religion, and not infallibly to every person who may be in error as to any one particular article. A rubric to this effect was drawn up by the commissioners appointed in 1689 for the review of the English Common Prayer Book, but none of their suggestions took effect. Compare also the 18th Article of the Church of England with these clauses.

ATHANA'SIUS, Primate of Egypt, was born in Alexandria about the year 296 A.D. There are no particulars on record of his lineage or his parents. Alexander, then officiating as primate or patriarch of Alexandria, brought him up in his own family, and superintended his education, with the view of his entering on the Christian ministry. In his youth, he often visited the celebrated hermit St. Antony, and embraced for a time the ascetic life with the venerable recluse. He was but a youth and only a deacon when appointed a member of the first general council at Nice, in which he distinguished himself by his erudition and his eloquence.

His patron, Alexander, having died in the following year, he was duly elected to the primacy by the clergy and people; and was but newly installed in his office, when Arius, who had been banished at the time of the condemnation of his doctrine at Nice, was recalled, and made a recantation of his erroneous principles. A., it is said, refused on this occasion to comply with the will of the emperor that the heretic should be restored to communion. On this account, and in consequence of several other charges brought against him by the Arian party, he was summoned by the Emperor Constantine to appear before the synod of Tyre, in 335 A.D., which deposed him from his office. His sentence was confirmed by the synod of Jerusalem in the following year, when he was banished to Treves. In 338, Constantius, now emperor of the East, though unfriendly to the principles of the Trinitarians, recalled A. from his banishment, and restored him to the primacy at Alexandria. His entrance into the city was like a triumphal procession; but the Arians soon rose against him, and (in 341) he was again condemned by the council of 90 Arian bishops assembled at Antioch. Against this decision a protest was made by 100 orthodox bishops at Alexandria, and in a council held at Sardis, 300 bishops, with Julius, bishop of Rome, at their head, confirmed the decision in favor of A., who was again replaced in his office (349 A.D.). The Arians once more acquired the ascendency after Constantius (in 353) had been made Emperor of both the East and West; for in that year A. was condemned by a council held at Arles, and the sentence was confirmed by another held at Milan in 355, the influence of the sovereign being strongly exerted to secure his condemnation. As the resolute patriarch had declared that he would not leave his place without an express order from the emperor, violent means were resorted to for his expulsion. While engaged in conducting divine service, he was interrupted by a company of soldiers, from whom he made his escape into the Egyptian desert. A price was set on his head; and to avoid his persecutors, he retired from the usual haunts of the anchorets to a remote desert in Upper Egypt, where he was attended by one faithful follower. Here he wrote several works to confirm orthodox Christians into their faith. On the accession of Julian to the imperial throne, toleration was proclaimed to all religions, and A. returned to his former position as patriarch of Alexandria (361 A.D.). His next controversy was with the heathen subjects of Julian, to whom the patriarch, by his zeal in opposing their religion, had made himself very offensive. To save his life, he was compelled again to flee from Alexandria, and remained concealed in the Theban desert, until 363, when Jovian ascended the throne. After holding office again as patriarch for only a short space of time, he was expelled anew by the Arians, under the Emperor Valens. A. now found refuge in the tomb of his father, where he remained hidden four months, until Valens, moved by petitions from the orthodox Alexandrians, restored the patriarch to his see, in which he continued till his death in 373 A.D.

A. was the leading ecclesiastic in the most trying period of the history of the early Christian Church. His ability, his conscientiousness, his judiciousness and wisdom, his fearlessness in the storms of opposition, his activity and patience, all mark him out as an ornament of the age, as well as the most influental public character in matters of religion. Though twenty years of his life were spent either in exile, or what was equivalent to it, yet his prudence and steadfastness, combined with the support of a large party, crowned his exertion with complete success. He was a clear thinker, and as a speaker, was distinguished for extemporaneous precision, force, and persuasiveness.

His writings are polemical, historical, and moral; all marked by a style simple, cogent, and clear. The polemical works treat chiefly of the doctrines of the Trinity, the incarnation of our Saviour, and the divinity of the Holy Spirit.

The earliest edition of the collected works of A. in the original Greek appeared in two volumes, folio, at Heidelberg in 1600. It was accompanied with a Latin translation. The most complete edition is that published at Padua in 1777. A.'s Four Orations against the Arians, and his Oration against the Gentiles, were translated by S. Parker (Oxford, 1713); also, his Treatise on the Incarnation of the Word was translated by W. Whiston, forming part of that gentleman's *Collection of Ancient Monuments Relating to the Trinity and Incarnation*, London in 1713. The Epistles of A. in defence of the Nicene Creed, and on the Councils of Arimínum and Seleucia, together with his first Oration against the Arians, were translated, with notes, by the Rev. John Henry Newman, Oxford (1842).

A'THEISM, a word of modern formation, from Gr. *atheos*, 'without God,' signifies the doctrine of those who deny the existence of a God. The term atheist conveys such terrible associations to almost all minds, that there is perhaps no reproach from which men shrink more; and yet it has been freely applied by the zealous of all ages to those whose notions of the invisible powers differed from their own. The imputation is the most damaging that can be made, and it requires only a little ingenuity to make out a case of *constructive* A. from any set of opinions at all differing from the common. Thus, the ancient Greeks accused some of their philosophers of A. though they did not deny the existence of a divinity, but only rejected the common notions of a plurality of gods. And in the Christian Church, after the doctrine of the Trinity had been fixed and defined, those that denied the divinity of Christ were not unusually branded as atheists.

The horror inspired by this name is strikingly shown in the way it is repudiated by the adherents of pantheism (q. v.), who reject a personal god, and substitute the idealized principle of order that pervades the universe. It is hardly to be denied, however, that the idea associated with the word God has hitherto involved personality as its very essence; and except for the purpose of avoiding odium, there could be little propriety in retaining the word when the notion is so completely altered.

The view of those who, like Kant, believe it impossible to *demonstrate* satisfactorily the existence of God, though it must be held on other grounds, is called *speculative* A., in opposition to the *dogmatic* A. of those who attempt to disprove that existence.

A'THELNEY, ISLE OF, a marsh at the junction of the rivers Tone and Parret, in the middle of Somersetshire. Here Alfred, when driven from his throne, hid from his enemies, and founded, in 888, a Benedictine abbey, now entirely gone. Among the many relics found in this spot is a ring of Alfred's, preserved in the Oxford Museum. The name Athelney means 'island of the nobles,' or 'royal island.'

A'THELSTAN, the grandson of Alfred the Great, was born about 895 A.D., and was the first Saxon monarch who took the title of king of England, Alfred himself only assuming that of king of the Anglo-Saxons. He was crowned at Kingston-upon-Thames in 925, and seems to have possessed both great ambition and high talent. It is supposed that his design was to unite in subjection to his single sway the entire island of Britain. His resources, however, were not equal to the undertaking, and he had to content himself with the acquisition of portions of Cornwall and Wales. On the death of Sigtric, king of Northumbria, who had married one of his daughters, A. took possession of his dominions. This excited the alarm and animosity of the neighboring states, and a league, composed of Welsh, Scotch, and Irish, was formed against the English king, for the purpose of placing Anlaff, the son of Sigtric, on his father's throne. A fierce and decisive battle was fought at Brunenburgh, in which the allies were utterly defeated, and which became famous in Saxon song. After this, the reputation of A. spread into the continent. His sisters were married into the royal families of France and Germany, and he himself enjoyed the greatest influence and consideration. At home, he exhibited a deep interest in the welfare of his people, improved the laws, built monasteries, and encouraged the translation of the Bible into the vernacular. He died at Gloucester on the 25th October 941, in his 47th year.

ATHENÆ'UM (Gr. *Athenaion*), the Temple of Minerva (Gr. *Athene*) at Athens, which was frequented by poets, learned men, and rhetoricians, who there read aloud their works.—The A. in Rome was a school or college erected, by the Emperor Hadrian, for the study of poetry and rhetoric, with a regular staff of professors. It existed for a long period. In the time of Theodosius II., it had three professors of oratory, ten of grammar, five of sophistry or dialectics, one of philosophy, and two of jurisprudence.—In modern times, the name A. has been revived as an appellation for certain literary institutions, and also as a collective title for literary essays and reviews. A. is the title of two weekly journals of

literature, science, and art—one published in London, the other in Paris.

ATHENÆ'US, a Greek *rhetor* and *littérateur*, born at Naucratis in Egypt. He lived at the close of the second and beginning of the third century. His work, entitled *Deipnosophistæ* (Banquet of the Learned), in fifteen books, but of which we possess the first two, and parts of the third, eleventh, and fifteenth only in an abridged form, is very interesting, as it has preserved for us copious fragments of old writers, and treats, in the form of dialogue, of almost all the topics of ancient Greek manners, private and public life, arts, sciences, &c. It is not a work indicative of any high ability; the author, for the most part appears in the character of an agreeable, well-read, epicurean gentleman, excessively fond of *tit-bits*, both of scandal and cookery. He tells many stories of the disadvantage of people whom history praises; but these we are by no means bound to believe, nor, indeed, is he a man whose opinions are worth much on any subject; but as a melange of literary, social, and domestic gossip, the value of the work is unrivaled. A. appears to have read enormously; he states that he had made extracts himself from 800 plays of the middle comedy alone. But his dialogue is prolix and lumbering; and his work is not irradiated by a single gleam of genius, and has only achieved immortality through being a store-house of miscellaneous information, that otherwise would have been lost to the race. The best editions are by Schweighäuser (14 vols. Strasb. 1801—1807), and Dindorf (3 vols. Leip. 1827). There is an English translation of A. in Bohn's Classical Library (3 vols. Lond. 1854).

ATHENA'GORAS, an early Christian philosopher, who taught first at Athens, and afterwards at Alexandria. He is one of the oldest of the apologetical writers, and is favorably know by his *Legatio pro Christianis*, which he addressed to the Emperor Marcus Aurelius in the year 177 A.D. He therein defended the Christians against the monstrous accusations of the heathen, viz., that they were guilty of atheism, incest, and cannibalism. His work is written in a philosophical spirit, and is marked by great clearness and cogency of style. We likewise possess a valuable treatise of his on the resurrection of the dead.

ATHENA'IS, an Athenian of distinguished beauty, the daughter of Leontinos the Sophist, was born about the close of the 4th c., A.D. She received from her father a superior education, being skilled in Greek and Latin literature, rhetoric, astronomy, geometry, and the science of arithmetic. After his death, she repaired to Constantinople, to obtain justice for the harsh treatment to which her brother subjected her. Here her beauty and intelligence made her the favorite of Augusta Pulcheria, sister of Theodosius II., who considered that she would make an excellent wife for the emperor. In 421, A. having been baptized and named Eudocia, was married to Theodosius, and in 438, made a splendid pilgrimage to Jerusalem, bringing with her, on her return, the supposed relics of the first martyr, Stephen. Afterwards, she lost the favor of Pulcheria—the real manager of affairs—and was banished from court. She then retired to Jerusalem, where she suffered many persecutions, and died, in the odor of sanctity, 460 A.D. A. wrote an epic poem on the war of Theodosius against the Persians, and several other metrical works which have not been preserved.

A'THENS, the capital of the ancient state of Attica, is said to have been founded by Cecrops, about 1550 B.C., and styled Cecropia; but even the ancients themselves doubted this tradition. Equally uncertain is the story that it was first styled A., in honor of Athene, during the reign of Erichthonius. The ancient citadel was situated on the top of a square craggy rock, 150 feet high, with a flat summit, 1000 feet long, and 500 broad. Gradually, as population increased, A extended itself over the wide and beautiful plain below. This increase is said to have been occasioned by the organization of the twelve Attic tribes into a political confederacy or union by Theseus, the brightest figure that shines through the 'dark ages' of Attic history. The position of A. near the Gulf of Saronica, opposite the eastern coast of the Peloponnesus, was favorable to the acquirement of naval power. The city, which was distant four or five miles from the sea, possessed three harbors, all situated on the south-west, and connected with it by walls. The oldest of these harbors was Phalerum. It was also the nearest to the city, and accessible at all times by a dry road. The Peiræus was first used as a harbor by Themistocles. Munychia was the Acropolis of the whole rocky peninsula termed the Peiræus, and of immense importance strategetically. The two last harbors were connected with the city by the famous 'long walls,' of which we read so much in Athenian history. They were forty stadia, or nearly five miles in length. Two streams flowed in the vicinity of A.; on the east side, the Ilissus, which also washed the southern part of the city; and on the west, the Cephisus, about a mile and a half beyond the walls. To the west lay Salamis, with Eleusis on the north-west, Phylæ and Decelea on the north, Marathon on the north-east, and Hymettus on the south. All along the coast rose splendid buildings.

The whole of the magnificent prospect was crowned by the Acropolis, where all the most glorious monuments of A. were assembled. First rose the Parthenon (q. v.), or Temple of Minerva, a pile which even now, after the lapse of centuries, remains among the wonders of the world.

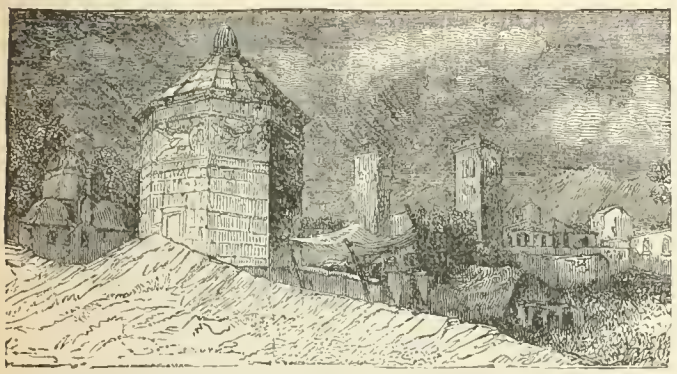
The Propylæa, all built of white marble, formed the entrance to the Parthenon. Close to it, on the north side of the Acropolis, rose the Erechtheium, the most venerated of all Athenian sanctuaries, and connected with the oldest religious history of the city. The whole of it was destroyed by the Persians, but was restored during the Peloponnesian war. Its ruins still exist, and allow us to form a very correct idea of its external form and structure. In some points, it differed from all other examples of Greek temples. But it would be tedious and unprofitable to mention in detail all those magnificent buildings which were the glory of ancient Athens. It is sufficient to say, that gods were never more superbly honored in any land. That enthusiastic love of the beautiful which animated the Athenians, turning their religion into an art, and making worship an education in æsthetics, is nowhere so clearly visible as in their religious architecture. Their mythological faith stood daily before their eyes in monumental splendor, for almost every deity had his temple or shrine in the city. Two of the finest buildings—the Temple of Theseus, and that of Jupiter Olympus—were on the outside of the city; the first to the north-west, the second to the south. The former was both a temple and a tomb, inasmuch as it held the remains of Theseus himself. It was built about 465 B.C., and was therefore older than the Parthenon. It had the privilege of an asylum for slaves, and the large space of ground which it enclosed was frequently used as a muster-ground for the Athenian soldiery. It was built of the favorite Pentelic marble, in the Doric style of architecture, and is the best preserved of all the monuments of ancient Athens. For centuries it was a Christian church, appropriately enough dedicated to St. George, the chivalrous hero of the 'dark ages' of Christianity, as Theseus had been of the 'dark ages' of Attic history; but is now the national museum of the city. The Temple of Jupiter, of which sixteen grand Corinthian columns are still extant, to the south-east of the Acropolis, and near the right bank of the Ilissus, in size, splendor, and beauty, excelled all other Athenian structures. Immense sums of money were expended upon it from the time when it was commenced by Peisistratus, until it was completed by Hadrian, a period of 700 years. The building of it was frequently suspended, so that Philostratus calls it 'a struggle with time.' At the time the Persians sacked the city, it was fortunately only beginning to be built, and so escaped destruction. Aristotle speaks of it as a work of despotic grandeur, and equal to the pyramids of Egypt. The exterior was decorated by about 120 fluted columns, 61 feet in height, and more than 6 feet in diameter. It was 354 feet long, and 171 broad, and contained the celebrated statue of the Olympian Jupiter in ivory and gold, the work of Phidias.

Besides these wonders of art, the city contained places of interest of which the memory will perpetually remain—the Academy where Plato, whose estate lay near it, gave his lessons in a grove of plane-trees adorned with statues; tradition alleged to have belonged originally to Academus. Hipparchus surrounded it with a wall, and Cimon adorned it with walks, fountains, and olive-groves. The Lyceum, the most important of the Athenian gymnasia, where Aristotle lectured; and, near to this, the Cynosarges, where Antisthenes the Cynic expounded his 'harsh and crabbed' doctrine; the hill of the Areiopagus, where the most venerable court of judicature was held; and the Prytaneum, or senate-house. About a quarter of a mile to the west of the Acropolis rises a low hill, which marks the locality of the Pnyx, a place of public assembly, forming a large semicircular area, bounded at the base by a limestone wall, from which projects a pedestal, carved out of the rock, and ascended by steps. This most interesting place has been preserved almost in its integrity, and, as we look around, we are carried back to the times when some six thousand Athenian citizens were here assembled, when the orator, standing upon the pedestal, could survey the Acropolis, with all its temples, the venerable Areopagus, and beyond the city, the extended plains and villages of Attica, with corn-fields, olive-grounds, and vineyards.

A., in its most flourishing period, numbered 21,000 free citizens; from which we may calculate that it contained about 200,000 inhabitants. More than two thousand years have passed over the beautiful city, and still its remains excite the admiration of the world. The Turks surrounded it with wide irregular walls, partly built out of the ruins of the old walls, and containing many fragments of noble columns. Of the Propylæa, the right wing, or Temple of Victory, was destroyed in 1656 by the explosion of a powder-magazine. Six columns, with lofty arches, remain to mark the site of the opposite wing. The interior of the Parthenon was used for some time as a Turkish mosque. Eight columns remain on the east of the front, several colonnades at the sides; and of the back pediment, where the combat of Minerva and Neptune was sculptured, nothing remains save the head of a sea-horse, and two decapitated female figures. Of the pediment in front, several

figures belonging to the group representing the birth of Minerva are preserved in the British Museum, and justly regarded as master-pieces of ancient sculpture. Of all the statues which the Parthenon contained, only one, that of Hadrian, has been preserved. Ruined as it has been, the general aspect of the Parthenon is still sublime. Of the Erechtheium (or temple of Neptunus Erechtheius) considerable vestiges remain, especially the beautiful female figures styled Caryatides.

The situations and vast extent of the two theaters may still be traced, though grain is now grown in the arenas. All these remains belong to the Acropolis. In the city below, there are no such splendid memorials. The Horologium, or octagonal Temple of the Winds (built by Andronicus Kyrrhestes), has been well preserved; but a few fragments found in broken walls are all that remain to tell of the splendid Gymnasium built by Ptolemæus. Beyond the city, the attention of the spectator is arrested by the



Temple of the Winds, Athens.

sublime ruins of the Temple of Jupiter Olympus. Pedestals and inscriptions have been found here and there, sometimes buried in the earth. The sculptures on the friezes of the interior of the Temple of Theseus, representing the exploits of Theseus, have been well preserved, while the external sculptures are almost utterly destroyed. A Turkish burial-place now occupies the hill where the Areiopagus held its sittings. The site of the Lyceum is indicated only by scattered stones, and a modern house and garden occupy the place of the Academy. Scarcely anything remains to show the old magnificence of the harbors Peiræus, Phaleros, and Munychia.

It is probable that, in the time of Pausanias, many structures remained belonging to the period before the Persian war, as Xerxes, during his short time of mastery over A., would scarcely have been able to destroy more than the fortifications and principal public buildings. Themistocles, in his restoration of the city, had chiefly a regard to utility; Cimon paid attention to its decoration; but Pericles far exceeded them in the magnificence of his designs, which were too vast to be carried into effect in later times. The civilization, spreading from A. as its center, raised Macedon and other states into dangerous rivalry. The defeat at Chæroneia was as fatal to the fine arts as to the liberty of the Athenians. After the works at the Peiræus had been destroyed by Sulla, the naval power, and with it the whole political importance of A., rapidly declined. It is true that the city was treated leniently by its conquerors; the temples and statues were preserved from violation, and A., with all the trophies of eight centuries of greatness, remained under the Antonines; but the free national spirit of the Athenians had departed for ever, and slowly, but surely, the fine arts shared the fate of Grecian liberty.

Their treasures, which had been spared by the Roman emperors, were gradually stolen away by various thievish collectors, especially for the decoration of Byzantium, or were destroyed by irreflective Christian zeal and barbarian invasion. About 420 A.D., the ancient religion and temple-service of A. had entirely disappeared; afterwards, the schools of philosophy were closed by Justinian, and Greek mythology was gradually forgotten. St. George took the place of Theseus, and the Parthenon was converted into a church. The surviving industry of A. was injured by Roger of Sicily, who removed its silk manufactures. In 1456, A. fell into the hands of Omar, and, to consummate its degradation, under the low, sensual Turks, the city of Athene was regarded as an appanage of the harem, and governed by a black eunuch. The Venetians, having captured the city in 1687, intended to carry away as a trophy the quadriga of victory from the west front of the Parthenon, but shattered it in their attempt to remove it. In 1688, A. was again delivered into the hands of the Turks, and the work of demolition now proceeds rapidly. The grand remains of antiquity were used as quarries to supply materials for ordinary buildings, and, in the course of another century, the city was reduced to its lowest point of degradation.

Modern A. (styled by the Turks Athina or Setines) is now the capital of the new kingdom of Greece. Previous to the Greek revolution (1821), it was a provincial city of inferior importance, the seat of a Greek metropolitan bishop, and under the jurisdiction of the Turkish governor in Eubœa. In 1821, the war of liberation commenced, and the Turks surrendered Athens in the following year; but again captured it in 1826, and took the Acropolis in 1827. After this it was left in ruins until 1830 when Attica was declared united with Greece by the protocol of the London Conference. In 1834, Otho, the son of the Bavarian monarch, who had been elected to the sovereignty of the new kingdom, removed his residence from Nauplia to A. Improvements now proceeded rapidly: Turkish manners and customs disappeared; the contemptible wooden houses and crooked streets were superseded by new ones—among which the Hermes, Æolus, Athene, and New Stadion streets are conspicuous; and in 1836, the foundation of a new palace was laid, and it was completed in 1843. The municipal affairs of A. are now regulated by a mayor (demarchos) and council elected by the citizens. Modern A. has a gymnasium, a library enriched with many donations from France and Germany, and a university, where about 52 professors and tutors are engaged. The number of students is about twelve hundred. Several interesting works have been printed in A. The French government has founded an Archæological Institute, and several missionary societies have branches here. A. has several printing establishments, soap-works, leather works, and silk and cotton factories. Pop. (1879) 63,374.

Political History of A.—It was the Ionic race that manifested most signally the distinguishing characters of Greek civilization; and of this portion of Hellas, A., in the brilliant part of its history, stands out most prominently. According to tradition, its political power was first established by Theseus, king of Attica, who made A. the metropolis. Here he instituted the great popular festival of the Panathenæa, and, by encouraging settlements in the city, greatly increased its population. He divided the citizens into three classes: nobility, agriculturists, and mechanics. Until the death of Codrus in 1068 B.C., A. was governed by kings; afterwards, by archons elected from the nobility. The time of holding office was limited to ten years in 752 B.C., and to one year in 683 B.C., when nine archons were annually elected, one being called the *archon eponymus*, because the year was distinguished by his name. Here begins the authentic history of A. These archons, together with the council of nobles, afterwards called the Areiopagus, exercised the whole power of the state, and administered justice. The Athenian government was thus, like all other Hellenic governments, an oligarchy; but the changes introduced by the archon Solon, 594 B.C., though remarkably moderate, laid the foundation of that democratic constitution which was afterwards perfected by Cleisthenes. The condition of the population at the time of Solon was one of extreme suffering and discord, arising chiefly from the oppressive execution, by the aristocratic archons, of the law of debtor and creditor. This law was of old extremely harsh in Greece as well as in Rome; it assigned the debtor that could not fulfil his contract as the slave of his creditor. The great part of the soil of Attica was in the hands of the rich, and the mass of the population, who tilled the lands as tenants, were either in hopeless arrears, or already, with their families actual slaves. Driven to desperation, the populace were ready to rise in mutiny; the oligarchy were afraid or unable to enforce the laws; and thus it was agreed to confer dictatorial power on Solon, well known for his wisdom, integrity, and sympathy with the people, and allow him to solve the problem. The disease being desperate, Solon applied the desperate remedy of abolishing existing contracts, liberating those that had been reduced to slavery, and forbidding for the future any one from pledging his own person or that of a member of his family. He next reformed the political constitution by dividing the freemen into four classes, according to the amount of their property. It was only the richer classes that paid taxes and were eligible to the offices of state; but all had votes in the assembly that elected the archons, and all sat in judgment on their past conduct, on the expiry of their year of office. The government, though still oligarchical, was thus modified by popular control. Its free operation was for some time (560—510 B.C.) interrupted by the usurpation of Peisistratus and his sons, whose *tyranny*, however, was mild and enlightened, the forms at least of the Solonian constitution being preserved.

On the banishment of the Peisistratidæ (510 B.C.), a further political reform was introduced by Cleisthenes, who extended the basis of the constitution, and rendered it essentially democratic. To Cleisthenes is ascribed the origin of the practice called *ostracism* (q. v.).

Then followed the brilliant period of the Persian war, when out of the circumstances which had seemed to threaten destruction, A. rose to the highest point of power and prosperity. Miltiades at Marathon, and Themistocles at Salamis, gained the victories which

infused new courage and enthusiasm into the Greek nation. The period between the Persian war and the time of Alexander the Great, or from 500 to 336 B.C., was the most glorious in Athenian history; and in 444, Cimon and Pericles raised the city to its highest point of grandeur and beauty. But under Pericles, the beginning of a decline took place, through the decay of ancient morals and the Peloponnesian war, which ended in the capture of A. by the Lacedæmonians. After this, A. retained only the shadow of its former power and dignity. The thirty appointed ministers of government were, in fact, so many tyrants, supported by the Lacedæmonian army. After eight months of despotism had been endured, the tyrants were expelled by Thrasybulus, a free constitution was restored to A., and a new period of prosperity commenced. But it was not destined to endure long; a formidable foe, Philip of Macedon, now appeared in the north. The Athenians having opposed him in the Phocian war, Philip took from them several of their colonies. Then followed the defeat of the Athenians at Chæroneia (338 B.C.), a fatal blow to Greece. A. with other states became subject to Macedon. The free spirit of the citizens was broken, and in moral character they degenerated. After Alexander's death, a fruitless attempt was made to regain their liberty. Antipater instituted an oligarchy of wealth. Soon afterwards, A. was taken by Cassander, and placed under the rule of Demetrius Phalereus, who employed his power wisely and beneficently. Once more the old constitution of A. was restored by Demetrius Poliocretes, and a short interval of independence was enjoyed, until the city was taken by Antigonus Gonatas. After liberating themselves from the dominion of Macedon, and joining the Achaian confederacy, the Athenians were so misguided as to support Mithridates against the Romans. The last error was fatal. Sulla conquered A., destroying the port of the Peiræus, and left only the appearance of liberty and independence, which entirely vanished in the time of Vespasian. Still, after the spirit of liberty and progress had departed, A. long remained safe from spoliation. The Romans, in their respect for Grecian pre-eminence in art and philosophy, and moved also by religious reverence, long regarded Athens as a captive too noble and beautiful to suffer any indignity.

A'THENS, a name applied to twenty-three places in the United States. The most important of them is a thriving town in Georgia, 92 miles to the west-north-west of Augusta. It is the terminus of a branch-railway, which joins the Georgia Central. It contains several cotton factories, and is the market for an extensive cotton-growing region. It is the seat also of the university of Georgia, and has three newspapers. Pop. (1871) 4251; (1881) 6099.

A'THERINE (*Atheri'na*), a genus of small fishes, allied to the Mullet family (*Mugilidæ*), but latterly separated into a distinct family, *Atherinidæ*. The Atherines have more than twice as many vertebræ as the Mullets; they are of a rather slender form, but few of them exceed six inches in length. They have a protractile mouth, and very small teeth; some are quite toothless. Almost all the known species, which are numerous, and found in the seas of different parts of the world, have a broad silvery band along each flank. Some of them are much esteemed for their delicacy. They all congregate in great shoals. They abound in the Mediterranean. One species, *A. Presbyter*, is very common on the south coast of England and on some parts of the coast of Ireland, but is rare on the east coast of Britain.

Atherine (*Atherina Presbyter*).

In the markets of some of the southern towns of England where the Smelt (q. v.) is unknown, it is sold under that name: in Brighton and some other places, it is called *Sand Smelt*. Where this fish abounds, it is often taken by anglers from the shore, biting readily at almost any bait.

ATHERO'MA, or 'fatty deposit,' is generally found in the tissues of aged persons, or those who have lived dissipated and ill-nourished lives. In appearance, it is yellow and cheesy, showing under the microscope fatty granules and crystals of cholesterine. Its most common situation is between the middle and inner coats of arteries, and is dangerous, inasmuch as it interferes with the elasticity of the arterial tube, rendering it more liable to injury, and less able to repair itself, should any occur. A. generally precedes aneurism (q. v.). Cysts filled with contents resembling bread-sauce, which frequently occur in the scalp, are termed atheromatous tumors.

A'THERSTONE, a market-town of Warwickshire, England, on the borders of Leicestershire, 16 miles north-east from Birmingham; in a valley surrounded by finely wooded hills, on the Roman road called Watling Street, the Trent Valley Railway, and the Coventry and Fazeley Canal. The town is irregularly built; many of the houses are very ancient; the old houses are of stone, the modern ones of brick. Some of the modern churches and other public buildings are handsome structures. Hats, stockings, and ribbons are manufactured here. Pop. (1871) 3661.

A'THLETE (Gr. *athleo*, to contend), the name given to a combatant, pugilist, wrestler, or runner, in ancient Greece. Athletics were studied in Greece as a branch of art, and led to several useful rules of diet, exercise, &c., applicable to ordinary modes of life. Bodily strength and activity were so highly honored by the Greeks, that the A. held a position in society totally different from that of the modern pugilist. When he proposed to enter the lists at the Olympic or other public games, he was examined with regard to his birth, social position, and moral character. A herald then stepped forth and called upon any one, if he knew aught disgraceful to the candidate, to state it. Even men of genius contended for the palm in athletic exercises. Chrysippus and Cleanthes, the famous philosophers, were victorious athletes, or, at least, *agonistæ*, i. e., persons who pursued gymnastic exercises, not as a profession, but for the sake of exercise, just as at the present day we have gentlemen-cricketers, amateur-pugilists, &c. The profound and eloquent Plato appeared among the wrestlers in the Isthmian games at Corinth, and also in the Pythian games at Sicyon. Even the meditative Pythagoras is said to have gained a prize at Elis, and gave instructions for athletic training to Eurymenes, who afterwards gained a prize at the same place. So great was the honor of an Olympian victor, that his native city was regarded as ennobled by his success, and he himself considered sacred. He entered the city through a special breach made in the walls; he was supported at the public expense; and when he died, was honored with a public funeral. Euthymus, of Locri in Italy, who had, with only one exception, been regularly victorious at Elis, was honored with a statue, to which, even during his lifetime, homage was paid by command of an oracle. Athletic sports were first witnessed at Rome 186 B.C. They were introduced by M. Fulvius at the end of the Ætolian war, and became excessively popular in the time of the emperors. At Rome, the athletes formed a corporation.

ATHLO'NE, a small town in the center of Ireland, on both sides of the Shannon, chiefly in the county of Westmeath, but partly in that of Roscommon. It is the largest town between Dublin and Galway, and lies on a commanding situation, 3 miles below Lough Ree, in a carboniferous lime-stone district. The chief manufactures are felt-hats, friezes, linens, and stays. A canal here, a mile long, enables large river-steamers to navigate the Shannon for 116 miles, from Killaloe to Carrick-on-Shannon, uninterrupted by the river-rapids. The Shannon is crossed by a fine bow-string and lattice iron bridge of two arches, 175 and 40 feet span. Pop. (1871) 6565; (1881) 6901. A. sends one member to parliament. A. Castle, on the Roscommon bank of the Shannon, was founded in the reign of King John, and has now been rendered one of the chief military positions in Ireland. The fortifications cover 15 acres, and contain barracks for 1500 men.

A'THOLE (Pleasant Land), a district of 450 square miles, in the north of Perthshire. It occupies a great part of the southern slopes of the Grampian mountains, and is intersected by many narrow glens, down which flow the rapid tributaries of the Tay. It is chiefly composed of gneiss and quartz rock, with beds of primary limestone. Dr. Hutton's explorations among the granite veins in Glen Tilt, were among the chief means of establishing the Plutonic theory of geology. A. was once one of the best hunting districts in Scotland. Athole deer-forest is said to contain 100,000 acres, and 10,000 head of deer, of which 100 are killed annually. In the picturesque Pass of Killiecrankie, in this district, 17 miles north-west of Dunkeld, Claverhouse fell in 1689, though victorious over the trops of King William III.

A'THOR, or ATHYR, but properly, *Het-her*, i. e., 'the habitation of God,' the name of an Egyptian goddess who, in the mythological system of that people, is ranked among the second class of deities. She was the daughter of Ra, the sun. By the Greeks, she was identified with Aphrodite (Venus). The cow was regarded as her symbol, and, in hieroglyphics, she generally appears with the head of that animal, bearing between her horns the figure of the sun's disk. A. is also represented as a cow itself, and as a bird with human face, horns, and the sun's disk. On the oldest monuments, she is frequently portrayed bearing a temple on her head, as in the Athor-capitals of the Ptolemaic buildings, falsely supposed to be heads of Isis. Originally, the goddess had a cosmogonic significance; later, she was called the 'mistress of dance and jest,' and held in her hands, as symbols of joy, the cord of love and the tambourine. Queens and princesses were often represented by the figure of A. Her worship was generally spread through Egypt. Her most sacred abode was at Denderah. After her the third month of the Egyptian year was named.

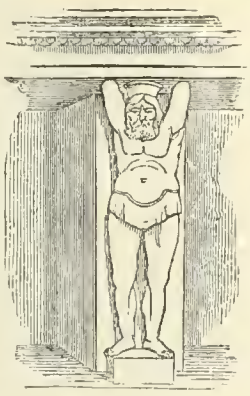
A'THOS, HA'GION O'ROS, or MO'NTÉ SA'NTO, i. e., the Holy Hill, the principal mountain of a chain extending, in a peninsular form, from the coast of Macedonia into the Ægean Sea, between the Gulfs of Contessa and Monté Santo, and connected with the mainland by a narrow isthmus. The length of the pen-

insula is 40 miles; breadth, 4. According to tradition, it received its name from A., son of Neptune, or from A., a giant who battled against the gods. The highest summit in the chain, or Mount A. proper, a solitary peak at the southern extremity of the peninsula, rises 6350 feet above the sea-level. In ancient times, several towns were built on A. Herodotus mentions five. The most memorable thing in connection with A., is the canal which Xerxes cut through the isthmus, in order to escape the stormy gales which rendered the navigatian round the promontory very perilous, and which had shattered the fleet of Mardonius some years before. Traces of this canal still exist. In the middle ages, A. was covered with monasteries, of which 20 still remain (besides several hermitages, chapels, &c.). The largest are the monasteries of Ivoron and St Laura; the richest, Vatopædi. The entire number of monks who inhabit the 'Holy Hill' is about 8000. They form a kind of monastic republic under the Turkish government, to which they pay an annual tribute of nearly £4000.

The monks follow the rule of Basilius, and lead an ascetic life, engaged chiefly in agriculture, gardening, and the care of bees. In diet, they restrict themselves to herbs, fruits, and fish. They carry on a considerable trade in amulets, images, crucifixes, wooden articles of furniture—all of their own manufacture—and also reap profits from the numerous visits of pilgrims. Karyæs, the principal place in the peninsula, is picturesquely situated in the midst of vineyards and gardens, and has 1000 inhabitants. Here the market is held; but no female, even of the animal kind, is permitted to be present, or even to enter the peninsula. In the middle ages, A. was the center of Greek learning and Christian-Byzantine art. Now, scarcely more than two or three monks, of tolerable education, can be found in a monastery. The libraries are neglected, though containing several beautiful old manuscripts, some specimens of which have been brought to Western Europe. They contain, however, little or nothing of value in classical literature.

ATHY′, a small town in the south-west of Kildare county, Ireland, on the E. side of the river Barrow, here joined by the Grand Canal. It lies in a carboniferous limestone district. It chiefly consists of 2 main streets. Pop. (1881) 4181. Its chief export is grain.

ATLA′NTA, a flourishing city of Georgia. It owes its prosperity chiefly to its situation, five important railways connecting here—the Atlanta and West Point, the Atlanta and Richmond, the Georgia, the Macon and Western, and the Atlantic and Western. Independently of these means of communication, the surrounding country, besides being rich in grain and cotton, contains gold, iron, and other valuable minerals. A. was destroyed by General Sherman, November, 1865, but is rapidly recovering its former prosperity. Pop. (1880) 37,421. See ATLANTA in AM. SUPP.



Atlas Column, from the Baths at Pompeii.

ATLA′NTES, in Arch., so called, by the Greeks, in reference to the mythical Atlas, (q. v.), are male figures used instead of columns. The Romans called them Telamones.

ATLA′NTIC OCEAN, so called either from Mount Atlas, or from the fabulous island of Atlantis, is that part of the ocean that divides the Old World from the New. Its extreme breadth is about 5000 miles, and its narrowest part, between Cape St. Roque in Brazil, and the nearest point in Africa, about 1600 miles. If the A. be supposed to be bounded by the polar circles, and to include the Caribbean Sea, Hudson Bay, Mediterranean Sea, and the other connected water-surfaces, it covers an area computed at 35 million square miles. The A. is naturally divided into three portions—the north, south, and intertropical A. It stands in open connection with the north and south polar seas, and in the remarkable parallelism of its coasts, resembles rather a vast river than an ocean. Its northern half sends off numerous ramifications on both sides, some of them forming almost shut seas: on the west, Hudson's Bay, the Gulf of St. Lawrence, and the Gulf of Mexico; on the east, the Baltic, North, Mediterranean, and Black Seas. In the south, again, both coasts present a comparatively unbroken line; and there is a remarkable correspondence between their projecting and retiring angles, the convex coast of Brazil lying opposite to the Gulf of Guinea, and the projection of Senegambia answering to the retirement of the American coast in the Caribbean Sea.

The whole of the New World, with the exception of the narrow strip lying west of the Andes and Rocky Mountains belongs to the *basin* of this ocean. It drains comparatively little of the Old World, as may be seen by tracing the water-shed on a map. Owing to the numerous seas and inlets connected with it, the extent of its shores is immense, over 50,000 miles, several thousands more than that of the shores of the Pacific and Indian Oceans. Except near the continents, the Atlantic is poor in islands compared with the Pacific. The chief islands in the open ocean are Iceland, Farö, Bermudas, Azores, Ascension, St. Helena, the Falkland Islands, South Georgia, and Sandwich Land.

The A. is the greatest highway of the civilized world, and everything that concerns its navigation is of great importance. Under the system of observations carried on for many years by the governments of Holland, Great Britain, the United States, and France, much has been done to amass information as to its currents, winds, depth, temperature, &c., the chief results of which either have been or are in the course of being published. The operations connected with the telegraph-cable were also the means of furnishing us with some valuable information regarding the Atlantic.

The chief A. currents are two. The *Equatorial Current*, which, starting from about the island of St. Thomas, in the Gulf of Guinea, with a rate of motion varying from 18 to 24 miles a day, proceeds westwards on both sides of the equator till near Cape San Roque, where it divides, one branch running south along the coast of Brazil, and the other along the coast of Guiana into the Caribbean Sea. The velocity of this current is 24 miles a day at the point where it curves south, whence it gradually diminishes in strength as it proceeds southward to little more than six miles a day. Within the South A. there is a complete circulation of the waters, induced by the prevailing winds, and maintained at about twelve miles a day Its force also varies with the months, being determined by the prevailing force of the wind of each month. Its breadth varies from 200 to 400 miles; and since it is fed by currents from north and south of it, its temperature is consequently considerably lower in the eastern than in the western part of its course. The other great current is the *Gulf Stream*. This, originally part of the equatorial current, after flowing past the Guiana coast, and through the Caribbean Sea, issues from the Gulf of Mexico, through the Strait of Florida, and after following the direction of the American coast to about 40°, turns seaward, touches the great Newfoundland Bank, and gradually curving round, is lost as a distinct current about the Azores (see GULF STREAM). The water of this stream is often upwards of 20° warmer than the surrounding ocean. The Gulf Stream has an immense influence on the Atlantic. Besides these great currents the A. abounds in smaller ones, such as the northerly currents along the East Greenland and Labrador coasts (this Arctic current extending as far south as 36° N. lat., its rate being from 24 to 10 miles a day); the southerly current along the west of Greenland; Rennel's current, west of the Bay of Biscay; and the great current along the west of Africa, from Morocco southwards, till it is merged in the Guinea current. The whole of these currents, follow in every case the prevailing winds of the regions where they flow.

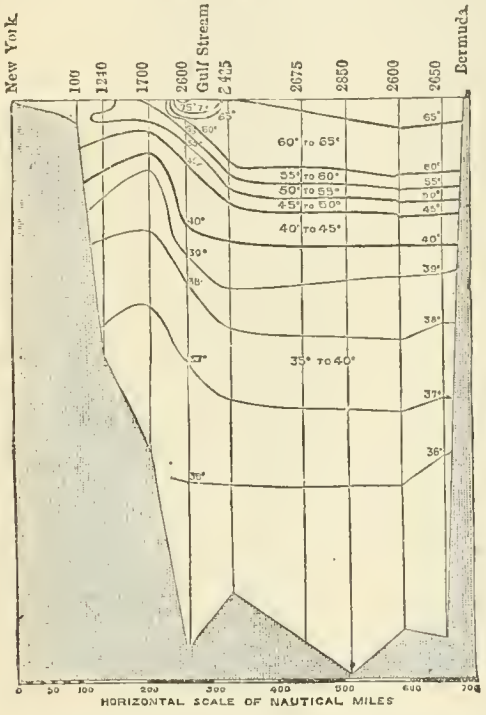
Since over the whole of the eastern half of the A., from about N. lat. 45° northwards, the prevailing winds are south-westerly, there is over the same region a general flow of the water of the ocean towards the north-east, passing the British Isles, and thence along the coast of Norway, to some distance east of the North Cape. It is to this circumstance that the mild temperatures of North-western Europe must be referred. The amelioration of the winter climates from this cause is very great, amounting to about 30° in the Hebrides, and to fully 40° in the Lofoden Islands. This effect is directly brought about, not by the winds alone, but by the influence of the winds and sea combined. The influence of currents on the temperature of the ocean is so great, that even in August, the isothermal of 50° touches the north of Norway in lat. 72° N., whereas to south-east of Newfoundland the same isothermal descends to about lat. 42° N. Again, on the meridian of 74° W., the change of temperature from lat. 40° to 35° N., or 300 miles, is 18°·0; whereas on the meridian of 20° W. from lat. 40° to 10°, a distance of 1800 miles, the change of the temperature of the sea is only 15°·0.

The temperature of the A. about the equator is, if we except the part between 20° and 35° W. long., above 80°: that of the Gulf of Guinea reaches the maximum of 85° in April; from October to May it is above 80°; in June and September about 80°; and in July and August it falls below 80°: that of the Caribbean Sea is above 80° from July to October, during the rest of the year below 80°, except in July. Between 10° and 30° lat. N., the temperature of the eastern part of the A. is always from 3° to 7° colder than the western, and the maximum and minimum temperatures take place later in the year in the Caribbean Sea than off the African coast.

Much has been done recently, particularly by H.M.'s ships *Porcupine* and *Challenger*, in throwing light on the physical geography of the A. The most important of the observations are those of deep and bottom temperatures, from their connection with oceanic circulation, and the distribution of life in the depths of the sea, and the bearings of the questions thereby raised on geological

speculation (see art. SEA). Animal life abounds at much greater depths than was formerly supposed; although beyond 6000 feet it gradually diminishes. A great part of the bottom of the North Atlantic is covered with a slimy 'ooze,' composed for the most part of the chalk-producing globigerina; in very deep parts this is replaced by a brown, clay-like mud, with few traces of animal forms.

Regarding the depth of the A., it is only recently that reliable data have been obtained; along certain tracts, especially those of the *Challenger*, the profile of the bottom can now be laid down with considerable certainty. The deepest sounding made by the *Challenger* with its improved method of sounding (see SOUNDINGS), is 3875 fathoms, or 23,250 feet, at a point about 90 miles off St. Thomas, West Indies. A remarkable ridge, about 400 miles wide, and 10,000 to 12,000 feet, or 2 to 2¼ miles, below the surface of the sea, extends along the bottom of the A. from Cape Clear in Ireland to Cape Race in Newfoundland, a distance of 1640 miles. Along this, which is known as the 'Telegraph Plateau,' the Atlantic cables are laid. The accompanying diagram exhibits the depths and temperatures in the track between New York and Bermuda:



Section of the North Atlantic Ocean between New York and Bermuda. Showing the Soundings (in fathoms) and Isothermal Lines obtained in H.M.S. *Challenger*, Captain G. S. Nares, 1873.

ATLANTIC TELEGRAPH. Referring to other articles for details concerning the scientific and mechanical principles of electro-telegraphy, the Atlantic cables may more especially be described here.

The possibility of laying an electric cable in the Atlantic, from Europe to America, was suggested by Professor Morse so far back as 1843; but it was not until 1854 that Mr. Cyrus Field and others discussed the means of practically realizing the idea. Lieutenant Maury discovered that the bed of the Atlantic, between Ireland and Newfoundland, forms a kind of plateau, covered with soft ooze, favorably situated as a resting-place for a cable. In 1855, negotiations were carried on, partly in America, but chiefly in England, to establish a company and raise capital; which objects were attained in 1856. The 'New York and Newfoundland Telegraph Company' connected Newfoundland with the mainland of America by cables and land wires; but the 'Electric Telegraph Company' undertook the laying of a cable from Newfoundland to Ireland, with a capital of £350,000, in shares of £1000 each. A length of 2500 English miles of cable was ordered, and was completed by the summer of 1857. The conductor consisted of 7 fine eepper wires, No. 22 gauge, twisted tightly together, forming a cord $\frac{1}{18}$th inch thick, and weighing 107 lbs. per mile. This thickness was increased to $\frac{3}{8}$th inch by a core of three layers of gutta-percha. Outside the core was a jacket of hempen yarn, saturated with pitch, tar, bees-wax, and boiled linseed oil. The outer sheath consisted of 18 strands, each formed of 7 No. 22 iron wires. The whole diameter was about $\frac{1}{10}$th inch, and the weight 1 ton per mile. In the manufacturing processes, the wires and yarns were twisted round each other by revolving drums and circular tables worked by steam-power; while the coatings of gutta-percha were applied by forcing the substance through dies which had the copper conductor passing through their center. The *Niagara* and the *Agamemnon*, the one lent by the United States government and the other by the English, took 1250 miles of the cable each, and steamed forth from Valentia (west coast of Ireland) on August 7, 1857. The *Niagara* paid out her portion of cable as she went. On the 11th, in an attempt to slacken the rate of paying out, the cable snapped, and the end sank in 2000 fathoms of water, at 280 miles from Ireland. The appliances on board were not sufficient to remedy the disaster, and the two ships returned to Plymouth, where the two portions of cable were placed in tanks until the next following year.

The Atlantic Telegraph Company raised more capital, made 900 miles additional cable, and prepared for a new attempt in 1858. The *Niagara* and *Agamemnon* were again employed; but the submersion was to begin in mid-ocean, one ship proceeding eastward, and the other westward, after splicing the two halves of the cable. They left Valentia, June 10; but it was not till the 26th that they could finish the splice and commence the submersion. On the 29th, a double breakage took place, and 144 miles of cable went to the bottom, wholly severed from the rest. The *Agamemnon* returned to England for improved appliances and further instructions; and a month was thus lost. On July 29, the two ships again spliced their two halves of cable in mid-ocean, and proceeded with their work without further disaster. On August 6, the *Agamemnon* reached Valentia, and the *Niagara* Newfoundland, and exchanged congratulatory messages through the whole length of cable. Soon afterwards, greetings were exchanged between the Queen and the President, and between many public bodies and official persons. The station at Newfoundland was connected by wires and cables with the general telegraphic system of America; and that at Valentia with the general system of Europe. The cable continued working until September 1, sending 129 messages (of about 11 words each on an average) from England to America, and 271 from America to England. The signals then ceased, and the cable became useless; it had been injured by the winter's sojourn at Plymouth.

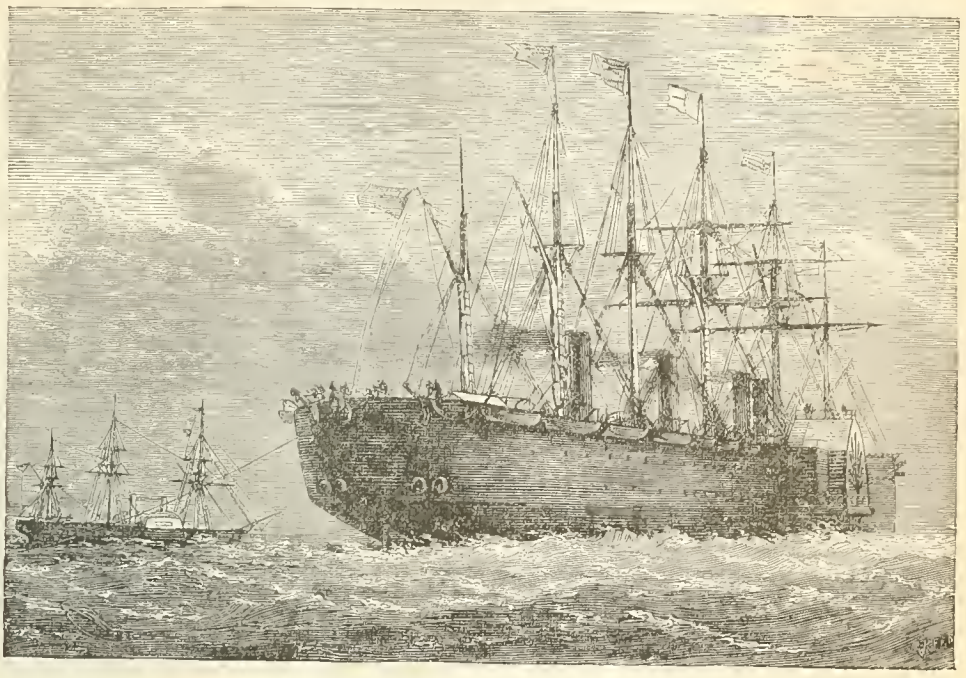
From 1858 to 1864, the Company were engaged in endeavoring to raise new capital, and to obtain increased subsidies from the English and American governments; while scientific men were making improvements in the form of cable, and in the apparatus for submerging it. At length the Telegraph Construction and Maintenance Company (formed by an amalgamation of the Gutta Percha Company with the wire-cable-making firm of Glass and Elliott) made an entirely new cable, much thicker and more costly than the former one. The conductor, 306 lbs. per mile, and $\frac{1}{4}$th inch thick, consisted of seven No. 18 copper wires, each $\frac{1}{20}$th inch thick. The core was formed of four layers of gutta percha alternating with four of Chatterton's Compound (a solution of gutta percha in Stockholm tar); the core and conductor together were 700 lbs. per mile, and $\frac{9}{20}$th inch thick. Outside this was a jacket of hemp or jute yarn, saturated with preservative composition. The sheath consisted of 10 iron wires, No. 13 gauge, each previously covered with 5 tarred Manilla yarns. The whole cable was $1\frac{1}{4}$th inch thick, and weighed 35¾ cwt. per mile, with a breaking strain of 7¾ tons.

As the cable (2300 miles) weighed more than 4000 tons, it was resolved to employ the *Great Eastern* steam-ship to carry it out and lay it. Three enormous iron tanks were built in the fore, middle, and aft holds, from 50 to 60 feet diameter each, by 20½ feet deep; and in these the cables were deposited, in three vast coils. On July 23, 1865, the *Great Eastern* started from Valentia with her burden, the main cable being joined end to end to a more massive shore cable, which was drawn up the cliff at Foilhummerum Bay, to a telegraph house at the top. The electric condition of the cable was kept constantly under test during the progress of the ship; and more than once, the efficiency was disturbed by fragments of wire piercing the gutta percha and destroying the insulation. On August 2, the cable snapped by over-straining, and the end sank to the bottom, in 2000 fathoms water, at a distance of 1064 miles from Ireland. Then commenced the remarkable process of dredging for the cable. A five-armed grapnel, suspended from the end of a strong iron-wire rope, five miles long, was thrown overboard; and when it reached the bottom, it was dragged to and fro across the line of cable by slow steaming of the *Great Eastern;* the hope being that one or other of the prongs would catch hold of the cable. A series of disasters followed by the breaking of swivels, and the loss of grapnels and ropes; until at length, on August 11, it was found that there were no more materials on board to renew the grappling. The *Great Eastern* returned to England, leaving (including the operations of 1857—1858) nearly 4000 tons of electric cable useless at the bottom of the Atlantic.

A new capital, and new commercial arrangements altogether, were needful for a renewal of the attempt. Another cable was made, slightly differing from the former. The jacket outside the core was made of hemp instead of jute; the iron wires of the

sheath were galvanized, instead of being left in their natural state; and the Manilla hemp which covered them was left white instead of being tarred. These few changes made it weigh nearly 500 lbs. per mile less, mainly through the absence of tar; while its strength or breaking strain was increased. Enough of this cable was made to span the Atlantic, with allowance for slack; while a sufficient addition of the 1865 cable was provided to remedy the disaster of that year.

The Atlantic telegraph operations in 1866 were of a remarkable and interesting kind. On July 13, the *Great Eastern* set forth from Valentia, accompanied by the steamers *Terrible*, *Medway*, and *Albany*, which were to assist in the submersion and in subsidiary matters. The line of route was chosen midway between those of the 1858 and 1865 cables, for the most part a few miles from each. The *Great Eastern* exchanged telegrams almost continuously with Valentia during her progress. The mishaps were few in number, and easily remedied; and the *Great Eastern* safely entered the harbor of Heart's Content, Newfoundland, on the 27th. After this, operations commenced for recovering the end of the 1865 cable, and completing the submersion. The *Albany*, *Medway*, and *Terrible* set off, on August 1, to the spot on the ocean beneath which the end of the cable was lying, or as near to it as calculations could establish. Certain buoys, left anchored there twelve months previously, had been carried away by the storms of the preceding winter; but the latitude and longitude had been very carefully registered. The *Great Eastern* started from Heart's Content on the 9th, and then commenced a series of grappling operations, which continued through the rest of the month. The cable was repeatedly caught, and raised to a greater or less height from the ocean-bed; but something or other snapped or slipped every time. After much trial of patience, the end of the cable was safely fished up on September 1; and electric messages were at once sent through to Valentia, just as well as if the cable had not had twelve months' soaking in the Atlantic. An additional length having been spliced to it, the laying recommenced; and on the 8th the squadron entered Heart's Content; having thus succeeded in laying a second line of cable from Ireland to America.



Great Eastern paying out the Atlantic Cable.

Mishaps have since taken place; but in every case the injuries have been attended to, and the two cables maintained in good working order. The rapidity of signalling (at first only two words per minute) was greatly increased; the tariff of charges was lowered; the public of the two nations used the cable-telegraph extensively; and the company realized good dividends, notwithstanding the heavy expenditure which had been incurred.

The art of laying submarine cables being thus established, many other projects for Atlantic telegraphy have from time to time been started. One scheme was for a line from the North of Scotland to Faröe Islands, Iceland, Greenland, and some point near the mouth of the St. Lawrence; but the projectors did not succeed in raising capital. A French company afterwards planned a direct route from France to America. In June 1869, the *Great Eastern* steamed out of Brest with this new cable, no less than 2328 miles long; and the submersion was successfully effected. There is a connection between Brest and Falmouth. A new French cable from Brest to the island of St. Pierre, to the south of Newfoundland, was laid in the end of 1879. In the year 1874, a third British cable was successfully laid from Ireland to Newfoundland. A 'Direct United States Cable Company' was also formed; Messrs. Siemens undertook the manufacture of the cable, the lightest yet planned for Atlantic telegraphy, its weight being 480 pounds of copper and 400 pounds of gutta-percha per mile; about 3060 miles were needed from Ireland to New Hampshire. The laying of the cable was completed early in the summer of 1875.

Lower down the Atlantic, extensive operations have been or are being completed. When a cable had been laid from Falmouth to Lisbon, the latter became the starting-point for extensive ocean routes. The 'Brazilian Submarine Cable Company' began in 1873 a cable to extend from Lisbon to Madeira, St. Vincent, and Pernambuco. The whole length is 4000 miles, of which the longest section (across the ocean) is somewhat under 2000 miles; it is connected at Pernambuco with other cables to Para, Rio Grande, &c.

There is a 'Direct Spanish Cable' from the Lizard to Bilbao; and there are duplicate lines from Falmouth to Lisbon. In and near the Gulf of Mexico, the electricians have been working with great energy. Most of the principal West India islands are now connected by cable one with another, with Colon (Panama), and with the United States mainland at Florida.

ATLA'NTIC TE'LEGRAPH, History of. In 1842, Professor Morse of New York, having stretched a submarine cable between Castle Garden and Governor's Island, Boston, and succeeded in transmitting an electric current from one end to the other, expressed his opinion that it would be possible to effect an electrical communication through the sea. After further investigations, he announced to the Secretary of the Treasury of the United States, 'that a telegraphic communication on his plan might with certainty be established across the Atlantic.'

Three years prior to that, Sir William O'Shaughnessy gave practical proof that electrical messages could be conveyed through water, by depositing a cable in the bed of the Hooghly; but it was the successful submarine telegraphic undertakings of the Messrs. Brett, who, in June 1845, registered a 'General Oceanic Telegraph Company,' with the object among others of joining this country with America by means of a telegraph 'across the Atlantic Ocean,' and six years afterwards united England with France (see Telegraph, *History*), that first fairly convinced the public mind that the New World might be put on what may be called conversational terms with the Old. The supposed great depths of the Atlantic Ocean presented the most imposing obstacle to this desired closeness of communion; but when it was discovered that between Ireland and Newfoundland there extended, along the bottom of the Atlantic, at a depth of not more than two miles below the surface, a fine broad platform (see Atlantic Ocean), seemingly so specially formed by nature for the purpose of electrical communication, that Captain Maury at once designated it the Telegraphic Plateau, the project of an Atlantic submarine cable assumed a practicable form. In 1854, the colonial government of Newfoundland passed an act incorporating a company to establish a telegraphic communication between the Old World and the New, and aided it by a subsidy, and by grants of lands. The colonial government also conferred upon the company the exclusive right of landing a telegraphic line upon the coast under its jurisdiction. The government of Prince Edward's Island and the state of Maine made similar concessions; and authority for certain subsidiary operations in Canada was also obtained. The company, incorporated under the title of 'The New York, Newfoundland, and London Telegraph Company,' commenced operations by uniting St. John's in Newfoundland with lines in the United States and British North America. This done, numerous preliminary experiments were undertaken by eminent electricians and engineers, in order to determine the amount of retarding force which inducted and disguised electricity were likely to offer to the transmission of currents along submarine wires of unusual length. Having by these experiments, 2000 in number, tried with 62 different kinds of cable, determined the one best adapted

for the conveyance of electricity through such a length, and at such a depth in the Atlantfc, the next step was the formation of a more influential company. In 1856, 'The A. T. Company,' to which all the privileges conferred on the old company were handed over, was formed with a capital of £350,000. The governments of Great Britain and the United States liberally aided the company, guaranteeing, by a contract of 25 years' duration, to pay to the company, until such time as its dividend reached 6 per cent., a subsidy of £14,000 a year, and of £10,000 subsequently. They also agreed to furnish ships for laying down the cable.

The cable, which weighed about a ton per mile, equal to 14 cwt. in water, was composed of a strand of seven wires of pure copper, coated with three separate layers of gutta percha, wrapped over with hemp saturated with pitch and tar, and finally bound round with iron wires, 332,500 miles of iron and copper wire being employed in its construction. It was deposited in the holds of the *Agamemnon*, a line-of-battle ship supplied by the British government, and the *Niagara*, a splendid frigate furnished by the United States, and the two vessels started on their grand mission. After two unsuccessful attempts during the years 1857 and 1858, the expedition started again for mid-ocean, whence the ships were to start, paying-out towards opposite shores, on the 17th of July, 1858. The cable was united and lowered on the 29th of the same month; and the *Agamemnon*, notwithstanding a severe gale of wind, arrived at Valentia, having successfully laid her portion of it, on the morning of the 5th of August. The *Niagara* about the same time arrived in Trinity Bay, Newfoundland, and science had annihilated space between the Old World and the New. On the 17th August, the extremities of the cable having been put in connection with the recording-instruments, the following message was flashed through the ocean in thirty-five minutes: 'Europe and America are united by telegraph. Glory to God in the highest; on earth peace and good-will towards men.' Messages and replies from the Queen to the President of the United States, from the Mayor of London to the Mayor of New York, &c., followed. But on the 4th of September, the signals at Valentia became unintelligible. One commercial message of great importance passed through the cable, in reference to the collision between the Atlantic steamers, the *Europa* and *Arabia;* this single message saved the commercial world £50,000, which would doubtless have been spent in extra insurance on the vessels and cargoes thus delayed. The cable of 1858 having become useless, two other lines were laid in 1865 and 1866, between Great Britain and North America. A cable was laid in 1869 from France to the United States. For the history of the Atlantic Telegraph since 1869, see ATLANTIC TELEGRAPH. See also TELEGRAPH.

ATLAN'TIS, according to ancient tradition, the name of a vast island in the Atlantic Ocean. It is first mentioned by Plato, who represents an Egyptian priest as describing it to Solon, but, of course, according to Plato's view of the matter. In this description, A. appeared as an island larger than Libya and Asia Minor taken together, and lying off the Pillars of Hercules in the Atlantic Ocean. Plato gives a beautiful picture of the interior of this imaginary land, and enriches it with a fabulous history. Some early writers supposed that the Canary Islands were the remains of the old A.; for Plato had stated that at the close of the long contest which its inhabitants maintained against the Athenians, nine thousand years before his time, the sea suddenly engulfed the island, and had ever since been unnavigable, by reason of the shoals of mud created by the sunken island. Some found it in the Scandinavian peninsula; others (first Bircherod in 1685) have supposed that Phœnician or Carthaginian merchant-ships had been driven by storm on the coast of America, and that the supposed vast island of A. mentioned by Plato, as well as the great unnamed island spoken of by Pliny, Diodorus, and Arnobius, may have been the New World.

ATLAS is that piece of the human vertebral column which is nearest to the skull; in other words, it is the first cervical vertebra. It may be known from the other six by its being without a body or spinnous process, by its being a mere irregular bony ring, partly divided into two unequal parts by a constriction; this division in the recent subject is completed by a ligament, the part in front being occupied by the tooth-like process of the second cervical vertebra, and that behind by the spinal-marrow. On each side, the ring is very thick; it is smooth and cupped above to receive the condyles of the occipital bone. The corresponding parts below are flat, and rest on the second cervical vertebra.

The A., with the occipital bone, form the joint on which the head moves in bowing; and turns on the pivot of the second cervical vertebra, when we look from side to side.

ATLAS, according to Hesiod's *Theogony*, one of the Titans, the son of Iapetus and Clymene, and brother of Menœtius, Prometheus and Epimetheus. Apollodorus, however, states him to have been a son of Asia, and Hyginus, a son of Æther and Gaea. He married Pleone, daughter of Oceanus (or Hesperis, his own niece), and became the father of the Pleiades. As leader of the Titans, he attempted to storm the heavens, and for this supreme treason was condemned by Zeus to bear the vault of heaven on his head and hands—the sting of this mythological punishment obviously being, that A. was compelled to support what he thirsted to destroy. The later writers, however, rationalize the myth, and state that A. was a mighty king who had great skill in astronomy, and only tried to storm heaven intellectually.—In consequence of the ancient views which made the vault of heaven rest on solid pillars or other supports, the name A., originally mythological and cosmogonic, was introduced into geography. Mercator, in the 16th c., gave the name A. to a collection of maps; probably because the figure of A. supporting the heavens had been given on the title-pages of such works.

A'TLAS, a mass of mountain-land in the western part of North Africa. Herodotus mentions a smoking mountain of this name situated on the south-west of the Little Syrtis, and twenty days journey westwards from the Garamantes, styled by the natives the 'pillars of heaven.' By later writers, after the time of Polybius, the name A. was always given to the chain of mountains in North-west Africa extending from the island of Cerne (now Cape de Ger) north-west through Mauritania, and Tingitana (now Fez and Marocco), and including also the heights dispersed through the region of Sahara. It is divided into the Little Atlas and the Great Atlas; the former denominating a secondary range in the country of Sous, and the other, the loftier mountains of Marocco. The A. is not properly a mountain-chain, but rather a very irregular mountainous mass of land formed of many chains running in various directions, meeting in mountain-knots, or connected by yokes, or short chains of inferior height, and diversified still further by several solitary mountains and groups of mountains. The A. attains its greatest height (13,000 feet) in Marocco, the only part where it rises above the snow-line, and obtains the name of Jebel-el-Thelj, or Snowy Mountains. Its highest peaks are Miltsin—27 miles south-east of the city of Marocco—Bibawan, and Tagherain. The most southern chain diverging here from the central mass bears the name *Jebel-Hadnar*. The heights approach the sea, and form the promontories jutting out into the Atlantic. From Marocco, the A. gradually decreases in height towards the east. In Algeria, the elevation is only 7673 feet; in Tunis, 4476 feet; and in Tripoli, 3200 feet. The whole mountain-system is intersected by the valley of the Muluia river, which flows through the north-east part of Marocco, and falls into the Mediterranean. The slopes on the north, west, and south are covered with vast forests of pine, oak, cork, white poplar, wild olive, &c. The valleys are well watered and capable of cultivation with great profit. The A. seems to be chiefly calcareous in its composition. The mineral wealth remains, however, almost wholly unexplored, though copper, iron, lead, antimony, &c., are stated to exist in abundance.

A'TMOSPHERE (Gr. *atmos*, vapor, *sphaira*, sphere) is the name applied to the gaseous envelope which surrounds the earth. The existence of an A. is to us a matter of vital importance. We owe to its influence the possibility of animal and vegetable life, the modifying and retaining of solar heat, the transmission of sound, the gradual shading of day into night, the disintegration of rocks, and the occurrence of weather phenomena. In consequence of the action of gravity, the A. assumes the form of a spheroidal stratum concentric with the earth, and presses heavily on its surface. It exhibits, in common with all fluid bodies, the usual characteristics of hydrostatic pressure, but its internal condition differs from that of a liquid inasmuch as its particles repel each other, and can only be held in proximity by external force. From this circumstance, it follows that the volume of any portion of air varies much more under the influence of external pressure than that of an equal volume of water, hence, the stratum of air nearest the earth is denser than strata in the upper regions, where, from their being subjected to the weight of a smaller mass of superincumbent air, the repulsive force of the particles has freer play.

That air possesses *weight*, is illustrated by the following simple experiment. If a hollow glass globe of 5 or 6 inches in diameter be weighed first, when filled with air, and then, after the air has been extracted from it by means of the air-pump, it will, when thus exhausted, weigh sensibly less than it did before, and the difference of the two results will represent the weight of the quantity of air which has been withdrawn. It has been determined by Biot and Arago that 100 cubic inches of dry air, when the barometer is at 30 inches, and the thermometer at 60° Fahrenheit, weigh 31·074 grains. The law of Archimedes (see ARCHIMEDES, PRINCIPLE OF), that a body immersed in a fluid loses a part of its weight equal to the weight of the volume of fluid displaced by it, finds its application in the A. as well as in water. If a glass globe filled with air and closed be suspended at the extremity of the beam of a delicate balance, and be kept in equilibrium by a brass weight at the other extremity, and if the whole be then placed under the receiver of an air-pump, and the air extracted, the equilibrium previously existing in air will be disturbed, and the larger body will become the heavier. The reason of this is, that when first weighed,

they each lose as much of their own weight as that of the respective volumes of air displaced by them, and are therefore made buoyant, though in different degrees, the ball with the larger volume having the greater buoyancy. In a vacuum, they are deprived of this buoyancy, and the larger body, suffering the greater loss, becomes sensibly heavier than the other. In like manner, a balloon filled with heated air or hydrogen gas is lighter than the volume of air displaced by it. It is therefore forced upwards till it reaches a stratum of such density that the weight of the volume of air there displaced by it equals the weight of the balloon itself. In this stratum it will remain poised, or move horizontally with the currents to which it may be exposed.

In endeavoring to determine the *form* of the atmospheric envelope, it is necessary to bear in mind that, according to the law of fluid-pressure, in order to produce a state of equilibrium at the level of the sea, the pressure of the A. must be equal at that level over the whole of the earth's surface. Gravity acts with less force on the air at the equator than on that at the poles, in consequence of the spheroidal form of the earth. It has there, in addition, to contend with the centrifugal force, which entirely fails at the poles, and which has a tendency to lighten the air by acting contrary to that of gravity. Hence we infer, that in order to produce the same pressure at the level of the sea, the atmospheric height at the equator must be greater than that at the poles, and that the A. must therefore possess the form of an oblate spheroid, whose oblateness is considerably greater than that of the earth itself. The greater heat at the tropical regions must also have the effect of increasing the oblateness.

The *height* of the A. has not yet been determined. That it must have a certain limit, is evident from the consideration that there must be a point at which gravity on the one hand, and centrifugal force and the repulsive action of the particles on the other, are poised, and beyond which the latter forces on balancing the former force, the aërial particles would be borne away from the earth. As, however, the law of the diminution of temperature, which materially affects the repulsive action, is unknown for the upper regions of the air, it is impossible to calculate the height of the atmosphere from the relations of these forces. From the observation of luminous meteors, it is inferred that it is at least 100 miles high, and that, in an extremely attenuated form, it may even reach 200 miles.

The *pressure* of the A. is one of its most important properties. Its effect is exhibited in the action of the ordinary water-pump. The piston is fitted air-tight in its cylinder; and on being drawn up, creates a vacuum. The water within the pump being thus freed from pressure, while that outside of it is exposed to the pressure of a column of air reaching to the surface of the A., is at once forced up by reason of the weight of air which it must rise to balance. The ascent of the water takes place till the piston has reached the height of nearly 34 feet, from which we conclude that a column of air is equal in weight to a column of water of the same horizontal section, and of the height of nearly 34 feet. As mercury is 13·6 times heavier than water, a mercurial column freed from atmospheric pressure at the one extremity, and subjected to it at the other, is 13·6 times less in height than the column of water, or about 30 inches. From the more convenient size of this column, mercury has been adopted as the standard for atmospheric pressure, and is employed in our ordinary barometers (q. v.). A mercurial column of 30 inches in height, and 1 square inch in section, weighs 15 lbs. (more accurately, 14·73), which gives us the equivalent weight of a column of atmospheric air of the same section. The word *A.* is often employed to express this weight or pressure on a square inch of surface, so that when we speak, in Mechanics, of the pressure of steam on a boiler as amounting to three atmospheres, we mean a pressure of 45 lbs. on the square inch. The pressure on a square inch being thus ascertained, we have merely to multiply it by the number of square inches on the earth's surface to obtain the total weight of the A. It amounts to 11·67085 trillions of lbs., or about $\frac{1}{1800000}$ of the earth's mass.

It must be observed that the height of the barometric column is not a constant quantity, as it varies with the latitude, the season of the year, and the hour of the day. At London its mean height is 29·88 inches; at Paris, 29·92 inches. The pressure of the A. in the northern hemisphere increases as we recede from the equator, reaching a maximum at 30° N. lat., and decreasing from 30° to 65°, where it again begins to rise. The greater height at 30°, is said to be due to the accumulation of air at that latitude by the action of the trade-winds. As the heat of the earth's surface increases the rarity of the air above it, and causes the air at the top of the heated column to overflow, we would expect that, during the year, the barometer would stand at a minimum in summer, and a maximum in winter. In reality, however, although the barometer is highest in midwinter, there is another maximum in mid-summer, making thus two minima—one in spring, the other in autumn. This arises from the part which watery vapor plays in the pressure of the atmosphere. The heat of mid-summer introduces into the air a large quantity of moisture, in the form of elastic vapor, which, adding its pressure to that of the dry air, raises what would otherwise be the minimum barometric column to a higher point than that at which it stands in spring and autumn. Similar causes affect the pressure of the A. during the 24 hours of the day. There are two maxima—one at 10 A.M., the other between 10 and 11 P.M.; and two minima—at 4 A.M. and 4 P.M. Very slight variations indicate the existence of atmospheric tidal waves; but this subject is still involved in some obscurity. The pressure of the A. exercises a most important influence on the organism of the human frame. A man of ordinary stature is exposed to a pressure of about 14 tons; but as the air permeates the whole body, and presses equally in all directions, no inconvenience is found to result from it. From experiments instituted by the brothers Weber in Germany, it has been ascertained that the heads of the thigh and arm bones are kept in their sockets by the pressure of the A; and in balloon ascents the aëronaut often suffers from bleeding at the nose, lips, and even eyes—a fact that would seem to indicate that the strength of the blood-vessels has been adjusted with reference to atmospheric pressure.

Chemical Composition of the A.—Recent chemical researches give the following as the mean composition of 100 volumes and of 100 grains of dry air:

	Volumes.	Grains.
Nitrogen	79·02	76·84
Oxygen	20·94	23·10
Carbonic acid	0·04	0·06
	100·00	100·00

Besides the substances just named, other gaseous matters occur, but in quantities so small as not sensibly to increase the bulk of the A., such as ammonia and ammoniacal salts, carburetted and sulphuretted hydrogen, carbonic oxide, sulphurous and sulphuric acid, nitric acid, and perhaps iodine, the quantity and even the presence of which are affected by local and meteorological causes. Roughly speaking, then, dry air may be said to consist of 4 volumes of nitrogen and 1 of oxygen, with a slight admixture of carbonic acid, and a mere trace of several other substances. As, however, the air of the A. is never found dry, we must add to the constituents already named watery vapor, the amount of which is constantly changing, according to locality, weather, wind, and temperature. It is stated that of 1000 grains of atmospheric air, the proportion due to aqueous vapor varies from a minimum of 4 to a maximum of 16 grains. By far the most active chemical constituent of the A. is oxygen, to the agency of which are owing the existence of animal life, the maintenance of combustion, the rusting of metals, and the occurrence of several other chemical phenomena too numerous to be detailed. A small portion of this oxygen occurs in the form of ozone (q. v.), a modification which, according to recent chemical discoveries, plays an important part in the chemistry of the A. The nitrogen which forms the bulk of the A. possesses few chemical properties of importance, but performs the important part of diluting the oxygen, which, if it occurred alone, would act with too great intensity. The presence of carbonic acid in the air is shown by the production of the white carbonate of lime in lime-water freely exposed to its influence. Carbonic acid is produced in all processes where carbonaceous matter unites itself with the oxygen of the air, such as in animal respiration, in combustion, in fermentation, in putrefaction, and similar processes. The green leaves of plants, on the other hand, possess, in presence of sunshine, the power of decomposing carbonic acid into its elements, absorbing the carbon for their own tissues, and restoring the oxygen to the A. in its original purity. Between the processes above mentioned, on the one hand, and the action of plants on the other, the quantity of carbonic acid in the air is kept nearly constant. From the table it will be seen that 10,000 volumes of atmospheric air contain 4 volumes of carbonic acid. If it occurred in a much larger proportion, being poisonous, it would become dangerous to animal life; and if it occurred in a much less proportion, the vegetable world would lack its requisite nourishment. The other substances, of which a trace is always or only sometimes found in atmospheric air, are difficult to detect in the air itself, but are generally found dissolved in rain-water, more especially in that which has fallen immediately after a long drought.

Of these, by far the most important and widely diffused are ammonia and ammoniacal salts, which are of essential importance to the vegetable economy, because, dissolved in the rain, they furnish plants with the nitrogen required by them for the production of their flowers and fruit. Nitric acid is detected in the air after thunder-storms, sulphuretted hydrogen in the tainted air of sewers and such like places, and sulphurous and sulphuric acid only in the neighborhood of chemical or smelting works. A considerable quantity of carbonic oxide and carburetted hydrogen escapes unconsumed from our furnaces; and although the latter gas is in addition given off to the air in marshy and bituminous dis-

tricts, the two occur in almost inappreciable quantity in the atmosphere.

In addition to its gaseous constituents, the A. contains solid substances in a state of exceedingly fine division, the presence of which is revealed in the sunbeam. Many of these minute particles, being the seeds or germs of plants and animals, must exert an important influence on the organic substances on which they may finally settle, inducing in many of them the conditions of disease or putrefaction.

When the composite nature of the A. was first discovered, it was supposed to be a chemical combination of nitrogen and oxygen, but further inquiries have rendered this opinion highly improbable. When any two bodies unite with each other chemically, the substance which results from their combination invariably possess properties which the original constituents did not possess. Now the atmospheric union of oxygen and nitrogen is distinguished by no properties which may not be attributed individually to these gases. We have, then, in this respect, no indication that the atmospheric combination of oxygen and nitrogen is a chemical one. Again, when any composite gas is dissolved in water, the proportion of the ingredients dissolved in it is exactly the same as that in which they occur in the compound itself; but this is not the case with air dissolved in water, which is found to be richer in oxygen than atmospheric air. Now, as oxygen dissolves more readily in water than nitrogen, it is manifest that this larger proportion of oxygen arises from both gases acting independently of each other in respect to the water, a condition that would be impossible if they were in chemical union. From these and other corroborative facts, the A. is considered to be simply a mechanical combination of the gases contained in it. This, however, does not prevent the A. from having a uniform composition, as might at first sight be supposed; for when gases are mixed with each other, they intermingle thoroughly throughout the whole space occupied by them. Local causes may temporarily affect the relative proportion of the atmospheric ingredients, but the changes are so minute as to require the most delicate analysis to detect them.

ATMOSPHE'RIC ELECTRI'CITY. Franklin was the first to establish the identity of the lightning of the heavens with the electric spark. By his famous kite-experiment, he ascertained that the thunder-cloud assumes an electrical condition precisely similar to that of the conductor of an electrical machine, and that the same mechanical and luminous effects are common, though in a different degree, to both. The attention that was first directed by this discovery to the A. E., as displayed in the thunder-cloud, has since then been extended to the electrical condition of the air in all the different states of the weather. It is now found that the air is sensibly electrical not only when the sky is overcast with thunder-clouds, but when the weather is clear, or when no thunder-clouds are present. Observations on A. E. are made by delicate electrometers connected with insulated rods at the top of the building, or other collecting apparatus. The following are some of the results got by continental observers: When the sky is clear and free from clouds, the A. E. is always positive, and an electroscope exposed to the action of the air is charged with positive electricity. On the other hand, the electricity of the ground is found to be negative. This was shown in a very ingenious way by Volta, who, by catching the fine spray of a fountain on the plate of a straw electroscope, found the straws to diverge with the negative electricity communicated to them by the water, which was necessarily of the same character as that of the ground. It is from this fact that electroscopes, or the collecting apparatus connected with them, must not be overtopped by the neighboring trees or buildings, the negative electricity of which materially affects the indications given, and it is due to the same fact that no A. E. is discovered in the middle of a wood, or in a room, however high the ceiling. Under a clear sky, the potential of the A. E. is found to increase as we ascend, the lower aërial strata being less electrical than the higher. Becquerel proved this by a simple experiment on the plateau of Mount St. Bernard. On a piece of oiled silk he placed a silk thread, covered with tinsel, one end of which, terminated by a ring, was connected with the rod of a straw electroscope, and the other end was tied to an arrow armed with a metal point. When the arrow was shot horizontally, the straws showed no divergence; but when the arrow was shot upwards, they opened as it ascended, and diverged most when the arrow, in ascending, disengaged the ring from the rod of the electroscope.

The same fact is shown in the following way: When a very delicate electroscope is adjusted for any particular position, it will, when elevated a few feet above that position, give indication of positive electricity, and when placed a few feet below, it will be charged negatively. In clear weather, likewise, the A. E. is found to be subject to certain daily periodical variations, and appears to have two maxima and two minima in the course of twenty-four hours. The first maximum takes place a short time after sunrise, and the second shortly after sunset; the first minimum shortly before sunrise, and the second in the afternoon, when the heat of the day is greatest. In cloudy weather, the electroscope is affected sometimes positively, sometimes negatively, and is generally less influenced than in clear weather. The electricity of rain, snow, hail, &c., is sometimes positive, sometimes negative. In Stuttgart, for instance, it was found in the course of a year that the rain was 71 times positive to 69 times negative, and the snow 24 times positive to 6 times negative.

Sir William Thomson, in our own country, has made various observations on atmospheric electricity. His delicate electrometers give him not only great facility of observation, but their delicacy far transcends that of any instrument hitherto employed in such observations. Instruments such as his electrometers, that are sensitive to the electromotive force of a single Daniell's cell with any condensing contrivance, are a wonderful advance in observing power. Sir William's collecting apparatus is an insulated can of water placed inside a window, with a nozzle extending four feet and a half beyond the wall, the window being only open so far as to admit of the nozzle-tube passing without touching. The can, when the stop-cock is opened, assumes the potential of the air outside at the point where the jet breaks up into drops. In the portable electrometer for outside observations, he uses as the collector a burning match at the top of a long rod attached to the instrument. The collecting apparatus is, of course, insulated and connected with the electrometer. He estimates the amount of atmospheric electricity per foot or per inch. He calculates the difference of potential at the perpendicular distance, say, of a foot from any portion of the earth s surface, whether the level ground or an upright wall. He finds, as mentioned above, that the earth is always negative in clear weather, and the air positive, and that the difference of potential per foot is very different at different times. Thus, in the Isle of Arran, he found this to vary in ordinary fine weather from 22 to 44 Daniell's cells; with an east or north-east wind, the difference of potentials was from 6 to 10 times that per foot. He also finds sudden and unaccountable variations of potential within even comparatively few minutes, and he can only suggest that there may be cloudless yet cloud-like masses of clear air floating in the atmosphere, which are charged with electricity, and which, in their passage over or near the electrometer, give rise to these marked variations.

The cause of A. E. has given rise to much discussion. The electricity developed by evaporation and vegetation has been thought by some to account for the positive electricity of the air; but this view has been combated, and as yet no theory has been proposed which satisfactorily accounts for it. With the instrument that Sir William Thomson has placed in the hands of observers, and with a cordon of observers all over the world, data may be got for a satisfactory theory, but as yet our knowledge of the subject is too fragmentary to reach anything like a satisfactory account of it. For the electricity of the thunder-cloud, see LIGHTNING.

ATMOSPHE'RIC RAI'LWAY, a railway on which the locomotive-power is supplied by the pressure of the atmosphere more or less directly on the carriages themselves. The idea of producing railway locomotion in this manner has been successively prosecuted by Lewis, Medhurst, Vallance, and Pinkus; and latterly with a greater prospect of success by Clegg, in connection with Samuda. Vallance patented a plan which proposed the conveyance of passengers along a railway laid within an air-tight tunnel exhausted in front of a carriage working as a piston, the pressure of the atmosphere acting on the carriage from behind. This plan was made public in 1825, and ultimately brought into experimental operation at Brighton, proving the possibility of such a mode of transit. The general opinion as to its merits was, that though it might succeed in the transmission of goods, or, with a smaller tube than the tunnel, might suit well the conveyance of the mails, it could not be expected to enjoy the favor of the traveling public, on account of its dark close tunnel. Thus the subject of atmospheric railways had ceased to attract attention, when the curiosity of the public was again called to it, by the proposal of another plan of propulsion, by Henry Pinkus, an American gentleman, resident in England, who took out a patent for it about the year 1835, under the name of the Pneumatic Railway. The apparatus for this was to consist of a cast-iron tube of about forty inches diameter, having a slit of about two inches wide on its upper side, the slit (which was covered by a flexible flap or valve) furnishing an opening through which the mechanism of a piston working within the tube might be connected with that of the leading carriage without.

Under improved arrangements of the details Messrs. Clegg and Samuda made an experiment of this plan in 1840, on a part of the line of the West London Railway; and so favorable was the issue, that the directors of the Dublin and Kingstown Railway adopted the atmospheric pressure system for a projected extension of their line from Kingstown to Dalkey. Accordingly, parliamentary sanction was obtained for the line, and the first A. R. was in full

operation at the beginning of the year 1844. In that year the London and Croydon Railway Company began to lay down a line of A. R. alongside of their locomotive line from London to Croydon. The South Devon Railway Company also adopted the atmospheric mode of working on a part of their railway. Both of these lines, however, were shortly afterwards abandoned as unsatisfactory.

The result of these trials has clearly shown that the A. R. system cannot stand in competition with that of the locomotive engine, unless, perhaps, in some very peculiar situation. The expense and care necessary to keep the tube with its valve in good working-order, led to the removal of the atmospheric mechanism from the various railways on which it was established; so that the history of Atmospheric Railways may be ranked under the chapter of failures. They survive only in the form of pneumatic despatch tubes, which are used largely in London, for the conveyance of parcels. See PNEUMATIC DESPATCH.

ATOLL. See CORAL ISLANDS.

A'TOM (Gr. *atomos*, an indivisible particle; from *a*, not, and *temno*, I cut). In ancient philosophy, two theories of the nature of matter were recognized, and these have continued to form subjects of argument among speculative men since the year 510 B.C. to the present time. The one theory is, that matter is infinitely divisible. Thus, a needle may be divided into two, and each of the parts may in its turn be broken or cut into two, and each of the latter again and again be subdivided, till the parts become so small that it may be impossible to see them by the naked eye; but these parts are regarded as capable of still further division, without limit or stoppage, provided more perfect or delicate means could be employed to act upon them. The second theory regarding the constitution of matter is, that in the repeated division and subdivision of a solid, liquid, or gas, a point will be at length reached when it will no longer be possible, by any conceivable means, to break a molecule in two, the molecule being a real unity, not composed of separable parts—in other words, an *atom*. The latter theory recognizes the finite divisibility of matter, and considers that all matter is more or less compactly built up of myriads of atoms aggregated together, and having spaces or pores between the several atoms or particles. If it were possible to subject such matter to the scrutiny of a sufficiently powerful magnifying-glass, or microscope, and thus exhibit or behold the atoms so separated by spaces, then an appearance would be presented similar to that which the painter chooses to depict on the canvas when he is representing a snow-storm, and where every little flake of snow is separated from its neighbor one by a space in which there are none; or that which would be observed if, during a hailstorm, some great power were to cry, 'Halt!' and that instant every minute hailstone was arrested in the spot it had reached.

This view of the physical nature of matter is that which is known as the *atomic* or *corpuscular theory*, and has in modern times received some support from the facts embodied in the chemical atomic theory originated by Dalton. Granting, however, that the chemist can prove that his simple and compound forms of matter are built up of chemical atoms, the problem still remains to be solved as to the possible identity of physical and chemical atoms. What the chemist regards as an A. in his science, may not be an ultimate and indivisible A. in a physical point of view; the chemical A., though incapable of division as a chemical A., may still be composed or built up of many physical atoms, and may be capable of being subdivided into such. Indeed, whilst the atomic theory of Dalton, when first announced, was eagerly seized upon as the best possible evidence for the existence of both chemical and physical atoms, the tendency of recent researches and discussions in chemistry has been to show that the chemical A. is different from the physical, and does not necessitate the existence of the latter. See ATOMIC THEORY.

According to the ordinary acceptation of the term, it is a molecule of matter having a definite weight, magnitude, and form, possibly alike for the atoms of the same material, but differing in those of different substances. The form of an A. is supposed by some men of science to be the same as that which the fragments of a substance assume when it is split in the direction of the planes of the cleavage of its crystals (see CRYSTALLOGRAPHY), but a more general belief has been, that all atoms are spherical, and that the various crystalline forms are produced by the manner in which the atoms are grouped together. In regard to the size of atoms, Sir William Thomson has shown, by three entirely different trains of argument from observed facts, that the diameter of an A. cannot be greater than $\frac{1}{250,000,000}$, nor less than $\frac{1}{5,000,000,000}$ of an inch. Further considerations regarding atoms will be found under the head MATTER (q. v.); also in the article VORTEX (q. v.).

ATO'MIC THE'ORY. Analysis shows that compound bodies contain certain elements (see CHEMISTRY) in certain proportions. These proportions have been minutely and carefully examined by many chemists since the time when the balance was first applied to chemical investigation, and it has been proved that the respective quantities of each of the combining elements are not dependent entirely upon external conditions, but are regulated by certain laws. These laws were partially observed and discussed by earlier chemists and physicists, but it was reserved for Dalton (q. v.) to systematize the somewhat incoherent labors of his predecessors, and to announce, in positive language the four laws which regulate the union of various kinds of substances, and which are still acknowledged by chemists as the LAWS OF COMBINING PROPORTION, or the Atomic Theory. These laws regulate the combination of unlike substances by *weight*, and not by *volume;* and they are based upon the preliminary acknowledged fact, capable of experimental demonstration, that the same compound substance is always composed of the same ingredients or elements.

The *first law* of combination by weight comprehended under the A. T. is THE LAW OF CONSTANT PROPORTION, which teaches that the elements or ingredients which form a chemical compound are always united in it in the same proportion by weight. Thus, water, which consists of oxygen and hydrogen, does not contain one or both of these elements in indefinite amount, but it is invariably made up of 8 parts by weight of oxygen to 1 part by weight of hydrogen. It makes no matter whether the total amount of either element be represented by grains, ounces, pounds, or tons, it will always be found that the proportion of 8 parts of oxygen to 1 part of hydrogen is kept up.

Neither does the source of the water make any difference, for pure water obtained from rain, snow, or hail, the river or the sea, the sap of plants or the juices of animals, invariably contains the same elements in the same proportions. Again, common salt (chloride of sodium), whether it be obtained from sea-water, salt-springs, rock-salt, or even the blood of animals, always consists of chlorine and sodium in the exact and never varying proportion of 35½ parts of chlorine to 23 parts of sodium. Whilst the law of constant proportion teaches us that the same compound is always built up of the same ingredients in the same proportion, it does not necessarily follow that the same elements or components in the same proportions will invariably form the same compound body. It is far otherwise; and many examples can be obtained, especially from organic chemistry, where the same components in the same proportions produce very different substances. Thus, starch and cotton (lignine)—very dissimilar substances—consist of carbon, hydrogen, and oxygen in the very same proportions; and gum-arabic and cane-sugar are similarly circumstanced. See ISOMERIC BODIES.

The *second law* is the LAW OF RECIPROCAL PROPORTION, which tells us that the proportions in which two substances unite with a third have a simple arithmetical relation to that proportion in which they unite with each other. Thus oxygen and hydrogen unite in the proportion of 8 to 1 to form water. Carbon and hydrogen are present in olefiant gas in the proportion of 6 to 1, and oxygen and carbon unite in the proportion of 8 to 6 to form carbonic oxide. Again we have a compound of oxygen and iron containing these elements in the proportion of 8 to 28; we have also a compound of sulphur and iron in the proportion of 16 to 28; and sulphur and oxygen unite together to form sulphurous acid gas, which contains equal weights of the two elements—the proportion of 1 to 1 having a simple arithmetical relation to the proportion 8 to 16.

Numbers representing the proportions in which the elements combine (such as 1 for hydrogen, 8 for oxygen, 6 for carbon, 16 for sulphur, 28 for iron, &c.), are called their 'combining proportions,' or *Atomic Weights* (q. v.). It is obvious that analysis alone cannot enable us to fix definitely such numbers. There is nothing in the *composition* of their compounds to lead us to adopt the proportional numbers given above for hydrogen, oxygen carbon, sulphur, and iron, rather than simple multiples or submultiples of them. In fact, the numbers adopted by Berzelius, and now reintroduced, are in the proportion—hydrogen 1, oxygen 16, carbon 12, sulphur 32, iron 56. The reasons for preferring certain particular numbers to any multiples or submultiples of them will be found in the article CHEMISTRY.

The *third law* is THE LAW OF MULTIPLE PROPORTION, which is, that when one substance combines with another in several proportions, the higher proportions are multiples of the first or lowest. Thus, hydrogen unites with oxygen in two proportions; as 1 of hydrogen to 8 of oxygen, when ordinary pure water is the result of union; and as 1 of hydrogen to 16 of oxygen, when peroxide of hydrogen, a powerful bleaching agent, is produced—the difference in the respective amounts of the oxygen—8 and 16—being, that the latter is a multiple of the former by 2. Again, carbon unites with oxygen in two proportions: as 6 of carbon to 8 of oxygen, when the inflammable gas, carbonic oxide, is formed; and as 6 of carbon to 16 of oxygen, when the non-inflammable gas, carbonic acid, is the result. The variation in this instance is, that the oxygen is present in the one case as 8, and in the other as a multiple of that number by 2, viz. 16. One of the best illustrations of this law occurs in the case of the union of nitrogen and oxygen: 14 parts of nitrogen can unite with 8 of oxy-

gen, and thus form laughing-gas; but the same amount of nitrogen can combine with 16, 24, 32, or 40 of oxygen—in the latter case constituting anhydrous nitric acid—all of the higher numbers being multiples of the first and lowest, viz. 8 by 2, 3, 4 and 5.

The *fourth law* is THE LAW OF COMPOUND PROPORTION, which teaches that the combining proportion of a compound substance is the sum of the combining proportions of its components. Thus, the compound body, carbonic acid, which consists of 6 of carbon united with 16 of oxygen, has the combining proportion 22, which is the sum of the combining proportions of the carbon and oxygen composing it, viz. 6 + 16=22. Similarly, the compound substance lime contains 20 of the metal calcium combined with 8 of oxygen, and has the combining proportion of 20 + 8 or 28. When carbonic acid and lime are linked together, as in marble, which is the carbonate of lime, then they are united in the proportion of 22 parts of carbonic acid and 28 of lime. Not only is 22 the proportion in which carbonic acid will combine with lime, but it is the proportion in which it will form compounds with every other substance of similar chemical constitution.

The preceding laws regulating the union of substances by weight have been obtained by comparing together the results of numerous experiments, and every careful analysis serves to confirm their accuracy. But Dalton's theory was not limited to the statement of these laws; it was also an attempt to explain them. It assumes that each elementary substance consists of extremely small indivisible particles or atoms; that the atoms of any one element are all exactly alike, but differ from the atoms of every other element. Among other points of difference, they differ in weight, and although the absolute weight of an atom is unknown, the weight of two atoms, one of one element, the other of another element, are in the proportion of the combining weights of the elements they belong to. Thus the combining weight of sulphur is twice that of oxygen: we do not know the absolute weight of an atom of either, but the A. T. assumes that each atom of sulphur is twice as heavy as an atom of oxygen. Further, Dalton's theory assumes that the ultimate particles of compound bodies contain a comparatively small number of atoms of the component elements. It is easy to see how this theory explains the laws enunciated above. We must, however, remember that while the theory satisfactorily explains the laws, the laws do not prove the theory. It is quiet conceivable that such laws might exist, although matter did not consist of atoms. The A. T., however, rests not only on a chemical, but also upon a physical foundation. According to the modern molecular theory, matter consists of small particles, each of which is in motion, and this motion is the more rapid the hotter the substance is. These small particles or 'molecules' cannot be broken up without changing the character and properties of the substance. They are not, however *atoms*. In the case of compounds, as the molecules of any *one* substance are all similar to one another, each molecule must contain all the components; and in many elementary substances it can be proved, assuming the truth of the molecular theory, that each molecule consists of several similar atoms. A molecule, then, is either a single atom, as in *some* elementary substances, or a group of atoms which remain together during those movements which depend on the temperature of the substance. Now, the velocity of these motions increases as the temperature is raised; when, therefore, the temperature is raised so high, and the velocity of the molecules becomes so great that the collision of the molecules with one another is sufficiently violent to break them up and separate their constituent atoms, the substance is decomposed, the atoms rearranging themselves into new groups (or molecules) capable of remaining unbroken under the new conditions. This explains the decomposition of compounds by the action of heat.

When the temperature is not so high, and the violence of collision insufficient to break up the molecules, these are merely shaken, thrown into a state of vibration, and thus the hold of the atoms upon each other is loosened. Now, if two substances are mixed together, it may happen that some atoms in the one set of molecules are so attracted by some atoms in the other set, that, when a molecule of the one set meets one of the other set in a vibrating or loosened condition, an exchange of atoms may take place between them, or each may loose a part of its atoms, these going to form a new molecule. This gives an explanation of the action of one substance upon another, and further shows why, in general, a certain temperature is required in order that the action may take place.

Gay Lussac first pointed out that a relation exists between the density of a gas and its atomic weight. Avogadro greatly simplified the statement of these relations by announcing the law of molecular volumes of gases, a law which Professor Clerk Maxwell has since proved to be a necessary consequence of the molecular theory of gases. This law is, that a given volume of gas at a given temperature and pressure contains the same number of molecules whatever be the nature of the gas.

From this law, to which we may give the name of 'Avogadro's law,' and from Boyle's law, and the law (often called Charles's law) that the volume of gas is directly proportional to the absolute temperature—that is, to its temperature reckoned from a point 273° centigrade below the freezing-point of water—it follows that the volume occupied by a given mass of a gas is a function of the pressure, the temperature, and the molecular weight of the gas; understanding by the 'molecular weight' of a substance a number M, such that M : 2 : : the absolute weight of a molecule of the substance : the absolute weight of a molecule of hydrogen. The number 2 appears in this proportion because we assume the *atom* of hydrogen as our unit, both of atomic and of molecular weight, and it can be proved (see CHEMISTRY) that the molecule of hydrogen gas consists of two atoms. If, then, P be the pressure in millimetres of mercury at 0°C; t, the temperature of the gas, as indicated by a centigrade thermometer; M, the molecular weight of the substance; and V, the volume (in cubic centimetres) occupied by a gramme of the gas, $V = \frac{760}{P} \times \frac{t+273}{273} \times \frac{22400}{M}$. In the gaseous state, the average distance between the molecules, although extremely small, is great compared with the size of the molecules, so that the volume of the gas depends almost exclusively upon the distance between the molecules: it is not so in the case of solids and liquids, in which the molecules are so closely packed as to be almost always in contact. The volume occupied by solids and liquids depends, therefore, far more upon the *atoms* of which the substance is made up, than upon its *molecular* structure. For further recent modifications of the atomic theory, see CHEMISTRY.

ATOMIC VOLUMES. See ATOMIC THEORY above, and CHEMISTRY.

ATO'MIC WEIGHTS are the proportions by weight in which the various elementary substances unite together. The subjoined table gives the names of the elements, their chemical symbols, and their atomic weights, according to two systems. The reader is referred, for the reasons for the change of atomic weights, to the article CHEMISTRY.

ELEMENTARY SUBSTANCES, WITH THEIR SYMBOLS AND ATOMIC WEIGHTS.

Name of Element.	*Symbol.*	*Atomic Weights.*	
		Old.	*New.*
Aluminium	Al	13·7	27·4
Antimony (Stibium)	Sb	122·0	122·0
Arsenic	As	75·0	75 0
Barium	Ba	68·5	137·0
Bismuth	Bi	208·0	208 0
Boron	B	11·0	11 0
Bromine	Br	80 0	80·0
Cadmium	Cd	56·0	112 0
Cæsium	Cs	133·0	133 0
Calcium	Ca	20·0	40 0
Carbon	C	6 0	12 0
Cerium	Ce	46·0	92·0
Chlorine	Cl	35·5	35·5
Chromium	Cr	26·0	52·0
Cobalt	Co	29 5	59·0
Copper (Cuprum)	Cu	31·7	63·4
Didymium	Di	47·5	95·0
Erbium	Er	56·3	112 6
Fluorine	F	19·0	19 0
Glucinum	G	4·7	9 4
Gold (Aurum)	Au	196·0	196 0
Hydrogen	H	1 0	1 0
Indium	In	37·8	113·0
Iodine	I	127 0	127·0
Iridium	Ir	99 0	198·0
Iron	Fe	28·0	56 0
Lanthanum	La	46·0	92·0
Lead (Plumbum)	Pb	103·5	207·0
Lithium	Li	7·0	7 0
Magnesium	Mg	12·0	24·0
Manganese	Mn	27·5	55·0
Mercury (Hydrargyrum)	Hg	100 0	200·0
Molybdenum	Mo	48·0	96·0
Nickel	Ni	29·5	59·0
Niobium	Nb	94·0	94·0
Nitrogen	N	14·0	14·0
Osmium	Os	100·0	200·0
Oxygen	O	8·0	16·0
Palladium	Pd	53·0	106·0
Phosphorus	P	31 0	31·0
Platinum	Pt	99·0	198·0
Potassium (Kalium)	K	39 0	39·0
Rhodium	Rh	52·0	104·0
Rubidium	Rb	85·4	85·4
Ruthenium	Ru	52 0	104·0
Selenium	Se	39 5	79·0
Silicon	Si	14 0	28·0
Silver (Argentum)	Ag	108 0	108·0
Sodium (Natrium)	Na	23·0	23 0
Strontium	Sr	43 8	87 6
Sulphur	S	16 0	32·0
Tantalum	Ta	182 0	182 0
Tellurium	Te	64 0	128 0
Thallium	Tl	204 0	204·0
Thorium	Th	57·8	115·6
Tin (Stannum)	Sn	59·0	118·0
Titanium	Ti	25·0	50 0
Tungsten (Wolfram)	W	92·0	184 0
Uranium	U	60 0	120·0
Vanadium	V	51 3	51·3
Yttrium	Y	30 8	61·6
Zinc	Zn	32·5	65 0
Zirconium	Zr	44 8	89 6

It is necessary that one element be selected as the starting-point of the series, and an arbitrary sum affixed to it, and thereafter all the other elements can have their sums awarded to them, according to the proportional amounts in which they combine with each other. The *second law*, mentioned under the ATOMIC THEORY (q. v.), explains the manner in which this can be done, and how far the numbers are arbitrary. In all systems of atomic weights in modern use, the atomic weight of hydrogen is taken as unity, and the atomic weights of the other elements are then fixed, so as to give on the whole the simplest and most consistent formulæ for their compounds.

There are two systems of atomic weights at present in use. 1*st*, The 'old' system, which, after a good deal of discussion, was generally adopted about 1845; and 2*d*, The new system, which is, in many respects, a revival of the system of Berzelius, and which may be said to have come into general use by scientific chemists about 1860.

ATO'NEMENT. Sin violates the ground of union which the personal creature has, by nature, with the holy God. The act of sin is one of separation; the act begets the state of sin, the state confirms and repeats the act. The doctrine of the A. treats of the mediation necessary for restoring the union between God and man, which has been lost by sin. The A., therefore, must ever be the fundamental doctrine in every religion of sinful creatures. In the Christian religion, it manifestly occupies this central position; for the Christian doctrine of the A. is but the explanation of its great historic fact—the embodiment in one person of the Divine and human natures in perfect agreement. In the person of Christ, God and man are atoned: He is their Atonement.

So fundamental is the doctrine of the atonement in the Christian religion, that it does not, like many other doctrines, form a ground of distinction among the different bodies into which the Christian world has been divided. All churches may be said to be equally orthodox on this point. The Church of Rome, the Greek Church, the various Protestant churches—established and dissenting—all agree, taking their standards as a criterion, in resting the sinner's hope of salvation on the mediatorial work or atonement of Jesus Christ. Nevertheless, there have been from the very beginning of speculative Christian theology, and still continue to be, within the bosom of the several churches, various ways of conceiving and explaining the exact nature and mode of operation of the mediatorial work. What follows is a brief sketch of the historical development of these speculations.

Christianity differs from heathenism in the clear perception which it has of the antagonism sin has introduced between God and man. Heathenism but vaguely conceives of this variance, and consequently has but an ill-defined notion of the atonement required, the notion seldom containing more than the idea of a reconciled union of the individual man with nature and the universal life. Even where its mythical divinities assume personality, it is but an ideal personality without any concrete reality of life, and consequently without any real significance for the conscience. In this state, the abject subjection of man to nature prevents his rising into that sphere of conscious freedom which makes sin sinful, and demands an A. with one who is Lord both of nature and man.

In Judaism, man stands above nature, in conscious relation to a personal God, whose written law exhibits the requirements of His relationship with man—requirements which are never met, and which only make him fearfully conscious of the ever-widening breach between him and his God. Thus the law awakened the sense of guilt, and the desire for an A.; a desire it could never satisfy. The never-ceasing demands of these ever-unfulfilled requirements were constantly acknowledged by its whole sacrificial *cultus*, which expressed the hidden ground of Jewish hope, and prophetically pointed to its future manifestation.

But whilst the Holy Scriptures, throughout the Old Testament, exhibit the making of an A. by vicarious sacrifice (Lev. xvi. 21; xvii. 11); and the idea, both of the suffering and the deliverance of many by the sins and virtues of one, was common to to all antiquity, the idea of the suffering and vicarious Messiah, plainly declared in the writings of the prophets (Luke xxiv. 46; Isaiah liii.; Psalms xxii.), and not entirely hidden from the more thoughtful and devout contemporaries of Jesus (Luke ii. 34; John i. 29), was one which was foreign to the Messianic faith of the great body of the people.

In the New Testament, Christ is everywhere exhibited as one sent from God for the salvation of the world (John iii. 16, 17); and as the condition, on the part of man, of his obtaining this salvation, we read of the requirement of repentance, faith, and reformation (Matt. iv. 17; v. 3, 11; vi. 12; Mark xvi. 16; Luke xv. 11), whilst, on the part of God, as conditioning and mediating His forgiveness of sins, we have exhibited the entire life of Christ upon earth conceived of as embracing severally its individual features (Acts v. 31; Rom. iv. 25; viii. 34); but more especially His death as a ransom for our sins (Matt. xx. 28; xxvi. 28), as a vicarious sacrifice (1 Peter i. 19; 2 Cor. v. 21), by which we are redeemed from the bondage of sin (1 Tim. ii. 6; Gal. iii. 13; 2 Peter ii. 1), and obtain forgiveness (Rom. v. 19; 1 Cor. xv. 3; 1 John i. 7), and eternal life and peace with God (John x. 11; Col. i. 20). Christ is therefore the Mediator between God and man (1 Tim. ii. 5), having made peace through the blood of His cross (Col. i. 20); the propitiation for our sins (1 John ii. 2; iv. 10); and our high-priest who offers Himself a sacrifice to reconcile us with God (Heb. ii. 17; v. 1; ix. 28). Moreover, we are also taught that God has in Christ reconciled the world with Himself (Rom. v. 10; Col. i. 22; 2 Cor. v. 19).

In accordance with this full and explicit teaching of Holy Scripture, we find that the sufferings and death of Christ were ever regarded as of primary and essential importance in His work of redemption; but notwithstanding this, we look in vain throughout the early centuries of the Christian Church for anything like a systematic development of the doctrine of the Atonement. The germs of the doctrine existed, but without any logical connection or clearness. 'On this head there has been a twofold mistake—sometimes the existing beginnings of many later elaborated dogmas have been overlooked; or, on the other hand, it has been attempted to point out with literal distinctness church doctrines as if already developed.' The early church fathers dwell with a sort of inspired devotion upon those facts of the gospel which represent Christ as the sacrifice of our sins, as the ransom paid for our redemption, as our deliverer from the power of Satan, as the restorer to mankind of whatever was lost by the fall of Adam; but they seldom *attempt* to show *how* these blessed results connect themselves with the sufferings and death of Christ; neither do they show in what manner the A. has objectively been made, nor how it is brought to the experience of its individual subjects.

The narrow limits of this article will not allow us to specify the many ways in which the sufferings and death of Christ were regarded in relation to their A. of sin. During the first four centuries there appeared no certainty of opinion as to whether they were a ransom-price paid to God or to the devil. The latter supposition is the more prevalent, and is shared in by Origen and St. Augustine. Gregory of Nyssa explains this opinion by saying, that the devil consented to receive Jesus as a ransom, because he regarded him as more than an equivalent for all those under his power; but that, notwithstanding his subtilty, he was outwitted, for, owing to the humiliation in which Christ was veiled, he did not fully recognize Him as the Son of God, and consequently was himself deceived. But having consented to receive Him as a ransom for mankind, he was righteously deprived of his dominion over man, whilst he could not retain Jesus when he discovered Him to be the Holy One of God, being horrified and tormented by His holiness.

Athanasius first of all successfully controverted this notion, and maintained that the ransom was paid to God. He argued that as God had threatened to punish transgressors with death, He could but execute His threat. But then it was not becoming the character of God to allow His purpose in the creation of man to be frustrated by an imposition practised upon Him by the devil. The only expedient, therefore, which remained for his deliverance from death, was the incarnation and sacrifice of the Logos in his stead, by which the justice and veracity of God would be maintained, man delivered, the law fulfilled, and the power of the devil broken. It has often been stated that Tertullian uses the term satisfaction with respect to Christ's A. for sin, but this is incorrect, for although he employs the term, he never does so in the sense of a vicarious satisfaction, but only in the sense of making amends for our own sins by confession and repentance.

These elemental and mythical conceptions of the doctrine of the A. remained in a most imperfect and altogether undeveloped condition, until the acute and subtle genius of the Piedmontese Archbishop of Canterbury reduced them to order, and presented them in logical consistency. We must regard Anselm, therefore, as the author, at least as to its form, of the doctrine of vicarious satisfaction, which, under various modifications, has ever since continued to be held as the orthodox doctrine of the church. The following is, in all essential respects, his statement of the doctrine: The infinite guilt which man had contracted, by the dishonor of his sin against the infinitely great God, could be atoned for by no mere creature; only the God-man Christ Jesus could render to God the infinite satisfaction required. God only can satisfy Himself. The human nature of Christ enables Him to incur, the infinity of His divine nature to pay, this debt. But it was incumbent upon Christ as a man to order His life according to the law of God; the obedience of His life, therefore, was not able to render satisfation for our guilt. But although He was under obligation to live in obedience to the law, as the Holy One he was under no obligation *to die*. Seeing, then, that He nevertheless voluntarily surrendered his infinitely precious life to the honor of God, a recompense from God became His due, and His recompense consists in the forgiveness of the sins of His brethren.—In this form of the doctrine we are taught the necessity of an active

vicarious satisfaction; but Anselm nowhere teaches the passive satisfaction, he nowhere says that Christ endured the punishment of men. Nor do we find in his writings the development of the subjective side of the doctrine — namely, how the satisfaction rendered to God mediates the A. in the experience of the believer.

Subsequent to the time of Anselm, and prior to the Reformation, there are two views of the A. which divide the opinions of this period: the one regarding the peculiar manner in which it was accomplished as absolutely necessary, and deriving its efficiency from its objective nature; the other supposing a subjective connection between the sufferings of Jesus and the price of redemption, because this was best fitted to effect the moral transformation of men. According to Anselm, the satisfaction rendered by Christ was greater than the guilt for which he atoned; and it needed to be greater, for the payment of the debt due to God gave men no claim to the favor of God. Thomas Aquinas and his followers maintained Augustine's opinion of the infinite value of the blood of Christ rendering it more than sufficient; while the Scotists maintained that is was sufficient only because God was pleased to regard it as sufficient. But in the period between Anselm and the Reformation, little or no progress was made in the development of this doctrine.

We now come to the period of the Reformation, when the objective speculations of the schoolmen are brought under the subjective requirements of human souls, and the doctrine of the A. is viewed in this light. In the writings of Luther, one will only with difficulty arrive at his intellectual apprehension of this doctrine in its scientific form; but setting out with the consciousness of sin, one will everywhere discover how he realized that in Christ all sin is 'vanquished, killed, and buried, and righteousness remaineth a conqueror and reigneth for ever.' The following is an outline of the Lutheran doctrine, as laid down in the *Concordienformel:* It is alone by faith we can receive the blessings presented to us in the gospel by the Holy Ghost. Faith justifies, because it appropriates the merit of Christ. Therefore, the righteousness which is imputed to the believer, simply by the grace of God, is the obedience, the suffering, and the resurrection of Christ, by which He has satisfied the claims of the law, and atoned for our sins. For as Christ is not merely man, but God and man in one person, He was, as Lord of the law, no more subject to it than He was subject to suffering and death. For this reason, His twofold obedience—that which He rendered, on the one hand, by His suffering and death; and, on the other, by His righteous fulfilment of the law on our behalf—is imputed to us, and God acquits us of our sins, and regards us as just, in view of His complete obedience in what He did and suffered. This obedience embraces the entire existence of Christ upon earth, and is so complete that it fully covers the disobedience of men, so that it is not reckoned against them for condemnation. Christ is our righteousness, therefore, only in so far as in His entire person the most perfect obedience is exhibited, which He was able to render in that He was neither God alone nor man alone, but both in one, God and man.

According to Calvin: if one asks how Christ has reconciled us with God, and purchased a righteousness which made Him favorable to us, it may be answered generally, that He accomplished this by the whole course of His obedience. But although the life of Christ is to be regarded as paying the price necessary for our deliverance, the Scriptures ascribe our redemption especially to His death. Calvin attached great importance to the particular mode of His death—any other mode of death would not have rendered the same satisfaction to God. He, however, says little or nothing about Christ's fulfilling the law for us, but dwells upon His delivering us from its curse. He does not, therefore, exhibit His active obedience separated, as an essential part of His satisfaction for sin, from His passive obedience. The importance attached to the obedience of His life arises from its natural and necessary connection with His suffering and death. And the great importance attached to His death is drawn rather from the view of its subjective necessity, than from the idea of the divine righteousness—namely, that without such a death there would have been no sufficient ground for the subjective realization of deliverance from sin and guilt. Calvin's view differs from that of the Lutheran *Concordienformel* in that he does not regard the relationship of God to man merely from the stand-point of punitive and satisfying righteousness, which always leads to the merely negative notion of a Redeemer from guilt and punishment, but looks upon Christ as the highest Mediator, through whom the nature of God is communicated to man. There was a necessity for Christ's incarnation, not merely because, apart from the suffering of the God-man, the divine righteousness could not be atoned, but also because, without such a divine Mediator, there could be no vital relation between God and man. 'Had man remained free from all taint, he was of too humble a condition to penetrate to God without a Mediator.'

While the reformers established the doctrine of the A. on the theory of Anselm, and extended it so as to make the sufferings of Christ include the Divine curse, and introduced distinctions between Christ's active and passive obedience, Socinus endeavored to prove the falseness of Anselm's theory. He shares with the Protestants the subjective principle, which the period of the Reformation established, but developed it in a one-sided manner. Socinianism represents man as attaining to oneness with himself and with God by his own moral energy. It rejects that idea of the righteousness of God which makes it impossible for Him to forgive sin without a satisfaction, as imposing finite limitations upon the divine Being; and also objects to the doctrine of satisfaction, on the ground that satisfaction for sin and forgiveness of sin are incompatible with each other; and, moreover, objects that sin and punishment are of so personal a nature as not to allow of their being transferred. It further opposes the doctrine of the active and passive obedience of Christ, on the ground, that the one excluded the other. Another objection maintained the actual impossibility of Christ's rendering the supposed satisfaction for sin.

The doctrine it sought to establish in the place of the one it attempted to overthrow may in brief be stated as follows. Man is reconciled to God by repentance and reformation. Only from an act of man changing his disposition, and not from an act of God changing His relation to man, follows his reconciliation with God. God is in Himself ever the same towards man—reconciled from all eternity; man alone has to assume a new relation; as soon as he does this, he is immediately reconciled; by this act of his will, he is at one with God. Only in man's moral state is there any obstacle to his reconciliation. This greatest and holiest accomplishment, the reconciliation of man with God, is achieved by an act of his will.

In this purely subjective theory, repentance occupies the place of faith in the orthodox doctrine, and faith becomes identical with obedience; for repentance and reformation are regarded as but the two sides of the same act of the will. It follows from this that justification is of works as well as reconciliation. A necessity for the sufferings of Christ is shown for the following objects—that He might become our example; better fitted to render us help; that we might have a pledge and guarantee of the Divine forgiveness; and as conditioning His resurrection and ascension to glory.

We must now hasten to the form of this doctrine among 'Modern Calvinists,' without attempting further to exhibit the links in the chain of its historic connection. 'Modern Calvinism' represents the A. as that satisfaction for sin which was rendered to God, in His public character as moral governor of the world, by the perfect obedience unto death of our Lord Jesus Christ. The nature of this satisfaction was a moral, not a pecuniary satisfaction. It preserves to the moral government of God its authority, whilst its tendency is to secure the forgiveness of sin. The value of the sufferings of Christ consists in their tendency to uphold the Divine moral government unimpaired whilst pardon is extended to those who have violated it, rather than in their intrinsic excellence, which, though essential to, did not constitute their value.

There was a moral necessity for Christ's sufferings and death—obstacles to the bestowment of pardon had to be removed—the influence of the Holy Spirit had to be secured. The whole contents of Christ's earthly existence, embracing both His active and passive obedience—a distinction which is unsupported by the word of God—must be regarded as contributing to the A. which He made. Of the actual sufferings of Christ immediately attending His death, it would be unpardonable to speak with confidence, so little has been revealed. It may, however, be considered—whether the Saviour's deprivation of His Father's countenance may not have been indirectly caused rather by His awful and afflicting sense of the evil of sin, than otherwise?—As to the 'Extent' of the A., there is a broad distinction to be made between the *sufficiency* of the A., and its *efficiency*. It may be true that Jehovah did not intend to exercise that influence of the Holy Spirit upon all which is necessary to secure the salvation of any one, but as the A. was to become the basis of moral government, it was necessary that it should be one of infinite worth, and so in itself adequate to the salvation of all. The body called Universalists (q. v.) hold both the efficiency and ultimate sufficiency of this great event in history.

The foregoing represents the modified view of the doctrine as advocated by Dr. Payne, and as held, in all essential respects, by such men as Pye Smith and Wardlaw, which in its earlier form, and as found in the writings of Owen and Edwards, maintains that the A. was made only for the elect; and that its necessity with respect to them arose out of the eternal justice of God, which required that every individual should receive his due desert; and, consequently, that the sufferings of Christ were the endurance of punishment equivalent in amount of suffering, if not identical in nature—as Owen maintains—with that to which the elect were exposed; and, moreover, that the meritorious obedience of Christ in fulfilling the law, imputes a righteousness to those for whom the A. secures salvation, which gives them a claim to the reward of righteousness.

Our space will not allow us to present to the reader the various forms which this doctrine is made to assume in the philosophic theology of Germany from Kant to the present time. See NEAN-

DER. We must therefore confine ourselves to the presentation of those views of the doctrine advocated by our own countrymen in our own time, which may fairly represent the present state of opinion with respect to this fundamental doctrine.

Let us begin with the view of modern Unitarianism, which may very clearly and fairly be presented in the words of one of the most able of its advocates, the Rev. Professor John James Tayler: "'There is *one* meditator between God and men, the man Jesus Christ.'' This can only refer to unrivalled pre-eminence, not to exclusive function. For all higher minds do, in fact, mediate between their less gifted fellow-creatures and the great realities of the invisible world. This "*one*" is a *human* mediator, "the man Christ Jesus"—not a being from another sphere, an angel or a God—but a brother from the bosom of our own human family. "He gave himself a ransom for *all*" who embrace His offers and will hearken to His voice. He brings from God a general summons to repent; and with that He conveys, through faith, a spiritual power to shake off the bondage of sin, and put on the freedom of a new heart and a new life. He is a deliverer from the power of sin and the fear of death. This is the end of His mediation. This is the redemption of which He paid the price. His death, cheerfully met in the inevitable sequence of faithful duty, was only one among many links in the chain of instrumentalites by which that deliverance was effected. It was a proof such as could be given in no other way, of trust in God and immortality, of fidelity to duty and of love for mankind. In those who earnestly contemplated it, and saw all that it implied, it awoke a tender response of gratitude and confidence, which softened the obdurate heart, and opened it to serious impressions and the quickening influences of a religious spirit.'

Professor Jowett advocates an opinion peculiarly his own, if, indeed, language so confessedly vague and indefinite can be said to embody an *opinion*. It is this: 'that the only sacrifice, A., or satisfaction with which the Christian has to do, is a moral and spiritual one; not the pouring out of blood upon the earth, but the living sacrifice "to do thy will, O God;" in which the believer has part as well as his Lord; about the meaning of which there can be no more question in our day than there was in the first ages.'—'Heathen and Jewish sacrifices rather show us what the the sacrifice of Christ was not, than what it was. They are the dim, vague, rude, almost barbarous expression of that want in human nature which has received satisfaction in Him only. Men are afraid of something; they wish to give away something; they feel themselves bound by something; the fear is done away, the gift offered, the obligation fulfilled in Christ. Such fears and desires can no more occupy their souls; they are free to lead a better life; they are at the end of the old world, and at the beginning of a new one.—The work of Christ is set forth in Scripture under many different figures lest we should rest in one only. His death, for instance, is described as a Ransom. It is not that God needs some payment before He will set the captives free. Ransom is deliverance to the captive. 'Whosoever committeth sin is the servant of sin.' Christ delivers from sin. 'If the Son shall make you free, ye shall be free indeed.' To whom? for what was the ransom paid? are questions about which Scripture is silent, to which reason refuses to answer.

A remarkably original work, was issued several years ago, by the Rev. John M'Leod Campbell, on the subject of the Atonement. His views are as follows: The work of the Son of God who came to do and did the will of His Father, must, in view of the deliverance which He wrought, be regarded as twofold: first, as dealing with man on behalf of God, and second, as dealing with God on behalf of man.

In dealing with man on behalf of God, Christ revealed to us the Father in His relation to a sinful world, showed us what our sins were to God, vindicated in the world the Father's name, and witnessed to the excellency of that will against which we were rebelling. In thus revealing the will of the Father towards sinful men, He necessarily became a man of sorrow and suffering, but these arose naturally out of what He was, and the relation in which He stood to those for whom He suffered; and to the holiness and love of His very nature must we refer their awful intensity and immeasurable amount. He suffered what He suffered just through seeing sin and sinners with God's eyes, and feeling in reference to them with God's heart. By what He suffered, He condemned sin, and revealed the wrath of God against it. His holiness and love taking the form of suffering, compose the very essence and adequacy of His sacrifice for sin.

Again, in dealing with God on behalf of man, the oneness of mind with the Father which towards man took the form of condemnation of sin, became in His dealing with the Father in relation to us a perfect confession of our sins, which was a perfect Amen in humanity to the judgment of God on the sin of man. Such an Amen was due in the truth of all things, due on our behalf, though we could not render it, due from Him as in our nature and our true brother. He who was the truth, could not be in humanity and not utter it; and it was necessarily a first step in dealing with the Father on our behalf. This confession of our sins by Him who, as the Son of God and the son of man in one person, could perfectly realize the evil of man's alienation, was a peculiar development of the holy sorrow in which He bore the burden of our sins; and which, like His sufferings in confessing His Father before men, had a severity and intensity of its own. But apart from the sufferings present in that confession, this Amen from the depths of the humanity of Christ to the divine condemnation of sin, is necessarily conditioned by the reception of the full apprehension and realization of the wrath of God, as well as of the sin against which it comes forth into His soul and spirit, into the bosom of the divine humanity, and, so receiving it, He responds to it with a perfect response, and in that perfect response He absorbs it. For that response has all the elements of a perfect repentance in humanity, for all the sin of man—a perfect sorrow—a perfect contrition—all the elements of such a repentance, and that in absolute perfection; all—excepting the personal consciousness of sin—and by that perfect response or amen to the mind of God, in relation to sin, is the wrath of God rightly met, and that is awarded to divine justice which is its due, and could alone satisfy it.

This confession of the world's sin by the Head and Representative of humanity, was followed up by His intercession as a part of the full response of the mind of the Son to the mind of the Father—a part of that utterance in humanity which propitiated the divine mercy by the righteous way in which it laid hold of the hope for man which was in God. 'He bore the sins of many, and made intercession for the transgressors.'

The Rev. F. D. Maurice professed to hold a purely biblical theology, as opposed to the theologies of consciousness, which he repudiates. His doctrine of the A. is the answer which the Bible gives to the demands of a sin-smitten conscience. A sinner requires, and is content to be told on the authority of Scripture, that the Son of God has taken away sin. This message from God is the gospel for all men. The sinner wants to be assured that God has spoken, that He has declared Himself the Reconciler, and desires to be shown how and in whom He has accomplished that work on his behalf.

To this question—How and in whom the work of reconciliation has been accomplished?—Mr. Maurice replied, in effect and almost in words as follows: The will of God is set forth in the Bible to be a will which is good to all, and the ground of all that is right, true, just, and gracious; that it also sets forth the Son of God as being one in will, purpose, and substance with the Father, and that His whole life on earth was an exhibition of, and submission to His Father's will; that the Son of God was Lord of men, the Root and Head of humanity, and the source of all light and righteousness in man: that being thus one with God and one with man, He brought the will of God into our nature, fulfilled it in our nature perfectly, and carried it down into the lowest condition into which it had fallen through sin; that in the fulfilment of this will in our nature, as its head, He shared its sufferings, enduring that wrath, or punishment, which proceeded from Holy Love, thus realizing, on the one hand, the sins of the world, and on the other, the consuming fury of the holiness of the love of God—with an anguish which only a perfectly pure and holy Being, who is also a sympathizing and gracious Being, can feel: that the man Christ Jesus was for this reason the object of His Father's continual complacency—a complacency fully drawn out by the death of the cross—which so perfectly brought out to view the uttermost power of self-sacrifice which lay hidden in the divine love, and consequently that He exhibited humanity, in its head, atoned for, reconciled. In this way, to Mr. Maurice, is Christ 'the Lamb of God, which taketh away the sin of the world.'

Finally, Dr. Trench, who may be regarded as fairly representing the prevalent views of the more devout and thoughtful men of the present day holding orthodox opinions, speaks as follows: 'The spirit of man cries out for something deeper than repentance, confession of sin, amendment of life; something which shall reach further back; which shall not be clogged with sinful infirmities, as his own repentance even at the very best must be. Men cry for some work to rest upon, which shall not be *their* work, but which shall be God's; perfect, complete. They feel that there must be something which God has wrought, not so much *in* them as *for* them; they yearn for this, for A., propitiation, ransom, and conscience purged from dead works by the blood of sprinkling; a rock to flee to which is higher than they, than their repentance, than their faith, than their obedience, even than their new life in the spirit. Now, this rock is Christ; and John the Baptist pointed to this rock, when, to those about him who longed after more than amendment of life, he exclaimed, in the memorable words: "Behold the Lamb of God which taketh away the sin of the world."'

Christ's sacrifice was vicarious—He died not merely for the good of, but in the room and in the stead of others, tasted death *for* them. He did this of His own free will. He saw that nothing else would overcome their sinful perversity and wilful obduracy, and that this would be effectual to do so.

Christ took upon himself the penalties of a sinful world, and His self-sacrifice is only *not* righteous, because it is so much better than righteous, because it moves in that higher region where law is no more known, but only known no more because it is transfigured into love. Vicarious suffering is the law and condition of all highest nobleness in the world. It is this which God is continually demanding of his elect, they approving his elect as they freely own themselves the debtors of love to the last penny of the requirements which it makes.

But the sufferings and death of Christ were not merely vicarious, they were also satisfactory; and thus atoning or setting *at one*, bringing together the Holy and the unholy, who could not have been reconciled in any other way. It is not maintained that God could have pleasure in the sufferings of the innocent and the holy, and that innocent and holy His own Son; but only that He must have the highest pleasure in the love, the patience, the obedience which those sufferings gave Him the opportunity of displaying, which but for those He never could have displayed. Christ's sublime devotion to the will of God permitted the Father to say, 'I have found a ransom.' Christ satisfied herein, not the divine anger, but the divine craving and yearning after a perfect holiness, righteousness, and obedience in man; which craving no man had satisfied, but all had disappointed, before.

The reader is referred for further and fuller information on this subject to the following works, which have been consulted and used in the preparation of this article: Baur's *Christliche Lehre von der Versöhnung;* Hase's *Hutterus Redivivus;* Neander's *Christliche Dogmengeschichte;* Gieseler's *Lehrbuch der Dogmengeschichte;* Hagenbach's *Lehrbuch der Dogmengeschichte*, vierte Auflage; Calvin's *Institutes of the Christian Religion;* Edwards, *Concerning the Necessity and Reasonableness of the Christian Doctrine of Satisfaction for Sin;* Owen's *Death of Death in the Death of Christ*, and *Of the Death of Christ;* Payne's *Lectures on Divine Sovereignty;* Chalmer's *Institutes of Theology;* Wardlaw's *Systematic Theology;* Campbell's (John M'Leod) *Nature of the Atonement*, &c.; Tayler's (J. J.) *Christian Aspects of Faith and Duty* (Discourse on 'Christ the Mediator'); Maurice's *Theological Essays;* Jowett's *St. Paul's Epistles*, first and second editions (Article 'On Atonement and Satisfaction'); Trench's *Five Sermons* (sermon on 'Christ the Lamb of God').

ATRA'TO, a river of Columbia, more important from its position than from its magnitude. It has already been mentioned under the head of AMERICA in connection with the scheme of opening a communication by water between the Atlantic and the Pacific.

The main stream falls into the Gulf of Darien by 9 mouths—the quantity of water, from the almost daily rains, being large in proportion to the area drained, which does not, at the utmost, exceed 300 miles by 75. Of the 9 mouths, the third in rank, the Boca Coquito, appears to offer the most available facilities for improving the navigation. About 220 miles above this entrance, opposite to Quibdo, the A. is 850 feet wide and 8 feet deep at the shallowest parts, while the entire fall to the sea averages less than 3 inches to a mile. Unfortunately, however, the A. itself cannot advantageously be followed thus far, because, as one advances to the south, the intervening ridge to the west, and its streams towards the Pacific become less and less practicable.

A comparatively convenient route was surveyed through the munificence of Mr. F. M. Kelley, a private citizen of New York. Ascending the Boca Coquito as before, this route leaves the main stream at a distance of 63 miles from the sea, following the Truando, one of its western affluents, for 36 miles more without impediment or interruption. From this point on the Truando to the Pacific there would still remain 32 miles. The heaviest work would be a tunnel of 3¼ miles in length. According to the plan, the canal would be without a lock. The plan for utilizing the middle branch of the A. and the Jurador, flowing into the Pacific, would require 48 miles of canal. At the International Congress assembled at Paris in 1879 for deciding the best route for the inter-oceanic canal, the A. route was, with various others, discussed and rejected in favor of one from Limon to Panama.

A'TRI (anc. *Hadria Picena*), a town of South Italy, in the province of Teramo, and 14 miles south-east from Teramo, on a steep hill, 6 miles from the Adriatic. It is of very great antiquity, and some of its coins bear a legend in Etruscan characters. Numerous remains of public buildings, baths, and walls attest its ancient importance. In a hill near the town are some remarkable subterranean chambers, supposed to be excavations of a very remote age. They are formed with the greatest regularity, but their purpose is unknown. A. is a bishop's see. It has an aspect of stagnation and decay. Pop. 3632.

ATRI'P. An anchor is said to be A. when it is just drawn out of the ground in a perpendicular direction. A top-sail is A. when it is just started from the cap.

A'TRIPLEX. See CHENOPODIACEÆ and ORACHE.

A'TRIUM, in Roman Architecture, was the covered court or entrance-hall which formed the chief part of a Roman house. It was lighted from the roof, which sloped towards an opening in the center (the *compluvium*), through which the rain-water flowed into a kind of cistern situated on the floor (the *impluvium*). On both sides, passages led to the several chambers. Its size was in proportion to the other parts of the house. After the burning of Rome in the reign of Nero, great attention was paid to the decorations of the entrance-halls or *Atria*. Here the female slaves were engaged in weaving and other domestic occupations, under the superintendence of their mistress. Family pictures were preserved in the A., it also contained the nuptial couch, and it served as a general waiting-room for visitors and clients. The Atria of the temples were used as places of assembly of the senators, and for other public meetings.

A'TROPA. See BELLADONNA.

A'TROPHY (Gr. *atrophia*, want of nourishment; from *a*, not, and *trophé*, nourishment) is a morbid condition of animal or vegetable life, resulting in deficient nutrition of the body, or part of the body, and a consequent decay and waste of its substance. The term is not applied to the mere withholding the requisite supply of nutriment, but to the condition produced by various diseases that affect the body. See NUTRITION, also DIGESTION, DYSPEPSIA, HYPERTROPHY.

ATRO'PIA, or A'TROPINE ($C_{34}H_{23}NO_6$), is an alkaloid existing in all parts of the deadly night-shade (*Atropa Belladonna*), and in the seeds of the thorn-apple (*Datura Stramonium*); hence it has also been called DATURIA or DATURINE. The Pharmacopœial directions for extracting it from the roots of belladonna by means of alcohol are somewhat complicated. It is first taken up in combination with malic acid, which is removed by the addition of lime; sulphuric acid is then added, which throws down the lime and forms sulphate of atropia; the atropia is liberated by carbonate of potash, which also separates and resolves impurity, and is taken up by chloroform, which, after being distilled off, leaves atropia, which must be finally purified by decolorization with charcoal, and crystallization from an alcoholic solution. The crystals occur in colorless silky needles, united in tufts. It is so highly poisonous, that no one has ventured to use it internally in medicine. A single drop of a solution containing one grain of atropia, one minim of nitric acid, three minims of spirit, and a drachm of distilled water, let fall on the lower eyelid, will dilate the pupil to fully double its ordinary size in the course of about ten minutes, the dilatation lasting for four or five days. The solution thus used is now generally preferred to the dirty practice of smearing the vicinity of the eye with belladonna ointment, in all those cases in which the oculist requires the pupil dilated.

ATROW'LI, a town of British India, the chief place of a pergunnah of the same name, in the district of Allygurh, North-west Provinces, 63 miles north-north-east from Agra. The streets are wide, the bazaar good, and the supply of water abundant. Pop. (1871) 15,052.

A'TRYPA, a genus of fossil brachiopod or lamp shells, having a close resemblance to the well-known *Terebratula*. It possessed a perforation for the passage of the peduncle, by which the animal attached itself to foreign bodies. This foramen is not visible in all examples of the same species, from the beak touching and overlying the umbo of the other valve; the animal was, therefore, probably free during a portion of its existence. The name (derived from *a*, without, and *trypa*, foramen) was given to this genus by Dalman, as he erroneously supposed that the perforation was entirely absent. Judging from the markings of the interior of the shell, the animal seems to have differed little from the recent *Rhynconella*, except that it had large calcareous spines for the support of its labial appendages. A. is a strictly palæozoic brachiopod, the solitary Permian species being the last representative of the genus. Of the 179 described species, 100 are Silurian, 56 Devonian, 22 Carboniferous, and 1 Permian.

ATTACHÉ (French), a subordinate or assistant. The term is generally applied to young diplomatists who accompany embassies.

ATTA'CHMENT is an English legal term, signifying the form of process, by the authority of which the person or the goods of a debtor may be seized in satisfaction. As a proceeding against the person, it is a species of criminal process, and has the force of much that will be found under APPREHEND (q. v.); but in strictness, it means a process issuing from a court of record against a person guilty of a contempt, or, more properly, of a judicial contempt, and who is punishable in a summary manner by the court in whose presence, against whose authority, or against whose writs the contempt has been overtly displayed. Thus, in Hawkins's Pleas of the Crown, such contempts are thus classed: 1. Disobedience to the Queen's writs; 2. Contempts in the face of a court; 3. Contemptuous words or writings concerning a court; 4. Refusing to comply with the rules and awards of a court; and 5. Forgery of writs, or any other deceit tending to impose on a

court. Parties are also liable to the process of A. as for a contempt of a court where, in an arbitration (see ARBITRATION) the award having been made a rule of the court under the 9 and 10 Will. III. c. 15, the parties refuse to obey the same. In Chancery, there may be A. of the person for judicial default or other offence to the court, as, for example, where a defendant fails to put in his answer or proper plea to the plaintiff's bill of complaint. The only other process of A. against the person which it is necessary here to notice, is the non-attendance in court of a witness, who in such event is considered to have committed a contempt of court, and to be liable to be punished for such contempt by attachment. An action may also be brought against such defaulting witness at the suit of the aggrieved party, on account of any loss or damage occasioned by the non-attendance.

The proceeding by A. of goods resembles in some respects the Scotch diligence or process of arrestment. See ARRESTMENT. The best illustration we can give of it, in this sense, is that relating to the power of a judgment creditor to recover under his judgment. By the 17 and 18 Vict. c. 125, it is provided that the judgment creditor may apply to the court or a judge for a rule or order to have the debtor orally examined as to the debts owing to him by any third party, or *garnishee*, as he is called (see GARNISHEE), and also for an order that all such garnishee debts be attached to answer the judgment debt, the service of which order has the effect of binding or attaching the debts in the garnishee's hands. See ATTACHMENT in AM. SUPP.

ATTA'CHMENT, FOREIGN. See FOREIGN ATTACHMENT.

ATTAC'K, in military warfare, is an advance upon the enemy, with a view of driving him from his position. It may either be an attack in the open field or an attack upon a fortess.

In an attack in the open field, the general first ascertains the strength and position of the enemy, by means of a reconnaissance or of spies. He then seeks to discover at what point the enemy can make the least resistance; which is generally on one or other flank. He next arranges to concentrate his chief strength upon this particular point; and to mask his real intention by feigned operations in other places. He then attacks with energy and force; his troops advancing without halt till near enough to use their weapons with the greatest effect. The more the attack has the character of a 'surprise,' the greater the probability of its success. In order to make this success as much felt as possible, and to be provided also against unforeseen disaster, the attacking body should be followed at a distance by a reserve; a neglect of this precaution has frequently caused the entire failure of an attack. Various forms have been devised for the attack; but generally the *parallel* or *frontal* is the one made use of. Frederick the Great, however, won most of his battles by the oblique attack, in which one wing is more advanced than the other. The first Napoleon preferred, by means of his heavy columns, to penetrate and break up the enemy's center. Another mode combines an attack on one flank as well as in front, by two separate corps; so as either to get into the enemy's rear, or to perplex him as to his retreat. A skilful general will be guided by circumstances in his selection among these several modes of operating. An attack by night might act most signally as a surprise; but as this requires a very exact knowledge of the ground, an attack at early dawn is generally preferred.

The different arms of the service render each its own kind of aid during an attack. First come the skirmishers, or perhaps whole battalions of light and active troops, whose rifles or long-range guns commence the firing. Then come the main body of infantry in heavy column; they halt within musket-shot, fire, and charge with the bayonet—the skirmishers meanwhile deploying round to the rear of the column, but holding themselves in readiness to harass the enemy's flanks. English troops especially excel in the attack by bayonet in line; but foreign armies, for the most part, rely more upon the momentum of a compact and heavy column in an attack. There are positions in which the cavalry attack, with its shock and the use of the sword, is more efficacious than that of the infantry. The troopers approach at a trot, break into a gallop at a distance of one or two hundred paces from the enemy, and endeavor by their weight and impetuosity to force the enemy's line. There are many forms of cavalry attack, according to the nature of the ground and the position of the enemy. The artillery, working at a distance, often begin an attack long before the infantry and cavalry can come up, harassing and confusing the enemy. At 800 to 1200 yards' distance, the artillery pour out shot and shell, and try to silence the enemy's guns, so as to make way for the attack of the infantry; while the bayonet-charge is being made, the artillery keep in check the enemy's cavalry. If the attack succeeds, the infantry and artillery take up the ground recently occupied by the enemy, leaving the cavalry and riflemen to maintain a pursuit; but if it fail, the artillery and cavalry take up such positions as will cover the retreat of the infantry.

In an attack upon a fortress, the operation is a part of that of besieging (see SIEGE); but very often intrenchments are attacked in the open field. Such an attack has the character of a surprise, when the works are approached under cover of night, and an attempt is make to break into them on all sides. In such case, there is a reserve corps, which is rapidly brought up when wanted; but the attacking corps retire behind the reserve, if repulsed. The artillery post themselves on the prolongation of the line of works, and try to dislodge the enemy's guns and gunners; or pour a concentric fire sufficient to breach the works. The infantry advance as close as will enable them to fire upon the gunners. When the enemy's fire is silenced, the engineers (under cover of the artillery) proceed to remove palisades and all other obstacles, and to bridge over ditches and openings. Then follow the operations of the storming-party, analogous to those noticed under ASSAULT.

ATTAI'NDER is the legal consequence of judgment of death or outlawry, in respect of treason or felony. It is said to have been derived from the Latin word *attinctus*, attaint, stained, and it is followed by *forfeiture of estate*, real and personal, and *corruption of blood*; and generally it imported extinction of civil rights and capacities. Thus, an attainted person cannot sue in a court of justice; he loses all power over his property; and he is by his A. rendered incapable of performing any of the duties, or enjoying any of the privileges of a free citizen. But absolute and severe as the consequences of A. seem to be, they had their limits. In regard to the attainted person, neither the government nor the crown could exercise absolute or capricious authority; everything must be done according to legal and constitutional principle and rule, and for the ends of public justice alone. Formerly, an attainted person could not give evidence in a court of justice; but that disability in England has been removed by the 6 and 7 Vict. c. 85, and in Scotland by the 15 and 16 Vict. c. 27.

We have stated that the immediate consequences of A. were *forfeiture* of estate and *corruption of blood*. The forfeiture was of estate real and personal. But in 1870 the law on this subject was revised and made more consistent with reason by the act 33 and 34 Vict. c. 23. No conviction for treason or felony now causes any A. or corruption of blood, or forfeiture or escheat. When a convicted person is sentenced to any punishment more severe than twelve months' hard labor, he is deprived of any public office or employment, and of any public pension, or of the right of voting at elections. He may be condemned to pay the costs or expenses incurred in procuring his conviction, and in cases of felony to make payment of a sum not exceeding £100, as compensation for any loss of property caused by such felony. He cannot sue for any property, debt, or damage.

While he is a convict undergoing any imprisonment, her Majesty may appoint paid administrators to take charge of his property at the convict's expense, to deal with the property, and pay debts and do what is needful. They may also pay out of his property satisfaction for any loss or injury suffered by third parties in consequence of his criminal or fraudulent acts, though no proof of such criminal or fraudulent acts may have been made in any court of law. They may also make allowances to support the convict's family. If the crown does not appoint an administrator, justices of the peace may appoint interim curators, if satisfied that it will benefit the convict or his family, or the due administration of his property and affairs. Should any person intermeddle with the convict's property, the attorney-general or next of kin might call them to account. When the convict ceases to be such, by the expiration of his sentence, then the administrators or curators are to account to him for all his property, or rather the surplus, like any other guardians appointed by law. If during the sentence any property be acquired by the convict, it is not to vest in the administrators, but is to be his own, as in other ordinary cases.

The old consequence of A.—viz., *corruption of blood*, is anxiously and learnedly treated of in old law-books, and in Blackstone's *Commentaries;* but the ancient law on the subject had been so much narrowed in its application by modern legislation as to have lost much of its importance; and, indeed, this doctrine of corruption of blood was in modern times always looked upon as a peculiar hardship, at least as regards the family of the offender; and now, by the statutes 54 Geo. III. c. 145, already referred to, 3 and 4 Will. IV. c. 106, and 13 and 14 Vict. c. 60, whatever savored of inhumanity or harshness under the ancient system has been effectually removed; in fact, it is now enacted that, even with the cases of treason and murder, the law of corruption of blood, so far as the family of the offender are concerned, has ceased to form part of the law. Besides A. by the operation of law as above stated, there have been frequent instances of attainders by express legislative enactment, as to which, see BILL OF ATTAINDER.

The Scotch law of A., consequent on a conviction for treason, corresponds to the English doctrine; and although the word A. is not a Scotch technical term in regard to crimes other than treason, the forfeitures consequent on conviction and judgment are very much the same as the English. See ATTAINDER in AM. SUPP.

ATTAI'NDER, Bill of. See Bill of Attainder.

ATTAI'NT, Writ of, was anciently a mode of inquiring whether a jury had given a false verdict, which has been abolished by the 4 Geo. IV. c. 50. A. is, however, still in use to some extent as a technical word in the law of England; thus, there is the plea of *autrefois A.*, or of a former attainder, for the same crime, and now regulated by the 7 and 8 Geo. IV. c. 28, s. 4.

In the old Scotch criminal law, A., or *attaynt*, signified a conviction, or being convicted.

ATTALE'A, a genus of Palms, comprising a number of species, natives of the tropical parts of South America. They have in general lofty cylindrical smooth stems, but there are some stemless species. The leaves are large and pinnate. The fruit has a dry fibrous husk, enclosing a nut with three cells and three seeds. The leaves of some species are much used for thatching, and those of some are woven into hats, mats, &c. The nuts of *A. excelsa* and of *A. speciosa* are burned to dry the India-rubber obtained from the *Siphonia elastica*, which acquires its black color from their smoke. The leaf-stalks of *A. funifera*, which is found in the southern maritime provinces of Brazil, and is there called Piassaba, yield a fibre much used for cordage. The ropes made of it are very strong, and extremely durable in salt water. The Piassaba palm of the northern parts of Brazil, however, is totally different, and much of the Piassaba (q. v.) fibre imported into Britain is obtained from it. The fruit of *A. funifera*, known by the name of Coquilla nut, is as large as an ostrich's egg, and supplies a kind of vegetable ivory, used for making umbrella handles, &c. The fruit of *A. compta*, the Pindova or Indajá palm, is of the size of a goose's egg, and the kernels are eatable. It is a stately and beautiful tree, with a wide-spreading crown.

A'TTAR. See Otto.

ATTEMPT to commit a felony or criminal offence is in many instances equally cognizable by the criminal tribunals with the complete crime itself. See Treason, Felony, Misdemeanor.

A'TTERBURY, Francis, Bishop of Rochester, was born on the 6th of March, 1662, at Milton, near Newport Pagnel, in Buckinghamshire, and educated at Westminster School, from which, in 1680, he passed to Christ Church, Oxford. In 1687, he gave proof of that ready controversial talent which distinguished him through life, in a reply to a pseudonymous attack on Protestantism by Obadiah Walker, master of University College. Disappointed in his expectation of succeeding to his father's rectory, in 1693, he sought a wider field of distinction, for ambition seems to have stimulated his efforts rather more than the love of souls, and in London his rhetorical powers soon won him reputation. He became a royal chaplain, minister of Bridewell, and lecturer of St. Bride's. In 1698, a temporary sensation was created in the learned world by the appearance of the Hon. Charles Boyle's *Examination of Dr. Bentley's Dissertations on the Epistles of Phalaris and the Fables of Æsop*.

This clever, but shallow and malicious performance was in reality composed chiefly by A., who had been the young nobleman's tutor at Christ Church. In 1700 he distinguished himself in a controversy with Dr. Wake and others regarding the powers and privileges of convocations. A.'s zealous and caustic defence of the ecclesiastical against the civil authority, procured him the thanks of the lower House of Convocation, and the degree of D.D. In 1704, he was promoted to the deanery of Carlisle, on which occasion he subjected himself to just obloquy by attempting to procure an alteration in the date of his predecessor's resignation, which happened to interpose a temporary obstacle to his appointment. In 1707 he was made a canon of Exeter; in 1709, preached at the Rolls Chapel; in 1710 he was chosen prolocutor to the lower House of Convocation, and in the same year he had the chief hand, according to the common belief, in drawing up the famous defence of Dr. Sacheverell; in 1712, he became Dean of Christ Church, where, however, his turbulent and combative spirit had meanwhile involved him in so many controversies, that there was no peace until he was removed; in 1713, he was made Bishop of Rochester and Dean of Westminster. It is supposed, not unreasonably, that A. aspired to the primacy; but the death of Queen Anne extinguished his hopes in that direction. His known character and Jacobite leanings made him no favorite with George I. In 1715 he refused to sign the bishops' declaration of fidelity, and some of the most violent protests of the Peers against the government measures proceeded from his reckless pen. His deep complicity in a succession of plots for the restoration of the Stuarts, brought down upon him at length the charge of treason, and, in August 1722, he was committed to the Tower. A bill of pains and penalties was brought into the House of Commons, and passed in the Lords by a majority of 83 to 43. A., who had defended himself with great ability, was deprived of all his ecclesiastical offices, incapacitated from holding any civil or spiritual office in the king's dominions, and condemned to perpetual banishment. There is no doubt of the fact that A. was implicated in treasonable plots, but the legal proof on which this sentence was founded cannot be regarded as sufficient to justify its severity. In June 1723, he quitted England for France, and after a short stay at Brussels, finally settled in Paris, where he died, February 15, 1732. In his exile, he maintained a constant correspondence with his friends, and took an active part in the abortive conspiracies of the Jacobites. His fame as a writer is founded on his sermons, and his letters to Pope, Swift, &c.; as a letter-writer, indeed, he has seldom been surpassed.

ATTESTA'TION, in conveyancing, is the verification of the execution of deeds and wills by witnesses; hence the clause at the end of these instruments which immediately precedes the signatures of the witnesses, is called the A. clause. See Deeds, Wills, Witnesses. In the Scotch practice, the corresponding clause is called the testing-clause. See Testing-clause.

A'TTIC, a term in Architecture, employed to designate a low story rising above the cornice that terminates the main elevation of a building; in domestic architecture, it is usually applied to sky-lighted rooms in the roof.

A'TTICA, one of the political divisions or states of Ancient Greece or Hellas, of which Athens was the capital. The territory is of triangular shape, having its north-east and south-west sides washed by the sea, while on the north it is connected with the mainland. In ancient times, it was bounded on the W. by Megaris and the Gulf of Saronica; on the S., which ran out into the 'marble steep' of Sunium, by the Ægean Sea; on the E., by the Ægean Sea; and on the N., by Bœotia, from which it is separated by a lofty range of hills, the most famous part of which was formerly called Cithæron. Ancient A. was thus walled in from the rest of Greece. The two principal rivers were the Cephissus and Ilissus; and if they exhibited the same features in ancient times as they do now, must have been mere mountain torrents, dry in summer. The unfruitfulness of the soil, and the scarcity of water, compelled the inhabitants occasionally to send out colonies. According to ancient tradition, the Aborigines of A. were first civilized under Cecrops, who is said to have come hither from Sais, at the mouth of the Nile in Egypt, about 1550 B.C.; and to have introduced the culture of olives, and of several species of grain, as also to have implanted milder manners, and taught the worship of the gods. He is stated to have divided the country into 12 communities or states. This, however, was not the only division known in early A. A still older division into *phylai*, or tribes, existed, as also a minute subdivision into *demoi*, or townships. By Theseus, Athens was united with the eleven other states of A. under one government, of which Athens was made the seat. After this union of the several states, the whole of A. shared in the fortunes of Athens (q. v.), and, under Vespasian, became a Roman province. On the division of the Roman empire, A. naturally fell into the hands of the Greek emperors. In 396 A.D., it was captured by Alaric, king of the Goths. What may have been its population in ancient times, it is impossible to determine precisely. Clinton estimates it at upwards of half a million, but this is probably exaggerated.

In the present arrangement, Attica and Bœotia form a department or government in the kingdom of Greece. The surface of the country is broken into hills and narrow plains. The most considerable hills are—Oxea, 4636 feet; Elaté, 4629; Pentelicus, famous for its marble in ancient times, of a white brilliant appearance and perdurable character, 3884; and Hymettus, 3506. The largest plains extend in the neighborhoods of Athens and Eleusis. As early as the time of Solon, A. was well cultivated, and produced wine and corn. Mount Hymettus was celebrated for its bees and honey, and metals were found in the range of Laurium. Figs, olives, and grapes are still cultivated. Goats and sheep find suitable pasturage; but the country does not now produce much grain. The population of A. and B. (1879) was 185,364.

A'TTICUS, Titus Pomponius, one of the most noble and generous men in ancient Rome, was born in 109 B.C., or a few years before the birth of Cicero. His excellent education, during which he enjoyed the companionship of Torquatus, the younger Marius, and Cicero, developed, at an early age, a love of knowledge, which was increased during his stay in Athens, where he remained many years, glad to be separated from the political distractions of his native land. After 65 B.C., when he was induced by Sulla to return to Rome, he still devoted himself chiefly to study and the pleasure of friendship, and refused to take any part in political affairs. Yet he was by no means without influence on public matters, as he lived on terms of familiar intercourse with several leading statesmen, and freely gave his counsel, which was generally sound and wholesome, while it was always benevolent. He was a man of great wealth, having been left a large inheritance by his father and his uncle, which he greatly increased by judicious mercantile speculations. His mode of life was frugal. When he was informed that a disorder under which he was laboring was mortal, he voluntarily starved himself and died in 32 B.C. Among his personal friends Cicero held the first

place. The *Annales*, written by A., were highly commended by his contemporaries. They were especially valuable on account of containing genealogical histories of the old Roman families. A. was one of those men (not uncommon either in ancient or modern times) in whom fine culture and a fortunate social position had highly developed the faculty of good taste. He had no creative genius, but was possessed of such delicate discernment that he could detect the flaw that would have been invisible to Cicero. Every author was anxious to secure his favorable opinion. None of his writings have been preserved. His Biography is found in Cornelius Nepos, and in Cicero's *Epistles to A.*

A'TTILA (Ger. *Etzel;* Hungarian, *Ethele*, conjectured to have been originally titles of honor), king of the Huns, was the son of Mundzuk, a Hun of the royal blood, and in 434 A.D. succeeded his uncle Roas as chief of countless hordes scattered over the north of Asia and Europe. His brother Bleda, or Blödel, who shared with him the supreme authority over all the Huns, was put to death by A. in 444 or 445 A.D. The Huns regarded A. with superstitious reverence, and Christendom with superstitious dread, as the 'Scourge of God.' It was believed that he was armed with a supernatural sword, which belonged to the Scythian god of war, which must win dominion over the whole world. It is not known when the name 'Scourge of God' was first applied to A. He is said to have received it from a hermit in Gaul. The whole race of Huns was regarded in the same light. In an inscription at Aquileia, written a short time before the siege in 452, they are described as *imminentia peccatorum flagella* (the threatening scourges of sinners.)

The Vandals, Ostrogoths, Gepidæ, and many of the Franks, fought under his banner, and in a short time his dominion extended over the people of Germany and Scythia—i. e., from the frontiers of Gaul to those of China. In 447, after his unsuccessful campaign in Persia and Armenia, he advanced through Illyria, and devastated all the countries between the Black Sea and the Mediterranean. Those inhabitants who were not destroyed were compelled to follow in his train. The Emperor Theodosius collected an army to oppose the inundation of the barbarians, but in three bloody engagements fortune declared against him. Constantinople owed its safety solely to its fortifications and the ignorance of the enemy in the art of besieging; but Thrace, Macedon, and Greece were overrun; seventy flourishing cities were desolated, and Theodosius was compelled to cede a portion of territory south of the Danube, and to pay a tribute to the conqueror, after treacherously attempting to murder him. In 451, A. turned his course to the West, to invade Gaul, but was here boldly confronted by Aëtius, leader of the Romans, and Theodoric, king of the Visigoths, who compelled him to raise the siege of Orleans. He then retired to Champagne, and in the wide plain of the Marne—called anciently the Catalaunian Plain—waited to meet the enemy. The army of the West, under Aëtius and Theodoric, encountered the forces of the Huns near the site now occupied by the city of Chalons-sur-Marne. Both armies strove to obtain the hill of moderate height which rises near Mury, and commands the field of battle, and after a terrible contest, the ranks of the Romans and their allies, the Visigoths, were broken. A. now regarded victory as certain, when the Gothic prince, Thorismund, immediately after his father had fallen, assumed the command, and led on the brave Goths, who were burning to avenge the death of Theodoric. Their charge from the height into the plain was irresistible. On every side the Huns were routed, and A. with difficulty escaped into his encampment. This, if old historians are to be trusted, must have been the most sanguinary battle ever fought in Europe; for it is stated by contemporaries of A., that no less than 252,000 or 300,000 slain were left on the field. A., having retired within his camp of wagons, collected all the wooden shields, saddles, and other baggage into a vast funeral pile, resolving to die in the flames rather than surrender; but by the advice of Aëtius, the Roman general, the Huns were allowed to retreat without much further loss, though they were pursued by the Franks as far as the Rhine. In the following year, A. had recovered his strength, and made another incursion into Italy, devastating Aquileia, Milan, Padua, and other cities, and driving the terrified inhabitants into the Alps, Apennines, and the lagoons of the Adriatic Sea, where they founded Venice. The Roman Emperor was helpless, and Rome itself was saved from destruction only by the personal mediation of Pope Leo I., who visited the dreaded barbarian, and is said to have subdued his ferocity into awe by the apostolic majesty of his mien. This deliverance was regarded as a miracle by the affrighted Romans, and old chroniclers relate that the apostles Peter and Paul visited the camp of A., and changed his purpose. By 453, however, A. appears to have forgotten the visit of the two beatified apostles, for he made preparations for another invasion of Italy, but died of hæmorrhage on the night of his marriage with the beautiful Ildiko.

His death spread consternation through the host of the Huns. His followers cut themselves with knives, shaved their heads, and prepared to celebrate the funeral rites of their king. It is said that his body was placed in three coffins—the first, of gold; the second, of silver; and the third, of iron; that the caparison of his horses, with his arms and ornaments, were buried with him; and that all the captives who were employed to make his grave were put to death, so that none might betray the resting-place of the king of the Huns.

Jornandes describes A. as having the Mongolian characteristics—low stature, a large head, with small, brilliant deep-seated eyes, and broad shoulders. There can be little doubt that circumstances conspired, in the case of A., to give a certain largeness to his barbaric conceptions, which made him a most formidable foe to the civilization of Europe.

A'TTOCK, a town and fort of the Punjab, on the left or east bank of the Indus; pop. 2000. A. stands below the fort, a parallelogram of 800 yards by 400, established by the Emperor Akbar in 1581, to defend the passage of the river, but it is no longer a position of strength. The great railway-bridge across the Indus here was opened in 1883. It has 5 arches 130 feet high, and renders continuous the railway connection between Calcutta and Peshawur (1600 miles.)

The situation of A. is important, whether in a commercial or in a military view. It is at the head of the steam-boat navigation of the Indus, being 940 miles from its mouth; while about 2 miles above it, the Cabul River, the only considerable affluent of the Indus from the west, is practicable for vessels of 40 or 50 tons to a distance of 50 miles. The valley, again, of this last-mentioned stream, presenting, as it does, the best approach to the east and south from Central Asia, has been the route of nearly all but the maritime invaders of India from the days of Alexander the Great downwards. *Taxila*, where the Macedonians crossed the Indus, is supposed to have been the same as Attock.

ATTO'RNEY, in its general meaning, is one appointed by another to act for him in his absence, the authority for so acting being expressed by a deed called a Power of Attorney.

ATTO'RNEYS AND SOLI'CITORS are those legal practitioners who conduct litigation in courts of justice, preparing the cause for the barristers, or counsel, as they are called, whose duty and privilege it is to plead and argue on behalf of the contending parties, and who in open court have its exclusive audience. A. and S. also practise conveyancing, or the preparation of legal deeds and instruments, and they manage a great deal of other general business connected with the practice of the law, for which, as well as for the discharge of all their duties, they are mostly remunerated by a fixed and minute scale of charges. Theirs is, indeed, an extremely important, influential, and lucrative profession, and the well-employed attorney, and the 'family solicitor,' are expressions which readily suggest the idea of acute intelligence, along with high character and confidential trusts seldom abused.

They are called *A.*, as practitioners in the courts of common law, because the attorney is one who is put in the place, stead, or *turn* of another. Formerly, when prosecuting or defending, suitors were obliged to appear *personally* in court; but now, on principles of convenience, A. may represent, and can often prosecute or defend any action or suit in the absence of, the parties. They are called *S.* in the Courts of Chancery, according theoretically to the more gentle (but not less absolute) compulsion of equity. S. also is the name usually given to this profession when they transact family or other general business out of court, and in their own chambers. A. and S. are admitted by the superior courts, of which, therefore, they are officers, having many privileges as such, and they are, in consequence, peculiarly subject to the censure and control of the judges.

The statutes relating to this branch of the legal profession being numerous and complicated, were amended and consolidated by the 6 and 7 Vict. c. 73, &c., and 33 and 34 Vict. c. 28. No person shall act as an attorney or solicitor in any court of civil or criminal jurisdiction, or in any court of law or equity in England or Wales, unless he shall have been admitted, enrolled, and be otherwise duly qualified according to the provisions of the act. And it has been decided that the person who acts as an attorney without being properly qualified, is liable to be indicted for a misdemeanor. There is an exception, however, to the rule of admission as stated, contained in a subsequent act, the 7 and 8 Vict. c. 101, s. 68, which provides that clerks or other officers to any board of guardians under the poor laws, may commence or defend proceedings before magistrates, in special or petty sessions, or out of sessions, without being qualified as attorneys. And by the 20 and 21 Vict. c. 39, facilities are afforded for the admission and enrolment in England of A. and S. of those colonial courts where the English system prevails.

To entitle a person to admission as an attorney or solicitor under 23 and 24 Vict. c. 127, and 6 and 7 Vict. c. 73, it is required, first, that he shall have served—having been duly bound by contract in writing so to do—with some practising attorney or solicitor in England and Wales, a clerkship of five years; or—if a barrister,

advocate, W.S., or S.S.C., or graduate of Scotch or Irish university, or of Cambridge, Oxford, Dublin, Durham, or London—a clerkship of three years. In some cases, four years' service are allowed. He must now pass a preliminary examination in general knowlege, as well as occasional examinations in legal subjects during his articles. The judges now have large controlling and dispensing powers as to the articles, service, fitness, and capacity to act; and the judges (or Master of the Rolls, as the case may be), upon being satisfied by such examination, or by certificates of examiners appointed by them, of the competency of any candidate for admission, shall administer to him such oaths as specified in the act, viz., 'that he will truly and honestly demean himself in practice,' and also the oath of allegiance; and after such oaths, shall cause him to be admitted as an attorney of the said courts of law at Westminster, or as solicitor of the High Court of Chancery.

It is moreover enacted, that there shall be a registrar of A. and S., whose duty it shall be to keep an alphabetical list or roll of all A. and S., and to issue certificates as to persons who have been duly admitted and enrolled; and the duties of this office are by the act committed to the 'Incorporated Law Society,' until some person shall be appointed in their room. Such a certificate from the registrar, of due admission and enrolment, must be produced to the proper authorities, by any person desirous of practising as an attorney or solicitor, before he can obtain the stamped certificate required by the Stamp Act, 33 and 34 Vict. c. 97, authorizing him to practise for the ensuing year; and in order to obtain such registrar's certificate, a declaration in writing, signed by the attorney desirous of practising, or by his partner, or in some cases by his London agent, containing his name and address, the courts of which he is an admitted attorney or solicitor, and the date of his admission, must be delivered to the registrar. And if any attorney or solicitor shall practise in any of the courts aforesaid, without having obtained a stamped certificate for the current year, he shall be incapable of maintaining any action or suit to recover his fees, and be guilty of a contempt of court, and subject to fine.

The same statute also contains the following regulations, among others of less general information: That no attorney or solicitor shall have more than two clerks, bound by contract in writing, at one and the same time; nor any such clerk after he shall have left off business. That all persons admitted as A. of one of the superior courts of law at Westminster may, upon production of a certificate thereof, be admitted in any other court of law in England or Wales, upon signing the roll of the same; and that persons admitted as S. in High Court of Chancery may in like manner obtain their admission in all other courts of equity, and in the Court of Bankruptcy. That no attorney or solicitor, who shall be a prisoner in any jail or prison, may commence or defend any action, suit, or proceeding in law, equity, or bankruptcy; or maintain any action for fees for business done during such his confinement; and that no practising attorney or solicitor shall be a justice of peace in England or Wales, except in counties or towns corporate having justices by charter or otherwise. And that no attorney or solicitor shall commence an action or suit for his fees or charges in respect of any business whatever, until after the expiration of one calender month after a bill of his costs and charges, signed by such attorney or solicitor, shall have been delivered to the party to be charged; and such party may, on a proper application, obtain an order for referring such bill to be taxed; and for staying all proceedings to recover the amount thereof in the meantime. An order may also be obtained directing an attorney or solicitor to deliver his bill (when he has not done so); and also an order for his delivering up, upon payment of what is due, all deeds, papers, and documents in his possession or power touching the business in such bill comprised. Attorneys may now, under the act 33 and 34 Vict. c. 28, enter into special agreements with their clients as to their remuneration. But this agreement, as regards suits and actions, must be deemed by the taxing officer or a court to be reasonable and fair. They may now also make it one of the stipulations that they shall not be liable for negligence. But they are still prohibited from stipulating for payment only in the event of success.

The position of A. and S. in Ireland, like the system of law and practice in that country generally, is so like that of the same profession in England, that it is unnecessary here to give any details respecting them.

The corresponding professional class in Scotland was, up to the year 1874, composed of several distinct bodies called Writers to the Signet, and Solicitors before the Supreme Courts, who had the exclusive right to practice before the Court of Session; and of procurators, whose practice was confined to their own sheriff courts. The unsatisfactory relations existing between these bodies led to a revision of the law, which was embodied in the Law Agents Act of 1873 (36 and 37 Vict. c. 63). No person was thereafter entitled to be admitted a law agent in Scotland except under the new regulations, and all enrolled law agents were to have the right, on payment of proper stamp-duties, to practise in any court of law in Scotland. Applicants for future admission are to be apprenticed for five years with a practising law agent; but advocates, English barristers, and attorneys are to serve only three years, as also graduates of a university. The Court of Session appoints examiners. Any enrolled law agent may be admitted to practise in the Court of Session. Law agents acting for the same client may lawfully agree to share profits and qualify their mutual liability. Existing societies of procurators may admit members as they see fit, but any agent admitted under the act need not become a member of such society.

ATTORNEY-GENERAL, the title by which, in England and Ireland, the first ministerial law officer of the crown is known. The A. is appointed by letters-patent. His office, powers, and duties correspond in many respects to those that belong to the Lord Advocate (q. v.) in Scotland, though the powers of the latter functionary are more extensive and less clearly defined. Originally, the A. was simply the king's attorney, and stood to the sovereign in the same relation that any other attorney does to his employer. The term 'general' was afterwards conferred to distinguish him from attorneys appointed to represent the interests of the crown in particular courts, such as the Court of Wards; or from the master of the crown office, who, is called the 'Coroner and Attorney for the Queen.' The early history of this office is involved in obscurity. Though there can be no doubt that the crown must always have been represented by an attorney in the courts of justice, there is no trace of the existence of such an office as the A., in the modern sense, till some centuries after the Conquest. Up to a period comparatively recent, the king's serjeant was the chief executive officer of the crown in criminal proceedings, and this circumstance gave rise to various questions of difficulty as to the right to precedency of these officers respectively. These questions were set at rest in 1811, by a special warrant by the then Prince Regent, afterwards King George IV., by which it was declared that both the attorney and solicitor general should have place and audience before all other members of the English bar.

A similar question arose in a Scotch appeal in the House of Lords in 1835, between the A. and Lord Advocate which was also decided in favor of the former. The following may be enumerated as the principal duties of the A.: 1st, To exhibit informations and conduct prosecutions for crimes which have a tendency to disturb the peace of the state or endanger the constitution (see PLEAS OF THE CROWN); 2d, To advise the government on legal questions; 3d, To conduct prosecutions and suits relating to the revenue; 4th, To file informations in the Exchequer for personal wrongs committed on any of the possessions of the crown; 5th, To protect charitable endowments in the sovereign's name, as *parens patriæ*, and, generally, to appear in all legal proceedings in which the interests of the crown are at stake. The attorney and solicitor general are two of the Commissioners of Patents (q. v.) *ex officio*. The powers of the solicitor-general are co-ordinate with those of the A., and in the absence of the latter, or during a vacancy, the former may perform his functions in all their extent. Both usually have seats in the House of Commons, and their tenure of office concurs with that of the government of which they are members. They were formerly paid by fees, but now by fixed salary.

The duchies of Lancaster and Cornwall, and the county palatine of Durham, have separate attorney-generals. See ATTORNEY-GENERAL in AM. SUPP.

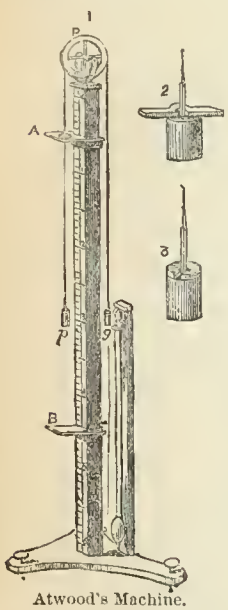
ATTRA'CTION is the general name for the force or forces by which all bodies, from the minutest particles to the largest planets, suns, and systems of suns, tend to approach, or are *drawn towards* (*ad*, to; *tractus*, drawn) one another, and when in contact, are held together. The term is generic, embracing a vast variety of facts, which are subdivided under five heads or species of A. These are—1. Gravitation; 2. Cohesion; 3. Adhesion; 4. Chemical Affinity; 5. The attractions of Electricity, Magnetism, &c. See GRAVITATION, COHESION, &c. Attempts have been made to deduce all these phenomena from one principle of A., modified by an opposing force of repulsion, but as yet without success. Still less can they be explained by assuming only *one* force—A. alone or repulsion alone—for this, too, has been attempted. The idea of an attractive force acting as the bond of the universe was first introduced as a scientific hypothesis by Newton, and was violently combated by Leibnitz and others.

A'TTRIBUTE, in the Fine Arts, is a species of symbol, consisting of a secondary figure or object accompanying the principal figure—as the trident of Neptune, or the owl of Minerva. Attributes serve to mark the character meant, and add to the significance of the representation. The necessity of using them lies in the limited means of expression possessed by the formative arts. Attributes may be either essential or conventional. Essential attributes have some real relation or resemblance to the object or idea to be expressed; and are often such as could stand alone as symbols—as the bee, representing diligence. Attributes, in the strictest sense, and as distinguished from symbols, are such as are

significant only in connection with a figure, to which they in a manner belong; e. g., the wings of genii, the finger on the mouth of Harpocrates. The last is an example of an accidental or conventional A., of which kind are also the *anchor*, to express hope; the *cross*, faith. Common attributes in Christian art are—the harp for King David, and writing materials for the evangelists, especially St. John.

A'TTRIBUTE, in Logic, is used to denote the opposite of substance. The latter is considered to be self-existent, while the former can only be conceived as possessing a dependent existence. Attributes are commonly said to belong to substances. Thus, wisdom, holiness, goodness, and truth are termed attributes of God, who is Himself regarded as the substance in which they inhere; in the same way, whiteness is called an A. of snow.

A'TWOOD'S MACHI'NE, an instrument for illustrating the relations of time, space, and velocity in the motion of a body falling under the action of gravity. It was invented by George Atwood or Attwood, a mathematician of some eminence, who was born in 1745, educated at Cambridge, became fellow and tutor of Trinity College in that university, published a few treatises on Mechanics and Engineering, and died in 1807. It is found that a body falling freely, passes through 16 feet in the first second, 64 feet in the first two seconds, 144 feet in the first three seconds, and so on. Now, as these spaces are so large, we should require a machine of impracticable size to illustrate the relations just mentioned. The object of A. M. is to reduce the scale on which gravity acts without in any way altering its essential features as an accelerating force. The machine consists essentially of a pulley, P (see fig. 1), moving on its axis with very little friction, with a fine silk cord passing over it, sustaining two equal cylindrical weights, p and q, at its extremities. The pulley rests on a square wooden pillar, graduated on one side in feet and inches, which can be placed in a vertical position by the levelling-screws of the sole on which it stands. Two stages, A and B, slide along the pillar, and can be fixed at any part of it by means of fixing-screws. One of these stages, A, has a circular hole cut into it, so as to allow the cylinder, p, to pass freely through it; the other is unbroken, and intercepts the passage of the weight. A series of smaller weights, partly bar-shaped, partly circular, may be placed on the cylinders in the way represented in figs 2 and 3. A pendulum usually accompanies the machine, to beat seconds of time. The weight of the cylinders, p and q, being equal, they have no tendency to rise or fall, but are reduced, as it were, to masses without weight. When a bar is placed on p, the motion that ensues is due only to the action of gravity upon it, so that the motion of the whole must be considerably slower than that of the bar falling freely. Suppose, for instance, that p and q are each $7\frac{1}{2}$ ounces in weight, and that the bar is 1 ounce, the force acting on the system—leaving the friction and inertia of the pulley out of account—would be $\frac{1}{16}$ of gravity, or the whole would move only 1 foot in the first second, instead of 16. If the bar be left free to fall, its weight or moving force would bring its own mass through 16 feet the first second; but when placed on p, this force is exerted not only on the mass of the bar, but on that of p and q, which is 15 times greater, so that it has altogether 16 times more matter in the second case to move than in the first, and must, in consequence, move it 16 times more slowly. By a proper adjustment of weights, the rate of motion may be made as small as we please, or we can reduce the accelerating force to any fraction of gravity. Suppose the weights to be so adjusted that under the moving force of the bar or circular weight the whole moves through 1 inch in the first second, we may institute the following simple experiments:



Atwood's Machine.

Experiment 1.—Place the bar on p, and put the two in such a position, that the lower surface of the bar shall be horizontally in the same plane as the 0 point of the scale, and fix the stage A at 1 inch. When allowed to descend, the bar will accompany the weight, p, during one second and for 1 inch, when it will be arrested by the stage A., after which p and q will continue to move from the momentum they have acquired in passing through the first inch. Their velocity will now be found to be quite uniform, being 2 inches per second, illustrating the principle that a falling body acquires, at the end of the first second, a velocity per second equal to twice the space it has fallen through. *Exp.* 2.—Take instead of the bar, the circular weight, place the bottom of p in a line with the 0 point, and put the stage B at 64 inches. Since the weight accompanies p throughout its fall, we have in this experiment the same conditions as in the ordinary fall of a body. When let off, the bottom of the cylinder, p, reaches 1 inch in 1 second, 4 inches in 2 seconds, 9 inches in 3 seconds, 16 inches in 4 seconds, 25 inches in 5 seconds, 49 inches in 7 seconds, and 64 inches and the stage in 8 seconds—showing that the spaces described are as the squares of the times. *Exp.* 3. If the bar be placed as in *Exp.* 1, and the stage A be fixed at 4 inches, the bar will accompany the weight, p, during two seconds, and the velocity acquired in that time by p and q will be 4 inches per second, or twice what it was before. In the same manner, if the stage A be placed at 9, 16, 25, &c. inches, the velocities acquired in falling through these spaces would be respectively 6, 8, 10, &c. inches—two inches of velocity being acquired in each second of the fall. From this it is manifest that the force under which bodies fall is a uniformly accelerating force—that is, adds equal increments of velocity in equal times. By means of the bar and the stage A, we are thus enabled to remove the accelerating force from the falling body at any point of its fall, and then question it, as it were, as to the velocity it has acquired.

AUBAGNE (anc. *Albania*), a town of the dep. of Bouches-du-Rhône, France, stands on the Huveaune, 9 miles east from Marseille, with which it is connected by railway. It is built with some regularity and elegance. The ancient town stood on a hill, at the base of which the present town is situated. It was the capital of the Albicii, who were subdued by Julius Cæsar. The castle, once of great strength, is now in ruins. The church was founded in 1164. This town is a place of considerable activity, manufacturing pottery, tiles, paper, &c. It has also tanneries and distilleries. Pop. (1876) 5087.

AUBE, the name of a river and a department of France. The river A., a tributary of the Seine, rises near Pralay, on the plateau of Langres; flows in a north-west course by Rouvres, La Ferté, Bar, and Arcis; and falls into the Seine at Pont-sur-Seine, after a course of 90 miles.—The department of A., which occupies the southern part of the old province of Champagne, and a small portion of Burgundy, is bounded on the N. by the Marne; on the E. by the Haute-Marne; on the S.W. by the Yonne; and on the N.W. by the Seine-et-Marne. The eastern part belongs to the basin of the A.; the western, to the basin of the Seine. Area, 2310 sq. m. Pop. (1881) 255,326. The climate is mild, moist, and changeable; but on the whole healthy. A great portion of the area is arable land. The north-east is chiefly applied to pasturage; but the south-east is far more fertile, rich in meadow-land and forest, and producing grain, hemp, rape, hay, timber, and wine. In minerals, the department possesses little besides limestone, marl, and potters' clay. The chief manufactures are woollen cloth, cotton and linen goods, ribbons and stockings, leather, parchment, &c. The sausages and bacon of A. have long been famous. *Troyes* is the capital of the department.

AUBENAS, a town in France, in the department of Ardèche. It is picturesquely situated on the right bank of the Ardèche, 14 miles south-west from Privas, in the middle of the volcanic region of Vivarais. It looks well from a distance; but the streets, with the exception of one traversed by the diligence, are narrow and crooked, the squares small, and the houses very irregularly built. An old and rapidly decaying wall, flanked with towers, girds the town, which contains an ancient castle. A. is the principal mart for the sale of chestnuts and silk in the department. Several important fairs are also held here. It possesses in addition manufactures of silk, paper, cotton, coarse cloths, leather, &c., the machinery of the mills being driven by water. Pop. (1876) 5082.

AUBER, Daniel François Esprit, a composer of operas, was born at Caen in Normandy, January 29, 1784. His father was a printseller in Paris, and being desirous that his son should devote himself to business, he sent him to London to acquire a knowledge of the trade. But his irresistible passion for music obtained the upper-hand, and after a short stay he returned to Paris. Among his earliest compositions may be noticed—the *concertos* for the violoncello, ascribed to Lamare the violoncellist; the concerto for the violin, played by Mazas with great applause at the Conservatory of Music, Paris; and the comic opera, *Julie*, with a modest accompaniment for two violins, two altos, and a bass. These works were very successful; but A., aspiring to greater things, now devoted himself to a deeper study of music under Cherubini, and wrote a mass for four voices. His next work, the opera *Le Séjour Militaire* (1813), was so coldly received that A. grew disheartened, and resolved to abandon the idea of reaching eminence as a musical composer. However, the death of his father compelled him to be dependent on his own resources; and in 1819 appeared *Le Testament et les Billets-doux*, which was also unsuccessful; but in *La Bergère Châtelaine* he laid the foundation of his subsequent fame.

In all these early essays, as well as in the opera of *Emma* (1821), he displayed an original style; but afterwards he became an imi-

tator of Rossini, and disfigured his melodies with false decorations and strivings for effect. All his later works, excepting *La Muette de Portici* (Masaniello), produced in 1828, are written with an assumed mannerism, but in a light and flowing style, with many piquant melodies which have made the tour of Europe. The operas *Leicester* (1812), *La Neige* (1823), *Le Concert à la Cour* and *Lévocadie* (1824), *Le Maçon* (1825), *Fiorella* (1826), *La Fiancée* (1829), *Fra Diavolo* (1830), were followed by a series of lighter works: *L'Elixir d'Amour*, *Le Dieu et la Bajadère*, *Les Faux Monnayeurs*, &c.; the later operas, *Gustave ou le Bal Masqué*, *Le Lac des Fées*, *Le Cheval de Bronze*, *Les Diamants de la Couronne*, *La Part du Diable*, *La Sirène*, and *Haydée*, exhibiting the same popular qualities as their predecessors; but their interest is evanescent, as they are deficient in depth of thought and feeling. His later works are *Jenny Bell* (1855), and *Manon Lescaut* (1856). In 1842, A. was appointed director of the Conservatory of Music, Paris. He died May 14, 1871.

AUBIGNÉ, Merle d'. See Merle d'Aubigné.

AUBIGNÉ, Theodore Agrippa d', a famous French scholar, was born on 8th February, 1550, near Pons in Saintonge. At an early period he exhibited a remarkable talent for the acquisition of languages. Although come of a noble family, he inherited no wealth from his father, and consequently chose the military profession. In 1567, he distinguished himself by his services to the Protestant cause, and was subsequently rewarded by Henry IV., who made him vice-admiral of Guienne and Bretagne. His severe and inflexible character frequently embroiled him with the court; and after the death of Henry, he betook himself to Geneva, where he spent the remainder of his life in literary studies. He died April 29, 1630.

His best known work is his *Histoire Universelle*, 1550—1601 (Amsterdam, 1616—1620), which had the honor of being burned in France by the common hangman, as also his *Histoire Secrète, écrite par luimême* (1721). A. was possessed of a spirit of biting satire, as is proved by his *Confession Catholique du Sieur de Sancy*, and his *Aventures du Baron de Fœneste*.

AUBRY DE MONTDIDIER, a French knight who lived in the times of Charles V., and, as tradition says, was assassinated in the forest of Bondy by Richard de Macaire in 1371. The latter became suspected of the crime on account of the dog belonging to the deceased Aubry invariably displaying towards him the most unappeasable enmity. Macaire was therefore required by the king to fight with the animal in a judicial combat, which was fatal to the murderer. This tale was afterwards, under the titles of *Aubry's Dog*, *The Wood of Bondy*, *The Dog of Montargis*, frequently acted, the 'dog' always gaining the greatest share of applause! After being performed with success at Vienna and Berlin, it was appointed to be played at the Weimar Theater, of which Goethe was the manager; but the poet resigned his office before the dog made his *début*.

AUBURN, the name of several places in the United States. Of these, the most important is in the state of New York, on the railway between Albany and Buffalo, 174 miles west of Albany. Pop. (1870) 17,225; (1880) 21,924. The outlet of Owasco Lake, which is two or three miles to the north, flows through the town, furnishing a water-power which is employed in mills of various kinds, and in manufactures of wool, cotton, carpets, iron, and paper. A. abounds in seminaries of education, but is perhaps most widely known for its state prison. The building itself is a large structure of stone, while the wall that encloses it is 3000 feet long, and from 12 to 35 feet high. The number of convicts usually exceeds 1000; and their labor is said to be generally equal to the expenses of the establishment.

AUBUSSON, a town of the dep. of Creuse, France, 125 miles west from Lyon. It is picturesquely situated on the Creuse, in a narrow valley or gorge, surrounded with mountains and rocks. It is a well-built town, consisting chiefly of one broad street. It is celebrated for the manufacture of carpets, which is said to have been introduced by the Arabs or Saracens, who settled here in the 8th century. Tanning and dyeing are carried on, and there is some trade in wine. Pop. (1876) 6424.

AUBUSSON, Pierre d', grand master of the order of St. John of Jerusalem, was born in 1423 of an ancient and noble French family. His early history is imperfectly known, but he is said to have borne arms, when very young, against the Turks in the wars in Hungary, and to have distinguished himself by the mingled zeal and valor he displayed. Here he acquired that intense antipathy to the 'Infidels' which subsequently animated his whole public career, and gave a peculiar bias to his ambition.

Having returned to France, he accompanied the dauphin in his expedition against the Swiss, and was instrumental in securing their defeat at the battle of St. Jacob near Basle. His mind, however, constantly reverted to the ominous encroachments in the East of the dreaded Mussulman, and at last resolved to betake himself to Rhodes, where he enrolled himself among the brotherhood of Christian knights. Now, his history emerges into clear light, and assumes a very considerable importance. He swept the Levant, and chastised the pirates who prowled perpetually among the Greek isles, obtaining the approbation and regard of the grand master. In 1458, by his ardor and address he succeeded in forming a kind of Christian league between the French monarch and Ladislaus, king of Hungary, against Mohammed II. This was the great aim of A.'s life, the 'idea' which continually possessed him—viz., the necessity of a vast organization of all Christendom to overthrow the power of the Turks. Step by step, through long years, he won his way to supreme power in his order. In 1476, he was elected Grand Master. It was a critical period for the civilization and religion of Europe. Constantinople had recently been taken and the Byzantine empire destroyed by Mohammed II. Every day the conqueror marched further west. Thrace, Macedonia, Central Greece, Servia, Wallachia, Bosnia, Negropont, Lesbos, and the islands of the Adriatic, had been successively conquered by him. Proud of his rapid glories, and sustained by an immense prestige, the sultan threatened to dictate terms from Rome to the entire West. Rhodes, however, stood in his way, the sentinel isle of Christianity, on the great maritime route between Asia and Europe. Mohammed saw that the battle between the two faiths must begin here; and in May 1480, a Turkish army of 100,000 men, commanded by a Greek renegade, Palæologos, landed in the island, and commenced to besiege the town. Two desperate assaults were made. The Turks, however, were compelled to desist, and sailed away, leaving 9000 dead. Mohammed was enraged, and planned a second expedition, which was interrupted by his death at Nicomedeia in Asia Minor, May 1481. After this, A. took a leading part in the religious diplomacy of the papal court, and received from the pontiff many honors and privileges. Meanwhile, he exerted himself to improve and strengthen the internal organization of the brotherhood, enriching the diplomatic code of his order with several wise statutes and regulations relative to the election of dignitaries, the finances, &c., and exciting great admiration throughout Christendom. In 1501, he was appointed generalissimo of the forces of the German emperor, the French king, and the pope, against the Turks; and in spite of his great age, he enthusiastically entered on his duties, and sailed to attack Mitylene; but the expedition failed on account of the discordant aims which the various belligerents had in view. Broken by disappointment and vexation, the grand master returned, and died at Rhodes in July 1503, at the age of 80.

AUCH, the capital of the department of Gers, in the south of France, situated on the river Gers, 42 miles west of Toulouse, lat. 43° 38′ N., long. 0° 35′ E. Pop. (1875) 12,145. It is the seat of an archbishop, and possesses a museum of natural science, together with an old and beautiful cathedral, the painted windows of which are greatly admired. Its chief articles of trade are woollen and cotton stuffs, fruits, wine and brandy.

In ancient times, it was called *Elimberis;* and at a somewhat later period took its name from the Ausci, whose chief town it was. In the 8th c., it became the capital of Gascony, and later, of the county of Armagnac.

AUCHE'NIA (from the Gr. *auchen*, the neck), a genus of ruminating quadrupeds, of which the Llama (q. v.) and the Alpaca (q. v.) are the best known. The genus is exclusively South American; indeed, the species occur only on the lofty ranges of the Andes. They are nearly allied to the camels, and may be regarded as their representatives in the zoology of America. They form, along with them, the family *Camelidæ* (see Camel), and were included by Linnæus in the genus *Camelus*. They agree with the camels in certain important anatomical characters, particularly in the structure of the stomach; and also resemble them very much in general form, in the long neck, small head, prolonged and movable upper lip, and small apertures of the nostrils. They differ from them partly in dentition, and partly in the more cloven feet and movable toes. The nails, also, are stronger and curved, and each toe is supported behind by a pad or cushion of its own; by all which the feet are admirably adapted for the rocky heights which the animals inhabit. The genus A. is by some naturalists called *Llama*.

AUCHTERA'RDER, a village in the south-east of Perthshire, on the west side of the Scottish Central Railway. Pop. (1881) 2666, chiefly employed in cotton-weaving. The popular opposition to the presentee to the church of A. originated (1839) the struggle which ended in the secession from the Church of Scotland and the formation of the Free Church in 1843.

AU'CKLAND, Bishop, a small town in the middle of the county of Durham. Pop. (1881) 10,087. It stands on an eminence, 140 feet above the plain of the Wear. A. contains the abbey-like palace of the Bishop of Durham.

AU'CKLAND, Lord, William Eden, an able statesman and diplomatist, third son of Sir Robert Eden, Bart., of West Auckland, Durham, born, in 1744, educated at Eton and Oxford, and called to the bar in 1768. In 1772 he was appointed Under-secre-

tary of State, and afterwards filled the positions of a Lord of Trade, a commissioner to treat with the insurgent colonists of North America, chief secretary to the Lord Lieutenant of Ireland, minister-plenipotentiary to France (concluding a commercial treaty with that country, 1786), ambassador to Spain, ambassador to Holland, and joint-postmaster-general. In 1788 he was created an Irish peer as Baron A.; and in 1793 he was made a British baron. He died suddenly, May 28, 1814. A. was the author of the *Principles of the Penal Law* (1771, 8vo); *Remarks on the Apparent Circumstances of the War* (1795); *Speech on the Income-tax* (1799); *Speech in Support of the Union with Ireland* (1800); and other pamphlets.

AU'CKLAND, Earl of, George Eden, governor-general of India, son of William Eden, Lord Auckland, born August 25, 1784, succeeded his father in 1814 as Lord A.; and in November 1833 joined Earl Grey's administration. In July following, in Viscount Melbourne's first ministry, he became First Lord of the Admiralty. He vacated that office in November of the same year, but was appointed to it again in 1846. In 1835 he went out to India as governor-general. He returned to England in 1841, and died unmarried, January 1, 1849.

AU'CKLAND, the northern provincial district of New Zealand, includes fully a half of North Island, and is about 400 miles long by 200 wide, at its greatest breadth. A. has a coast line of nearly 1200 miles; and is remarkable for its rivers, which serve as carriage-ways for the produce of the interior. Pop. (1875) 79,104; (1881) 99,451. There are three almost natural divisions of this district: North Peninsula, East Coast, and the Waikato Country—the latter two being mainly in the hands of the natives. Gold, copper, tin, iron, coal, and other minerals exist in A. The value of the gold exported from 1857 to 1882 was £4,917,780. A. is very rich in timber, the most important tree being the Kauri pine. The fossil gum found wherever the Kauri forests have been, is an important article of export. Much New Zealand flax is grown. In the year 1881, the total value of the exports was £813,113; including wool, Kauri gum (£253,728), timber, flax, and gold. The imports were valued at £1,490,124. The climate of A. is pleasant and healthy. Volcanic action has deeply left its mark on the surface of A.: there is still an active volcano near the city of Auckland; and the warm lake and geyser scenery of the region is very remarkable. A. is now called strictly, not province, but 'provincial district.'

AU'CKLAND, the second city of New Zealand, on the Hauraki Gulf, was, till 1865, capital of New Zealand, when the seat of government was transferred to Wellington. A. is distant from Sydney 1236 m.; from Melbourne, 1650. Picturesquely situated, its position for commerce is also excellent, as in addition to its harbor at Waitemata, it possesses also a western-harbor, the Manakan, six miles distant. There is a wharf 1690 feet in length. It is surrounded by numerous thriving villages, with several of which it is connected by railway. A. contains a well laid out botanical garden, and shows numerous public buildings, government house, barracks, &c. It supports two daily papers. About 220 sailing vessels and 50 steamers are registered as belonging to A. A. was founded in 1840. Pop. (1881) 16,675; but including suburban districts, about 38,000. The temperature appears to be singularly equable. The mean of the coldest month is 51° F., and that of the warmest 68°. The annual rainfalls is 45½ inches; and the days of rainfall average 100.

AU'CKLAND ISLANDS, a group of islands to the south of New Zealand, being about the 51st parallel S., and the 167th meridian E. The largest of them measures 30 miles by 15. It has two good harbors, and is covered with the richest vegetation. The A. I. are valuable chiefly as a whaling station, being at the confluence, as it were, of the Pacific and Southern Oceans.

AU'CTION (Lat. *auctio*). The character of this convenient mode of offering property for sale is correctly indicated by the name. The Latin word *auctio* means 'an increasing or enhancement,' and an A. is an arrangement for increasing the price by exciting competition amongst purchasers. What is called a *Dutch Auction*, in which the usual mode of proceeding is reversed, the property being offered at a higher price than the seller is willing to accept, and gradually lowered till a purchaser is found, is thus no A. at all in the original and proper sense of the term. The A. is of Roman origin, and is said to have been first introduced for the purpose of disposing of spoils taken in war. Such sales were said to take place *sub hastâ* (under the spear), from the custom of sticking a spear into the ground, probably to attract purchasers to the spot. 'Conditions of Sale,' or 'Articles of Roup,' as they are called in Scotland, constitute the terms on which the seller offers his property, and form an integral part of the contract between seller and purchaser.

The contract is completed by the offer or bidding on the part of the purchaser, and the acceptance by the seller or his representative, which is formally declared by the fall of the auctioneer's or salesman's hammer, the running of a sand-glass, the burning of an inch of candle (hence the term 'sale by the candle'), or any other means which may have been specified in the conditions of sale. These conditions or articles ought further to narrate honestly and fully the character of the object or the nature of the right to be transferred, to regulate the manner of bidding, prescribe the order in which offerers are to be preferred, and to name a person who shall be empowered to determine disputes between bidders, and in cases of doubt to declare which is the purchaser. Before the sale commences, these conditions, which are executed on stamped paper, are read over, or otherwise intimated to intending purchasers. The conditions, thus published, cannot be controlled by any verbal declaration by the auctioneer. The implied conditions, which, in addition to those thus expressed, are binding on the seller and purchaser in all auctions, are: 1. That the seller shall not attempt to raise the price by means of fictitious offers, but shall fairly expose his goods to the competition of purchasers; and 2. That the purchasers shall not combine to suppress competition. Much doubt has arisen as to the lawfulness of biddings for the exposer. The exposer may set a price below which the thing is not to be sold, which is best and most openly done by fixing an upset price, or he may expressly reserve to himself a power to offer. 'But if the sale is declared to be without reserve, or at the pleasure of the company, the plain meaning and effect of this, even in England, is held to be to bar all biddings in behalf of the seller.' 'In Scotland, the law condemns absolutely such interference.' 'It has been said, that if there be no upset price, and no agreement to sell at the pleasure of the company, the owner may bid, but that is not law, or is at least too broadly laid down.' Bell's *Commentaries*, i. 97, edit. 1858. The A. duties were repealed by 8 and 9 Vict. c. 15.

AUCTIONEE'R, the person who conducts an auction (q. v.). The A. is in a certain sense the agent of both the seller and purchaser, and by the fall of his hammer, or by writing the purchaser's name in his book, he binds him to accept the article sold at the price indicated. The A. may also, and frequently does, act as agent for absent purchasers, or for persons who have instructed him to make biddings for them during the sale. In both cases, however, the purchaser must be *bonâ fide*, otherwise the A. would himself become a 'puffer.' As to the circumstances in which he may bid for the seller, see Auction. Where the A. declines or omits to disclose the seller's name, he undertakes his responsibilities to the purchasers. To the seller, again, he is responsible for ordinary skill, assiduity, and prudence. Every A. pays an annual duty of £10 to the government for his license, which must be renewed on the 5th July; though there are certain judicial sales which may be conducted by bailiffs without license (see 19 Geo. III. c. 56, s. 3, and later Stamp Acts).

AU'CUBA, a genus of plants of the natural order *Cornaceæ* (q. v.), of which the only known species is *A. Japonica*, an evergreen shrub resembling a laurel, but with dichotomous or verticillate yellow branches, and, as seen in Europe, always with pale green leaves curiously mottled with yellow, It is dioecious, produces its small purple flowers in summer, and ripens its fruit, a small drupe, in March. It is a native of China and Japan, and was originally introduced into Britain as a stove-plant, but is found to be at least as hardy as the common laurel, and is now a very common ornamental shrub, especially in the suburbs of large towns, a sort of situation for which it is particularly adapted, as it is very little liable to suffer injury from smoke. It is often called the Variegated Laurel. The mottled appearance of the leaf is said, however, not to belong to the plant in its ordinary natural state; but only this variety has yet been brought to Europe, and of it only the female plant.

AUDÆ'US, Audi'us (or, according to his native Syriac name, *Udo*), the founder of a religious sect in Mesopotamia, flourished during the 4th c. He commenced by accusing the regular clergy of worldliness, impure morals, &c., and is said to have opposed to their manner of life a strict asceticism, until his conduct seemed dangerous to the welfare of the church, when he was excommunicated. His disciples, who were pretty numerous, now clung more closely to him, and he was elected their bishop. In 338 A.D., he was banished to Scythia, where he instituted a kind of rival church, and where he died about 370 A.D. Our knowledge both of his character and opinions is derived solely from inimical authorities, such as Augustine, Athanasius, &c., and is therefore to be accepted with caution. But his labors amongst the fierce barbarians in the north are acknowledged to have been beneficial, and one writer Epiphanius, states that he ought to be considered *schismatical*, but not *heretical*. But if the leading feature of his system, was, as is alleged, a decided tendency to anthropomorphism, we cannot see—according to the principles upon which the church usually proceeded—why he should not have been so called. He is said to have held that the language of the Old Testament justifies the belief that God has a sensible form—a doctrine deemed heretical in all ages of the church's history. This particu-

lar tenet took firm hold on many minds, and in the subsequent century, was widely spread through the monasteries of Egypt.

AUDE (*Atax*), a river in the south of France, rises in the east Pyrenees, not far from Mont Louis; flows for some time parallel to the canal of Languedoc; and falls into the Mediterranean 6 miles east-north-east of Narbonne, after a course of more than 120 miles.

AUDE, a maritime department in the south of France. It comprises some old 'counties' which formerly constituted a portion of the province of Languedoc. Pop. (1881) 327,942. Area, 2430 sq. m. The southern part of A. is mountainous, but the greater portion of it belongs to the valley of the lower A. and the canal of Languedoc. Its northern boundary is formed by the Black Mountains, the most southerly offsets of the Cevennes. The coast is flat, with no bays or roadsteads, but several lagunes. The climate is warm, but variable. The mountains are composed of granite, while the soil of the plains is chiefly calcareous, and about the coast—where salt and soda are procured—is extremely fertile, producing cereals, olives, fruits, and wines. A. is rich in iron and coal, and mineral springs. The woollen and silk manufactures are of considerable value. There is likewise a considerable export of corn, honey, &c. The chief town is Carcassonne.

AUDEBERT, JEAN BAPTISTE, a distinguished French naturalist, was born in 1759 at Rochefort; studied the arts of design and painting at Paris; and in early life attained a degree of eminence as a miniature-painter. Indulging a predilection for the study of natural history, he was much employed by naturalists in painting the more rare and beautiful objects in their collections. In 1800, after having visited England and Holland for the purpose of making sketches, he published at Paris, on his own account, a splendid volume, which raised him at once to celebrity, both as a painter and author. This work, the *Histoire Naturelle des Singes, des Makis, et des Galéopithèques* (Natural History of Monkeys, Lemurs, and Flying Lemurs), was a large folio, with 62 colored plates, remarkable alike for their truth and beauty. His method of color-printing in oil, which was then novel but now common, was to dispose all the colors on one plate instead of using a separate plate for each color. His use of gold and bronze in the illustrations and letterpress was then also as new as it is attractive. In his *Histoire des Colibris, des Oiseaux-mouches, des Jacamars, et des Promérops* (Natural History of Humming-birds, Jacamars, and Promeropses), he succeeded by the same process in giving to his plates even a greater brilliancy and finish. He died in 1800.

AUDIPHONE, is the name of an invention by Mr. Rhodes of Chicago, to assist the hearing of deaf persons in whom the auditory nerve is not entirely destroyed. The instrument is made of a thin sheet of ebonite rubber or hard vulcanite. It is about the size of a palm-leaf fan, with a handle and strings attached to bend it into a curving form, and a small clamp for fixing the string at the handles. The A. is pressed by the deaf person using it against his upper front teeth, with the convex side outwards; when so placed it communicates the vibrations caused by musical sounds or articulate speech to the teeth and bones of the skull, and thence to the organs of hearing. For different sounds, in requires to be focused to different degrees of convexity. A simple strip of fine glazed mill-board has been recommended by some experimenters as a cheaper and equally serviceable A.; and birch-wood veneer has been used with success for the same purpose.

AU'DITOR, the name given to certain officers appointed to examine accounts in behalf either of the government, of courts of law, of corporations, or of private persons—AUDIT-OFFICE. In 1785, public auditors were appointed, under the title of 'Commissioners for Auditing the Public Accounts;' and the patents of the two *auditors of the imprests* were vacated, the sum of £7000 per annum being made payable to each of them for life. Many subsequent statutes have been passed for the purpose of extending and defining the duties of these commissioners, and regulating the business of the audit-office. In 1832, the powers and functions of the Commissioners of Public Accounts in Ireland were transferred to the Commissioners for Great Britain. In 1866 an Act was passed, 'to consolidate the powers and duties of the comptroller of Her Majesty's Exchequer and of the Commissioners for Auditing the Public Accounts, and to unite in one department the separate establishments under them.' That department now consists of a comptroller and auditor-general, and a large staff of clerks. The Audit Department is empowered to call on all Keepers of Public Accounts to account for moneys or stores entrusted to them. The accounts of Army and Navy, of Land Revenue and the like, are accordingly examined by this branch.—AUDITOR OF THE COURT OF SESSION, in Scotland, is an officer whose duties consist in taxing the costs of suits in which expenses are found due, a remit being made to him for that purpose, either by a division of the court or a Lord Ordinary. The auditor returns a report to the judge or court making the remit, by whom decree is pronounced for the amount of the taxed account. The nomination of the auditor is in the crown. See AUDITOR in AM. SUPP.

AU'DITORY NERVE. By anatomists, the A. N. is associated with the facial, and is the seventh in order of origin from the brain, counting from before backwards. The seventh pair consists of the portio dura or facial, the portio mollis or auditory, and a small intermediate portion. The portio mollis apparently commences by some white streaks in the floor of the fourth ventricle; it then runs forward to the back of the petrous portion of the temporal bone, and enters the internal auditory meatus. The facial then leaves to pass along the canal called the Aqueductus Fallopii, and the auditory divides into two portions, which diverge—the smaller one posterior for the semicircular canals and the vestibule, the other for the cochlea. Those entering the semicircular canals divide into five branches, forming at last a nervous expansion somewhat analogous to the retina. Figs. 1 and 2 represent the A. N. (1) dividing into its two portions, the lesser branch supplying the semicircular canals (2), the larger branch supplying the cochlea (3). Fig. 1 represents the semicircular canals of the left side, with their bony rings round the membranous labyrinth. In this figure, the cochlea is cut in half longitudinally from base to apex, showing a section of the spiral canal, with the nerve proceeding up through its axis. Fig. 2 represents the membranous labyrinth (2), with the bony framework cut away, and with the cochlea opened so as to show the manner in which the nerve spreads out in the spiral lamina.

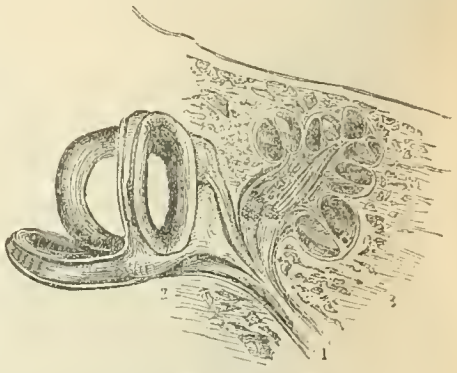


Fig. 1—Left Auditory Nerve.

Several theories have been held at different periods with regard to the manner in which the nerves terminate in the cochlea, and how sound is transmitted from the latter to the brain. The latest, and that which is at present entertained by most physiologists, is that of M. Schultze. It has been shown by actual experiment, that when a nerve in connection with a muscle is acted upon by a succession of very rapid strokes from the little hammer of a tetanmotor, and when the strokes have arrived at a certain number in the second, a stimulus is sent along the nerve exciting the muscle to action. It is the same way that M. Schultze supposes the impression of sound to be propagated to the nerves of the cochlea, by means of a series of little tetanmotors called the teeth of Corti, who discovered them.

They are situated in the spiral lamina, which separates the spiral canal in the interior of the cochlea into an upper and lower half or scala. The spiral lamina consists of an osseous septum, next to the central axis of the cochlea, and of a membranous layer which prolongs the osseous septum to the outer wall of the cochlea, thus completing the spiral lamina. This membranous septum is double, and between its layers there is a chamber which contains the teeth of Corti, ranged side by side throughout the whole length of the spiral lamina, and gradually getting shorter from base to apex, like the strings of a harp or pianoforte. The chamber is filled up by

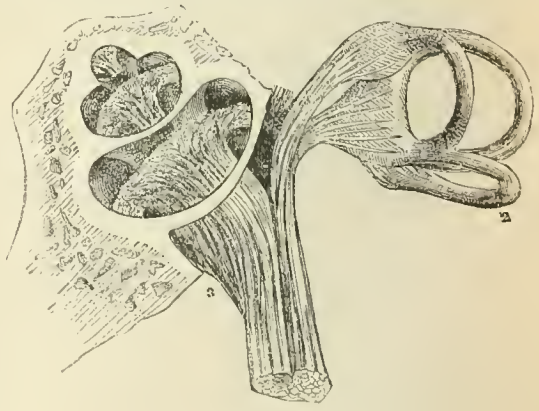


Fig. 2.—Right Auditory Nerve

a tremulous jelly-like fluid. The diagram, fig. 3, represents a perpendicular section of the spiral lamina. When the waves of sound strike against the bones of the head, those bones are caused to vibrate; this vibration is transmitted through the head to the bones of the cochlea, which in turn set in motion the tremulous jelly which fills up the membranous chamber, *c*.

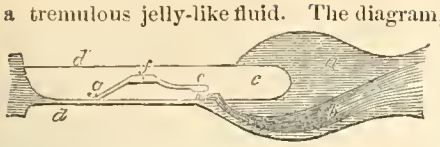


Fig 3.

a, the osseous septum grooved for the passage of the cochlear nerve *b*, which terminates by a free end inside the chamber *c*, along the floor of which it lies for a short distance; *d*, *d* are the two layers of the membranous septum. Lying in contact with the end of the nerve is the enlarged extremity of a rod *e*, which is connected in a flail-like manner by the hinge *f* to another rod, which is fixed at *g*.

AU'DLEY, Sir James, one of the original knights of the Order of the Garter, founded in 1344 by Edward III., on his return from France after the victory of Cressy, was frequently in personal attendance on Edward the Black Prince, whom he accompanied to France in 1346. He was so conspicuously brave at the battle of Poictiers, that the prince retained him as his own knight, and declared him to be the bravest soldier on his side. He conferred on him an annual revenue of 500 marks, which A. immediately gave up to his squires. This act of disinterestedness becoming known, the Black Prince conferred a further annual sum of 600 marks upon him. A. also accompanied the Black Prince into Spain, and in 1369 the office of seneschal of Poitou was conferred upon him. He took part in the capture of La-Roche-sur-Yon in Poitou, in the same year, and died a few months after. The Prince attended his funeral obsequies at Poictiers.

AUDRAN, Gérard, one of the most celebrated engravers of the French school, was born at Lyon in 1640. He belonged to a family distinguished for its excellence in this department of art. After a three years' residence at Rome, where he studied under Carlo Maratti, acquired a high reputation by his engraving of Pope Clement IX., he was recalled to France by Colbert, and was appointed engraver to his majesty Louis XIV. Here he engraved the principal works of Lebrun, with whom he lived on terms of the closest friendship. His master-pieces are a series of engravings illustrating the battles of Alexander. He died at Paris 1703.

AUDUBON, John James, a distinguished American ornithologist, was born in Louisiana, United States, in May 1780, where his parents, who were both French, had settled on a plantation. His father, who was himself an ardent lover of nature, early directed his son's attention to natural objects. The youth conceived a passion for the study of birds; and a book of ornithological specimens determined him to become a draughtsman. About the age of fourteen, he went to Paris, and studied for some time under the celebrated David. In 1798 he was settled on a farm in Pennsylvania by his father, but he did not distinguish himself as an agriculturist. In 1810 he sailed down the Ohio with his wife and child, on a bird-sketching expedition. The following year, he visited Florida for a like purpose; and for many years after he continued his ornithological researches among the American woods, to the neglect of his ordinary business. The latter he finally abandoned; and in 1824 he went to Philadelphia, where he was introduced to Prince Charles Lucien Bonaparte, who so warmly encouraged him in his plans that he determined on publication. After two years' further exploration of the forests of his native country, he came to Europe with the view to secure subscribers for his work on *The Birds of America*.

He met with a warm reception from such men as Herschel, Cuvier, Humboldt, Brewster, Wilson, and Sir Walter Scott. The issue of his work was commenced shortly after, each bird being delineated life-size. The colored engravings were chiefly executed by the late Mr. W. H. Lizars of Edinburgh. The work was completed in 87 parts, elephant folio, containing 448 plates. While the work was in process of publication in this country (it was finished in 1839), A. revisited America three times, in order to make further researches. In 1831, he began the publication of his *American Ornithological Biography* in Edinburgh, which was also completed in 1839. In 1839, A. finally returned to America, where, in 1844, he published a reduced edition of his works. Assisted by Dr. Buchanan, he also published *The Quadrupeds of America*, and a *Biography of American Quadrupeds*. He died, January 27, 1851, in his 71st year.

AU'ER, Alois, was born May 11, 1813, at Wels, in Upper Austria, and was trained in a printing establishment of his native town to be a compositor, corrector, and manager. During his scanty leisure moments, A. employed himself in acquiring a knowledge of French, Italian, English, and other languages, in which he underwent an examination in 1835 and 1836, before the university of Vienna. His brilliant appearance on this occasion opened up the way to the chair of Italian in the college at Linz. After travels in Germany, France, and England, he became director of the imperial state-press at Vienna, and was remarkably successful, obtaining other posts. In 1860 he was made a knight, and died 10th July 1869. He published a work showing the Lord's Prayer in 603 languages; a *Grammatical Atlas*, &c.; and in *Die Entdeckung des Naturselbstdrucks* (1864), he expounded his discovery of Nature-Printing (q. v.). He also made improvements in various typographical and mechanical processes.

AU'ERBACH, Berthold, a popular German author, of Jewish extraction, was born at Nordstetten, in the Würtemberg Black Forest, February 28, 1812. He received his education at Carlsruhe, Stuttgart, Tübingen, Munich, and Heidelberg. Having at an early age abandoned the study of Jewish theology, he devoted his attention to literature. His first publication was on the relation of *Judaism and Modern Literature* (1836). His first novel, *Spinoza*, contained many suggestive philosophical thoughts, and bright sketches of Jewish life; it was followed by a translation of the works of Spinoza (5 vols. Stuttg. 1841). In the *Village Tales* (*Schwarzwälder Dorfgeschichten*, 1843), he showed his power in the charming portraiture of German peasant life; a second series appeared in 1848. *Auf der Höhe* (1865) has been pronounced the best novel in the German tongue. The *Village Tales* were translated into English, Swedish, and Dutch, and were generally admired. Among his other works are *Schrift und Volk* (1846); *Das Landhaus am Rhein* (1869); *Wieder unser; Gedenkblätter zur Geschichte dieser Tage* (1871); *Waldfried* (1874). *Brigitta*, published in 1880, dealt with peasant-life in the style of his best village tales. A., regarded by many as the greatest German writer of fiction, died 8th February 1882.

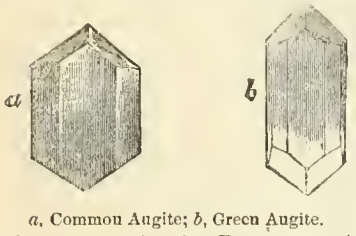
AU'GEAS, or AU'GEIAS, according to one account, the son of Helios and Iphiboë, but according to others, of Phorbas and Hermione, was king of Elis, and renowned for his wealth in oxen, of which he fed 3000 head in his stables. When the dung of these animals had been allowed to accumulate for many years, Hercules was commissioned by Eurystheus to cleanse the Augean stables in one day, and was promised as payment a tenth part of the oxen. Hercules accomplished the task, by turning the courses of the rivers Peneus and Alpheus through the masses of ordure. When A. refused to pay the stipulated wages, a war ensued, and A. was slain by Hercules. The fable of the Augean stables often serves as an allusion in declamations on political corruptions, &c.

AUGEREAU, Pierre François Charles, Duke of Castiglione, marshal and peer of France, one of the most brilliant and intrepid of that band of general officers whom Napoleon gathered around himself, was the son of a tradesman, and was born 21st October 1757. After serving some time in the French carabiniers, into which he enlisted at the age of seventeen, he entered the Neapolitan service, in which he remained until 1787, when he settled in Naples as a fencing-master. With other French residents, he was banished from that city in 1792, and immediately volunteered into the French revolutionary army intended for the repulsion of the Spaniards. His services were so conspicuous, that in less than three years he was made general of a division. In 1795 he accompanied the army to Italy, where he greatly distinguished himself, especially in the field, but also in the council. He took an active part and gained much glory in the battles of Millesimo, Ceva, Lodi, Castiglione (for which he received his title), Roveredo, Bassano, &c. In 1797 he was appointed to the command of the Army of the Rhine; but in a few months after, the Directory not liking the spirit he displayed there, made him commander of the tenth division at Perpignan. This post he resigned in 1799, when he was elected as deputy into the council of the Five Hundred. In 1801 he received the command of the army in Holland, and was active in several engagements. In 1804 he was made a marshal; and in the following year he commanded a division of the army which reduced the Vorarlberg; and was afterwards engaged at Wetzlar, Jena, Eylau; also in Italy (1809); Spain (1810); Berlin, Bavaria, and Saxony (1813). He died June 11, 1816.

AUGIER, Guillaume Victor Emile, a French dramatist of considerable reputation, was born at Valence, on the 17th of September, 1820, and was educated for the profession of an advocate. He soon, however, showed a predilection for letters, especially the drama. In 1844, he composed a piece in two acts, and in verse, entitled *La Ciguë*, which he offered at the Théâtre Français, but without success. The Odéon, however, received it, and it was played at that theater with considerable applause for nearly three months. This, while it is the first, is said to be likewise the best of A.'s works, containing some excellent moral lessons, set in a framework of the antique, and made attractive by elegant versification. In the following year, the Théâtre Français sought his services, and he produced for that theater his second comedy entitled *Un Homme de Bien*, in three acts, and in verse. This was a comedy of the day, and was only partially successful. A third *L'Aventurière*, which appeared in 1848, was better received; still there was said to be too much of commonplace in the moral sentiments with which it abounded. *Gabrielle*

in five acts, and in verse, which appeared in 1849, was also a highly moral piece, and gained for its author the Monthyon prize. In 1852, A. wrote a drama, entitled *Diane*, in which Rachel took the principal part, but in spite of all her efforts it proved a failure. He was more fortunate with *La Pierre de Touche*, a prose comedy in five acts, written in partnership with Jules Sandeau, and produced in 1853. In the same year he wrote a verse-comedy, in three acts, entitled *Philiberte*, said to be a charming *genre* piece, in which the grace of the details supplies the absence of intrigue. His subsequent pieces, however, belong all more or less to the comedy of intrigue. Such are *Le Mariage d'Olympe; Le Gendre de M. Poirier*, written in partnership with Jules Sandeau; and *La Revanche de Georges Dandin*—all produced in 1855; *La Jeunesse*, in 1858; *Les Lionnes Pauvres*, in the same year, written in conjunction with E. Foussier; and the *Beau Mariage*, also in conjunction with Foussier, in 1859. Either singly or with others, M. A. has also written *Les Effrontés*, *Le Fils de Giboyer*, *Maître Guérin*, *La Contagion*, *La Chasse au Roman*, *L'Habit Vert*, *Paul Forestier*, and *Sapho* —the last mentioned an opera, the music by Gounod. In 1856, he published a small volume of *Poésies*, some of which are very elegant both in thought and expression. Usually, A. is regarded as one of the leaders of the school of good sense; in his later pieces, however, approaching too much to the manner of the younger Dumas. In 1858, M. A. was elected a member of the Académie Française, and in the same year was promoted to the rank of officer in the *Légion d'Honneur*, of which he became a commander in 1868.

AU'GITE (from Gr. *augé* brilliancy), or PY'ROXENE (from Gr. *pyr*, fire, and *xenos*, a guest), a mineral very nearly allied to Hornblende (q. v.), which has, indeed, by some mineralogists been regarded as a variety of it, although the distinction between them is undeniably important, as characterizing two distinct series of ingneous rocks. A consists of 47—56 per cent. of silica, 20—25 per cent. of lime, and 12—19 per cent. of magnesia, the magnesia sometimes giving place in a whole or in a part to protoxide of iron, and some varieties containing a little alumina, or a little protoxide of manganese. Its specific gravity is 3·195—3·525. It is little affected by acids, or not at all. It is usually of a greenish color, often nearly black. It crystallizes in six or eight-sided prisms variously modified; it often occurs in crystals, sometimes imbedded, often in grains or scales. It is an essential component of many igneous rocks, particularly of Basalt (q. v.), Dolerite, and A.-porphyry (see PORPHYRY), from which chiefly it derives its importance as a mineral species. A. Rock, consisting essentially of A. alone, occurs in the Pyrenees. A. is a common mineral in the trap-rocks of Britain and other countries. It is rarely associated with quartz, in which respect it differs from hornblende, but very often labradorite, olivine, and leucite. Fluorine, which is generally present in small quantity in hornblende, has never been detected in A. The form of the crystals is also different in the two minerals, as well as their cleavage; but Professor Gustav Rose of Berlin has endeavored to show that the difference between A. and hornblende arises only from the different circumstances in which crystallization has taken place, and that A. is the production of a comparatively rapid, and hornblende of a comparatively slow cooling. He regards some of the varieties as intermediate. His views have been supported by experiments, and by a comparison of A. with certain crystalline substances occurring among the scoriæ of foundries.—*Diopside*, *Sahlite*, and *Coccolite* are varieties of A.—*Diallage* (q. v.) and *Hypersthene* (q. v.) are very nearly allied to it.



a, Common Augite; *b*, Green Augite.

AUGMENTA'TION, in Heraldry. See HERALDRY.

AUGMENTA'TION, in Music, is the reproduction of a melody, or principal subject of a composition, in the course of the progress of the piece, in notes of greater length than those notes in which the melody is first introduced. The tempo remains unaltered. A. is of great importance in the treatment of the subjects, or themes, for fugues, and when cleverly used, produces great effects.

AUGMENTA'TION, PROCESS OF, in Scotch law, is an action in the Court of Teinds (q. v.) by the minister of a parish against the titular, or beneficiary, and heritors, for the purpose of procuring an increase to his stipend. The moderator and clerk of the presbytery to which the minister belongs must also be called as parties. By 48 Geo. III. c. 138, it is enacted that no A. shall be granted till the expiration of 15 years from any A. previous to the act, nor till the expiration of 20 years from any A. subsequent to the act. A period of 20 years must thus elapse between each augmentation. The amount of the A. is fixed, or modified, as it is termed, in grain or victual; the stipend itself being paid in money, according to the fiars' prices (q. v.) of each year. In addition to the ascertainment or modification of a suitable stipend, regard being had to the state of the teinds, the extent of the parish, the expense of living, and the like—a process of A. has the further object in view of *localling* the stipend so modified—i. e., of assigning it in due proportions to the heritors or other parties in possession of the tithes. This latter object is attained by means of what is called a scheme of locality—i. e., an allotment of the stipend modified to the several parties liable therefor. This scheme is prepared at the instance of the second junior Lord Ordinary (q. v.), on a remit from the Teind Court. The last conclusion in a summons of A. is for a suitable sum, or increase to the sum already allowed, for communion elements—i. e., for bread, wine, and other necessaries for celebrating the sacrement of the Lord's Supper after the Presbyterian fashion. When there is not a sufficient amount of teind to bring the stipend of the minister up to £150 per annum, with £8, 6*s.* 8*d.* for communion elements, it is provided by 50 Geo. III. c. 84, and 5 Geo. IV. c. 72, that the residue shall be paid by the Exchequer. In addition to their stipend, ministers have right to a manse and glebe, or a provision of £50 annually in lieu of them. See STIPEND, GLEBE, MANSE; see also PARLIAMENTARY CHURCH.

AU'GSBURG, historically one of the most notable cities in Germany, is situated in the angle between the rivers Wertach and Lech, and is the chief city of the circle of Swabia and Neuburg, in Bavaria. The population is (1880) 61,408. Though presenting an antique and rather deserted appearance, A. has numerous fine buildings, and especially one noble street, the 'imperial' Maximilian Strasse, adorned with bronze fountains. The industry of A. is reviving; several cotton and woollen factories are in operation, as well as manufactories of paper, tobacco, and machinery. Its gold and silver wares still retain their ancient reputation. The art of copper engraving is extinct; but printing, lithography, and bookselling have taken a new start. The *Allgemeine Zeitung*, the best known of the German newspapers, was published here till 1882 (now at Munich). There are in A. 10 printing establishments, many book-shops, and still more breweries. Banking and stock-jobbing are extensively carried on; and it is still the emporium of the trade with Italy and Southern Germany.

It is the center of a system of railways connecting it with Nürnberg and Leipsic, with Switzerland, Munich, &c. The foundation of A. was the 'colony' planted by the Emperor Augustus, 12 B.C., after the conquest of the Vindelici, probably on the site of a former residence of that people. It was called *Augusta Vindelicorum*, and hence the present name. It became the capital of the province of Rhætia, was laid waste by the Huns in the 5th c., and came next under the dominion of the Frankish kings. In the war of Charlemagne with Thassilo of Bavaria, it was again destroyed. After the division of Charlemagne's empire, it came under the Duke of Swabia; but having again become already rich by commerce, was able to purchase gradually many privileges, and finally became, in 1276, a free city of the empire. It now rose to greater consequence than ever, and had reached the summit of its prosperity by the end of the 14th c. About this time (1368), its aristocratic government was set aside for a democratic, which lasted for 170 years, till the aristocracy, favored by Charles V., regained the ascendency. A. continued in great eminence for its commerce, manufactures, and art, till the war between Charles V. and the Protestant league of Schmalkald (1540). Along with Nürnberg it formed the emporium of the trade between Northern Europe and the south, and its merchants were princes whose ships were in all seas. See FUGGER. It was also the center of German art as represented by the Holbeins, Burkmair, Altdorfer, and others. Many diets of the empire were held in A., and the leading events of the Reformation are associated with its name. The discovery of the road to India by the Cape, and of America, turned the commerce of the world into new channels, and dried up the sources of A.'s prosperity. It lost its freedom with the abolition of the German empire in 1806, and was taken possession of by Bavaria.

AU'GSBURG CONFESSION, the chief standard of faith in the Lutheran Church. Its history is the following. With a view to an amicable arrangement of the religious split that had existed in Germany since 1517, Charles V., as protector, of the church, had convoked a diet of the empire, to meet at Augsburg, 8th April 1530, and had required from the Protestants a short statement of the doctrines in which they departed from the Catholic Church. The Elector, John, of Saxony, therefore, in March, called on his Wittenberg theologians, with Luther at their head, to draw up articles of faith, to lay before him at Torgau. The commissioned doctors took as a basis, in so far as pure doctrine was concerned, articles that had been agreed to the previous year at conferences held at Marburg and Schwabach, in the form of resolutions of the Lutheran reformers of Germany against the doctrines of Zwingli. These doctrinal articles supplemented, and with a practical part newly added, were laid before the Elector at Torgau.

Melanchthon then, taking the Torgau articles as a foundation, began in Augsburg, in May, and with the advice of various Protestant theologians, as well as princes and other secular authorities, composed the document, which he first called an Apology, but which in the diet itself took the name of the A. C. Luther was not present in Augsburg, being then under the ban of the empire, but his advice was had recourse to in its composition. The Torgau articles were in German; the Confession was both in German and Latin; and Melanchthon labored incessantly at its improvement till it was presented to the emperor, June 25. The character of Melanchthon, in the absence of Luther, had led him, in setting about the composition of the document, to aim at maintaining a spirit of love, forbearance, and mediation, as well as the utmost brevity and simplicity. Its object, which only became gradually apparent after the meeting of the diet, was, in the first place, to give a collected view of the belief of the Lutheran Protestants, aiming at the same time at refuting the false accusations of the Catholics, and at laying a foundation for measures of reconciliation.

The first part of the Confession contains 21 articles of faith and doctrine: 1. Of God; 2. Of Original Sin; 3. Of the Son of God; 4. Of Justification; 5. Of Preaching; 6. Of New Obedience; 7 and 8. Of the Church; 9. Of Baptism; 10. Of the Lord's Supper; 11. Of Confession; 12. Of Penance; 13. Of the Use of Sacraments; 14. Of Church Government; 15. Of Church Order; 16. Of Secular Government; 17. Of Christ's Second Coming to Judgment; 18. Of Free Will; 19. Of the Cause of Sin; 20. Of Faith and Good Works; 21. Of the Worship of Saints. The second and more practical part, which is carried out at greater length, contains seven articles on disputed points; 22. On the Two Kinds of the Sacrament; 23. Of the Marriage of Priests; 24. Of the Mass; 25. Of Confession; 26. Of Distinctions of Meat; 27. Of Conventual Vows; 28. Of the Authority of Bishops.

This document signed by some six Protestant princes and two free cities, was read before the emperor and the diet 25th June 1530. Melanchthon, not looking upon the Confession as binding, began shortly after to make some alterations in its expression; at last, in 1540, he published a Latin edition (*Confessio Variata*) in which there were important changes and additions. This was especially the case with the article on the Lord's Supper, in which, with a view to conciliation, he endeavored to unite the views of the Lutherans and Calvinists. This gave rise subsequently to much controversy; orthodox Lutheranism repudiated the alterations of Melanchthon, and long continued to subject his memory to great abuse; though it is clear that Melanchthon and his adherents contemplated no substantial departure in doctrine from the original Confession.

It is not certain that the form of the Confession found in the Lutheran standards is identical with the unaltered A. C., as the two original documents—German and Latin—laid before the diet have been lost. The chief distinction between the orthodox Lutherans and the reformed churches of Germany has all along been adherence to the 'unaltered' or to the 'altered' Confession. It was even a matter of controversy whether the 'reformed' were entitled to the rights secured to the Protestants by the Religious Peace of Augsburg, concluded in 1555, on the ground of the 'unaltered' Confession.—Though the A. C. is still formally adhered to by the Protestant churches of Germany, it is confessedly no longer the expression of the belief of the vast majority of the members, after the great advances made by theology, and the many alterations in public opinion and feeling.

AU'GSBURG I'NTERIM. See INTERIM.

AU'GURIES AND AU'SPICES. These terms are familiar to every reader of Roman history, and are, besides, so frequently employed in English in a secondary and metaphorical sense, that a vague notion of their original meaning is caught up even by those who know nothing of classical antiquities. As, however, the entire religious and political life of the early Romans was deeply penetrated by the influence of their sacred superstitions, and as amongst these auguries and auspices held a prominent place, a clear conception of what they were is a matter of considerable moment. The following statements exhibit, in a condensed form, the substance of what is known on the subject.

Like almost all primitive nations, the Romans believed that every unusual occurrence had a supernatural significance, and contained, hidden in it, the will of Heaven regarding men. To reveal or interpret this hidden will, was the exclusive privilege of the augur, who apparently derived his official designation, in part at least, from *avis*, a bird; while Roman history abundantly proves that the observation of the flight of birds was a principal means adopted for discovering the purpose of the gods. It was not, however, any one who could be appointed an augur. The gods selected their own interpreters—that is to say, they conferred the divine gift upon them from their very birth; but an educational discipline was also considered necessary, and hence a 'college of augurs' figures in the very dawn of Roman history. Romulus, it is almost certain, was an augur himself. He is said to have been skilled in the art of divination from his youth; and by 'divination' we must specially understand augury; for the Romans, with patriotic piety, held all the forms of divination practised in other countries to be useless and profane. Previous to the Ogulnian law, passed in the year 307 B.C., there were only four augurs, who were selected from the patricians. By this law, however, the plebeians became eligible for the pontifical or augural offices, and five were immediately created. For more than two hundred years, the number continued the same, till Sulla, in 81 B.C., increased it to fifteen. Finally, in the first days of the Empire, when all parties, sick of the long civil wars, hurried to throw their privileges at the feet of the monarch who had brought peace into their homes, the right of electing augurs at his pleasure was conferred on Augustus, after which the number became indefinite.

At first, the augurs were elected by the *Comitia Curiata*; but as the sanction of the former was necessary to give validity to the acts of the latter, they could always 'veto' any elections which were obnoxious to them; so that the power of electing members to fill up vacancies naturally fell into the hands of the college itself, and so continued till 103 B.C., when a tribune of the people named Ahenobarbus carried a law by which it was enacted that for the future, vacancies in the augural and pontifical offices should not be filled up by those religious corporations themselves, but by a majority of certain picked tribes. This new law was occasionally repealed and re-enacted during the civil wars which lasted till the time of Augustus. The scramble for power, however, during these political vicissitudes, as well as the general advance of knowledge, had rendered its prophetic pretensions ridiculous in the eyes of educated people. By Cicero's time, it had lost its religious character altogether, but was still regarded as one of the highest political dignities, and coveted for the power it conferred.

The modes of divination employed by the augurs were five in number—*augurium ex cælo, ex avibus, ex tripudiis, ex quadrupedibus, ex diris*. The *first*, related to the interpretation of the celestial phenomena, such as thunder and lightning, was apparently of Etruscan origin, and held to be of supreme significance. The *second* related to the interpretation of the noise and flight of birds. It was not every bird, however, that could be a sure messenger of the gods. Generally speaking, those 'consulted,' as it was called, were the eagle, vulture, crow, raven, owl, and hen. The first two belonged to the class of *alites*, or birds whose *flight* revealed the will of the gods; the last four to the class of *oscines*, whose voice divulged the same. These two modes of augury were the oldest and most important. Of the other three, the auguries *ex tripudiis* were taken from the feeding of chickens; the auguries *ex quadrupedibus*, from four-footed animals—as, for instance, if a dog, or wolf, or hare, ran across the path of a Roman, and startled him by any unusual motion, he mentioned it to an augur, who was expected to be able to advise him what to do; the auguries *ex diris* (a vague kind of augury), from any trifling accidents or occurrences not included in the previous four—such as sneezing, stumbling, spilling salt on the table, &c.

At Rome, the auspices were taken on the summit of the Capitoline Hill; and the ground on which the augur stood was solemnly set apart for the purpose. The latter then took a wand, and marked out a portion of the heavens in which his observations were to be made. This imaginary portion was called a *templum* (hence *contemplari*, to contemplate), and was subdivided into right and left. According as the birds appeared in either of these divisions were the auspices favorable or unfavorable. How vast the political influence and authority of the augurs must have been is seen from the fact, that almost nothing of any consequence could take place without their sanction and approval. The election of every important ruler, king, consul, dictator, or prætor, every civic officer, every religious functionary, was invalid if the auspices were unfavorable. No general could lawfully engage in battle—no public land could be allotted—no marriage or adoption, at least among the patricians, was held valid—unless the auspices were first taken, while the Comitia of the Centuries could be dispersed at a moment's notice by the veto of any member of the augural college.

We have employed the two terms, auguries and auspices, as synonymous. But a slight difference is perceptible between them: not the augurs only, but the chief magistrates of Rome (inheriting the honor from Romulus), held the 'auspices,' while the 'auguries' were exclusively in the possession of the former; but the mode of divination, and the end to be obtained by it, seem to have been the same in both cases.

The power of taking the auspices in war was confined to the commander-in-chief; and any victory gained by a legate was said to be won under the auspices of his superior, and the latter alone was entitled to a triumph. Hence has originated the very common phrase in our language, 'under the auspices' of some one, which usually denotes nothing more than that the person alluded to merely lends the influence of his name.

AU'GUST, the sixth month in the Roman year, which began with March, was originally styled *Sextilis*, and received its present name from the Emperor Augustus, on account of several of the most fortunate events of his life having occurred during this month. On this month he was first admitted to the consulate, and thrice entered the city in triumph. On the same month, the legions from the Janiculum placed themselves under his auspices, Egypt was brought under the authority of the Roman people, and an end put to the civil wars. (See Macrobius, i. 12). As the fifth month, or *Quintilis*, had previously been styled Julius in honor of Julius Cæsar, a day was taken from February to make A. equal with July.

AUGU'STA, the name of two considerable cities in the United States.—1. A. is the capital of Maine, situated on both banks of the river Kennebec, which is here crossed by a bridge 520 feet long. Its lat. is 44° 19′ N., and long. 69° 50′ W. Up to A., the river is navigable for sloops from its mouth, a distance of 43 miles, in a straight line; while a dam, constructed immediately above the city, enables steam-boats to ply more than 20 miles above, as far as Waterville. A. is also a station on the railway between Portland and Bangor. The dam, too, which improves the navigation, has created a vast water-power, which is extensively employed for manufacturing purposes. Between 1830 and 1870, the population had increased from 3980 to 7808.—2. A. is the second city in Georgia, on the Savannah, 231 miles from its mouth. Its lat. is 33° 28′ N., and long. 81° 54′ W. It has extensive railway communication; and a canal, from a point 9 miles up, brings the waters of the Savannah to the city on such a level as to furnish a fall of 35 or 40 feet—a water-power which is extensively and profitably employed. It is spacious and regular in its plan—Green Street, for instance, being 168 feet broad. The chief buildings are the City Hall, a Masonic Hall, an Oddfellows' Hall, the Richmond Academy, the Georgia Medical College, the Opera-house, and an Orphan Asylum. The city also possesses an arsenal, water-works, and numerous banks, factories—of which the chief is 'Augusta factory,' with 500 hands—foundries, flouring-mills, churches, hospitals, and newspapers. Population (1870) 15,389; (1880) 23,023.

AUGU'STENBURG, a village of 800 inhabitants in the center of the island of Alsen. It is noted for being the residence of the Duke of Holstein-Sonderburg-Augustenburg, for its splendid 'stables,' and for the castle belonging to the ducal family.

AUGU'STI, a learned German theologian, born in 1772 at Eschenberga, near Gotha. He studied at Jena under the celebrated Griesbach, and afterwards devoted himself for some time to public teaching. In 1798, he became lecturer (*privat-docent*) in philosophy, and in 1800 he was appointed professor-extraordinary of the same. Three years after, he succeeded Ilgen in the chair of Oriental Literature; but his love of theological studies becoming predominant, he accepted the offer of a theological professorship in the university of Breslau, where he exerted a wide and beneficial influence. In 1819 he was transferred to Bonn, and made a director of the consistory at Cologne. Other ecclesiastical honors were conferred on him during the course of his life. He died on the 28th April 1841.

In the early part of his career, A. was a decided rationalist; but subsequently he returned to orthodox Lutheranism, more, perhaps, from the conservative bias of his nature, than from any profound conviction of the truth of the national creed. The change, however, was not accompanied, as is usual in such cases, with any intense bigotry. A. remained to the last a liberal-hearted Christian. His writings, marked by great learning, industry, and spirit, are much esteemed by his countrymen. The most important is his *Manual of Christian Archæology* (Leip. 1836—1837).

AUGUSTINE, Aurelius St., the greatest of the Latin fathers, was born at Tagaste, a town of Numidia, on the 13th of November 354 A.D. His father, Patricius, was poor, but of good family, and filled the office of magistrate. He continued a pagan till advanced in years, and was only baptized shortly before his death. He does not seem to have been remarkable for any elevation of mind; on the contrary, one may fairly conclude, from his son's statements, that he was an irascible, kind-hearted man, more intent on his son's advancement in this world than in that which is to come. His temper often caused great sorrow to his gentle and pious wife, who loved him faithfully, however, and was therefore rewarded with the secret by which she could charm the evil spirit out of him. Patricius was very anxious that A. should become a fine scholar, as he noticed that not a few people in his day were obtaining large incomes by their 'wits.' A. was accordingly sent to school at Madaura, and subsequently to Carthage, to complete his studies. Previous to this, however, he had enjoyed the inestimable felicity of a religious education at home. His mother, Monnica, had been his best instructor. Neander truly says: 'Whatever treasures of virtue and worth the life of faith, even of a soul not trained by scientific culture, can bestow, was set before him in the example of his pious mother.'

The energy and penetration of intellect exhibited by the young A. excited the most flattering hopes. When he left home for Carthage, a joyous, ardent, and resolute student, a bright career of wordly prosperity seemed to open before him. But strong as A. was, the temptations of Carthage were stronger. His nature, deep, impetuous, and passionate, thirsted for excitement. He had just reached the age when happiness is conceived to be synonymous with pleasure, and Carthage, the second city of the empire, was rank as Rome in its sensual corruptions. A. fell. In his *Confessions*, he paints the frightful abyss into which he felt himself plunged; nor does he seek to excuse himself; on the contrary, the shadow of his guilt is thrown forward over all his boyish life, and he displays even a morbid zeal and acuteness in pointing out what others, less censorious, might term the frivolous errors of his childhood, but which seemed to A. the parents of his subsequent vices, and therefore equally bad and equally reprehensible. Before he had reached his eighteenth year, his mistress bore him a son, who was named Adeodatus—afterwards baptized along with him at Milan. The thing which appears to have stirred his deeper being into life was a passage which he suddenly came across in the *Hortensius* of Cicero, treating of the worth and dignity of philosophy. To use the language of Neander: 'The conflict now began in his soul which lasted through eleven years of his life. As the simplicity of the sacred Scriptures possessed no attractions for his taste—a taste formed by rhetorical studies and the artificial discipline of the declamatory schools—especially as his mind was now in the same tone and direction with that of the Emperor Julian, when the latter was conducted to the Platonic theosophy; as moreover, he found so many things in the doctrines of the church which, from want of inward experience, could not be otherwise than unintelligible to him, while he attempted to grasp, by the understanding from without, what can be understood only from the inner life, from the feelings of the inner wants, and one's own inward experiences; so under these circumstances, the delusive pretensions of the Manichæn sect, which, instead of a blind belief on authority held out the promise of clear knowledge and a satisfactory solution of all questions relating to things human and divine, presented the stronger attractions to his inexperienced youth.' A. now became a professed Manichæan. Returning to his native town, he lectured for a short time on 'grammar'—that is to say, on literature. Soon afterwards, he returned to Carthage, to pursue his profession under more favorable auspices. Here he wrote, in his twenty-seventh year, his first work, *De Apto et Pulchro*—a treatise on æsthetics, which has unfortunately been lost. About the same time his spiritual nature became keener and more imperative in its demands. The futile speculations of the visionary sect to which he had attached himself now became apparent. He had a series of interviews and conversations with Faustus, one of the most celebrated teachers of Manichæism; and these so utterly disappointed his expectations, that he left the society in disgust and sad bewilderment, after having wasted ten years in a fruitless search for wisdom and truth.

In 383 he went to Rome, followed by the tears, the prayers, and the anxieties of his excellent mother, who was not, however, bereaved of hope, for both her faith and her love were strong. After a short stay, A. left Rome, and proceeded to Milan, where he became a teacher of rhetoric. No change could have been more fortunate. At this time, the Bishop of Milan was the eloquent and devout St. Ambrose. An intimacy sprang up between the two. A. often went to hear his friend preach. He was not, however, as yet a Christian. He had only emerged, as it were, from Manichæism—the region of night-clouds and shadows—and was now gazing on the gray dawn of the Platonic philosophy, prophetic of the noon-tide splendors of Christianity which were soon to burst upon his vision. Still, A. did not afterwards despise this preliminary training; he was too great and honest a man for that. He confesses that the Platonic writings 'enkindled in his mind an incredible ardor;' they awakened his deeper spiritual nature, which keenly upbraided him with his sins. Once more he studied the Bible, although from a purely Platonic point of view, and rather wishing to find in it 'those truths which he had already made himself acquainted with from the Platonic philosophy, but presented in a different form.' He began to think that Christ and Paul, by their glorious life and death, their divine morality, their great holiness, and manifold virtues, must have enjoyed much of that 'highest wisdom' which the philosophers thought confined to themselves. For some time he clung to his Platonic Christianity, and shaped the doctrines of the Bible according to it; but when he found that it was weak to overcome temptations, and that 'he himself was continually borne down by the ungodly impulses which he thought he had already subdued,' the necessity of a living personal God and Saviour to rescue him from the condemnation of his own conscience, and impart a sanctifying vitality to the abstract truths which he worshiped, shone clear through all the stormy struggles of his heart. In the eighth and ninth books of his *Confessions*, he has left a noble though painful picture of his inward life during this momentous crisis. It is sufficient to say, that the Spirit of God triumphed. On the 25th of April 387 A.D.

A., along with his natural son Adeodatus, of whom he seems to have been justly fond, was baptized by Ambrose at Milan. Shortly after, he set out on his return home. At Ostia, on the Tiber, his beloved mother, who had followed him to Milan, died; her eyes had seen the salvation of her son, and she could depart in peace. After her death, and before leaving Italy for Africa, A. wrote his treatises, *De Moribus Ecclesiæ Catholicæ et de Moribus Manichæorum; De Quantitate Animæ;* and *De Libero Arbitrio*. It is unnecessary to relate at any length the subsequent life of Augustine. His character and principles of action had become fixed, and he now brought the whole majesty of his intellect to bear upon the side of Christianity. Having, as was then customary for converts, divided his goods among the poor, he retired into private life, and composed several treatises—*De Genesi Contra Manichæos, De Musicâ, De Magistro*, and *De Verâ Religione*, which secured him a high reputation. In 391 he was ordained a priest by Valerius, Bishop of Hippo; and during the next four years, though earnestly engaged in the work of preaching, contrived to write three different works. In 395, he was made colleague of Valerius.

Then ensued a period of hot strife, known in church history as the Donatist and Pelagian controversies. A., as may naturally be supposed, having passed through so fierce a fire of personal experience on religious questions, would be very jealous both of what he *knew* to be truth, and of what he only *thought* to be the truth. This, added to his acute and profound intellect, made him, in spite of the poverty of his historical erudition, a most formidable and relentless antagonist. But this portion of his career will fall to be treated more properly under PELAGIUS and PELAGIANISM (q. v.). In 397 appeared his *Confessiones*, in 13 books. It is a deep, earnest, and sacred autobiography of one of the greatest intellects the world has seen. Passages of it have no parallel except in the Psalms of David. In 1413, he commenced his *De Civitate Dei*, and finished it in 426. It is generally considered his most powerful work. Exception may be taken to much that it contains. The learning is no doubt very considerable, but it is not accurate. A. was an indifferent scholar; he had studied the Latin authors well; but of Greek 'he knew little, and of Hebrew, nothing.' Many of his reasonings are based on false and untenable premises, and he erred often in his etymological explanations, but in spite of these and other drawbacks, the final impression left on the mind is, that the work is one of the most profound and lasting monuments of human genius. In 428, A. published his *Retractationes*, in which he makes a recension of all his previous writings. It is a work of great candor. He frankly acknowledges such errors and mistakes as he had discovered himself to have committed, explains and modifies numerous statements, and modestly reviews his whole opinions. His end was now drawing nigh. In 429 the Vandals, under the barbarian Genseric, landed in Africa; next year they besieged Hippo. A., now in his seventy-sixth year, prayed that God would help his unhappy church, and grant himself a release out of this present evil world. He died on the 28th of August 430, in the third month of the siege.

No mind has exerted greater influence on the church than that of Augustine. Consistency of theological opinion is not to be looked for from him, nor from any of the church fathers. A larger sphere of freedom was permitted to religious speculation in those unfettered days, before creeds were encircled with that traditionary sanctity they now possess. Nevertheless, we have little difficulty in determining the central tenets of his theological belief. He held the corruption of human nature through the fall of man, and the consequent slavery of the human will. Both on metaphysical and religious grounds, he asserted the doctrine of predestination, from which he necessarily deduced the corollary doctrines of election and reprobation; and finally, he strenuously supported, against the Pelagians, not only these opinions, but also the doctrine of the perseverance of the saints. At the same time, it is but fair to add that, even on such points, his language is far from uniform; that much of the severity of his doctrines arose from the bitter and painful remembrance of his own early sins, and from the profound impression which the corrupt state of society in his time, and the vast desolations of barbarism, had made on his earnest and susceptible soul; and that, in his desire to give glory to God, he sometimes forgot to be just to man. In illustration of this may be mentioned the fact (see Neander, Mosheim, and Waddington's Church Histories), that the maxim which justified the chastisement of religious errors by civil penalties, even to burning, was established and confirmed by the authority of A., and thus transmitted to following ages. In his epistle to Dulcitius, a civil magistrate, who shrank from putting in force the edict of Honorius against heretics, he uses these words: 'It is much better that some should perish by their own fires, than that the whole body should burn in the everlasting flames of Gehenna, through the desert of their impious dissension.' In the opinion of Neander, it was to the somewhat narrow culture, and the peculiar personal experience and temperament of Augustine, that the doctrines of absolute predestination and irresistible grace, first systematized by him, owed much of the harshness and one-sidedness which so long obstructed their general reception by the church, and which continue to render them repulsive to multitudes.

His life has been written by Tillemont, and his entire works have been repeatedly edited. The Benedictine edition, published at Paris in 11 vols. (1679—1700), is the best. Numerous editions of the *Confessiones* and *De Civitate Dei* have appeared; the most recent of the latter by Marcus Dods, D.D. In the 'Library of Fathers of the Holy Catholic Church,' are translations into English of A.'s *Confessions, Exposition on St. John's Gospel* and *on the Psalms, Sermons on the New Testament*, and *Short Treatises*. His *Sermon on the Mount* is translated by Trench, and his *Letters* by Rev. J. G. Cunningham.

AUGUSTINE, St. first Archbishop of Canterbury, was originally a monk in the convent of St. Andrew at Rome. In 596 he was sent, along with forty other monks, by Pope Gregory I., to convert the Anglo-Saxons to Christianity, and establish the authority of the Roman see in Britain. The missionaries were kindly received by Ethelbert, king of Kent, whose wife Bertha, daughter of the king of the Parisians, was a Christian, and retained a Frankish bishop in her suite as chaplain. A residence was assigned to them at Canterbury, then called *Durovernum*, where they devoted themselves to monastic exercises and preaching. The conversion and baptism of the king contributed greatly to the success of their efforts among his subjects, and it is recorded that in one day A. baptized 10,000 persons in the river Swale. Nominal as much of this conversion must have been, there is abundant testimony to the fact, that a marked improvement in the life and manners of the Anglo-Saxons followed the evangelistic labors of A. and his companions.

In 597 he went to Arles, by direction of the pope, and was there consecrated Archbishop of Canterbury and Metropolitan of England. On his return, he despatched a presbyter and monk to Rome, to inform the pope of his success, and obtain instruction on certain questions. Gregory's advices with regard to the propagation of the faith are admirable examples of that pious ingenuity which has often characterized the missionary policy of the Church of Rome. Thus, instead of destroying the heathen temples, A. was recommended to convert them into Christian churches, by washing the walls with holy water, erecting altars, and substituting holy relics and symbols for the images of the heathen gods. A.'s subsequent efforts to establish his authority over the native British church were not so successful as his missionary labors. He died in 604, and was buried in the churchyard of the monastery bearing his name, founded by King Ethelbert. His body was removed to the cathedral of Canterbury in 1091. Bede's *Historia Ecclesiastica Gentis Anglorum* is the great authority for the life of St. Augustine. A thoughtful and pleasing sketch of it will be found in the Rev. Arthur P. Stanley's *Historical Memorials of Canterbury*. Lond. 1855.

The site and remains of St. A.'s monastery were purchased in 1844 by Mr. Beresford Hope, by whom they were presented to the Archbishop of Canterbury in trust, for the erection of a missionary college in connection with the Church of England. This institution was incorporated by royal charter in 1848. The buildings, in which as much of the ancient structure as possible has been preserved, contain accommodation for about 45 students, whose course of study extends over three years. Twenty exhibitions have been founded in connection with the college.

AUGU'STINES, or AUGUSTI'NIANS, names given to several religious bodies in the Roman Catholic Church. Whether St. Augustine ever framed any formal rule of monastic life is uncertain; but one was deduced from his writings, and was adopted by as many as thirty monastic fraternities, of which the chief were the Canons Regular, the Knights Templars (q. v.), the Begging Hermits, the Friars Preachers or Dominicans (q. v.), and the Premonstratensians (q. v.) The CANONS REGULAR OF ST. AUGUSTINE, or AUSTIN CANONS, appear to have been founded or remodelled about the middle of the 11th c. Their discipline was less severe than that of monks properly so called, but more rigid than that of the secular or parochial clergy. They lived under one roof, having a common dormitory and refectory. Their habit was a long cassock, with a white rochet over it, all covered by a black cloak or hood, whence they were often called Black Canons. In England, where they were established early in the 12th c., they had about 170 houses, the earliest, it would seem, being at Nostell, near Pontefract, in Yorkshire. In Scotland, they had about 25 houses: the earliest at Scone was founded in 1114, and filled by canons from Nostell; the others of most note were at Inchcolm in the Firth of Forth, St. Andrews, Holyrood, Cambuskenneth, and Inchaffray.

THE BEGGING HERMITS, HERMITS OF ST. AUGUSTINE, or AUSTIN FRIARS, were a much more austere order, renouncing all property, and vowing to live by the voluntary alms of the faithful. They are believed to have sprung from certain societies of recluses who, in the 11th and 12th centuries, existed especially in Italy without any regulative constitution. At the instigation, as is al-

leged, of the rival fraternities of Dominicans and Franciscans, Pope Innocent IV., about the middle of the 13th c., imposed on them the rule of St. Augustine, whom they claimed as their founder. In 1256, Pope Alexander IV. placed them under the control of a superior or president called 'general.' In 1287, a code of rules or constitutions was compiled, by which the order long continued to be governed. About 1570, Friar Thomas of Jesus, a Portugnese brother of the order, introduced a more austere rule, the disciples of which were forbidden to wear shoes, whence they were called *discalceati*, or 'barefooted friars.'

The degeneracy of the order in the 14th c., called into existence new or reformed Augustinian societies, among which was that Saxon one to which Luther belonged. But in his day, even these had fallen victims to the general corruption of the priesthood, and he inflicted serious injury upon it by his unsparing denunciations. After the French Revolution, the order was wholly suppressed in France, Spain, and Portugal, and partly in Italy and Southern Germany. It was diminished even in Austria and Naples. It is most powerful in Sardinia and America.

The name of AUGUSTINES was given also to an order of nuns who claimed descent from a convent founded by St. Augustine at Hippo, and of which his sister was the first abbess. They were vowed to the care of the sick and the service of hospitals. The Hôtel-Dieu at Paris is still served by them.

AUGUSTO'WO, a town of Poland, the capital of a circle of the same name, on the Netta, a feeder of the Bug, 138 miles north-east from Warsaw. It was founded by Sigismund Augustus, king of Poland, in 1557. It has woollen and linen manufactures, and some trade in horses and cattle. Great part of the surrounding district is occupied by lakes and marshes, or covered with forests. Pop. (1867) 9354.

AUGU'STULUS, ROMULUS, the last emperor of the western portion of the Roman empire. His name was Augustus, but the diminutive title under which he is universally known was given him by the Romans on account of the essential littleness of his character. He was the son of Orestes, a Pannonian of birth and wealth, who rose to high rank under the Emperor Julius Nepos, whose favor he repaid by stirring up the barbarian troops in the pay of Rome to mutiny against him. On the flight of the emperor, Orestes conferred the vacant throne on his son A. (476 A.D.), retaining all substantial power in his own hands. Orestes, failing to conciliate the barbarians, who had helped him against Nepos, with a grant of the third of the lands of Italy, they, under the command of Odoacer, besieged him in Pavia, and capturing, put him to death. A. yielded at once, and being of too little consequence to be put to death, he was dismissed to a villa near Naples with an annual pension of 6000 pieces of gold. His after fate is unknown.

AUGU'STUS, CAIUS JULIUS CÆSAR OCTAVIANUS, the son of Octavianus and Atia (daughter of Julia, the younger sister of Julius Cæsar), was born 23d September B.C. 63. The Octavian family came originally from Velitræ, in the country of the Volsci; and the branch from which A. descended was rich and honorable. His father had risen to the rank of senator and prætor, but died in the prime of life, when A. was only 4 years old. A. was carefully educated in Rome under the guardianship of his mother and his step-father Lucius Marcius Philippus. At the age of 12, A. delivered a funeral oration over his grandmother; at 16, he received the toga virilis. The talents of the youth recommended him to his grand-uncle, Julius Cæsar, who adopted A. as his son and heir. At the time of Cæsar's assassination (March 15, B.C. 44), A. was a student under the celebrated orator Apollodorus, at Apollonia in Illyricum, where, however, he had been sent, chiefly with a view to gain practical instruction in military affairs. He returned to Italy, assuming the name of Julius Cæsar Octavianus, and at his landing at Brundusium, was welcomed by deputies from the veterans there assembled; but declining their offers, he chose to enter Rome privately. The city was at this time divided between the two parties of the republicans and the friends of Mark Antony; but the latter had, by adroit manœuvres, gained the ascendency, and enjoyed almost absolute power. A. was at first haughtily treated by the consul, who refused to surrender the property of Cæsar. After some fighting in which Antony was worsted, and had to flee across the Alps, A., who had made himself a favorite with the people and the army, succeeded in getting the will of Julius Cæsar carried out.

He found an able friend and advocate in Cicero, who had at first regarded him with contempt. The great orator, while imagining that he was laboring in behalf of the republic, was in fact only an instrument for raising A. to supreme power. When Antony returned from Gaul with Lepidus, A. joined them in establishing a triumvirate. He obtained Africa, Sardinia, and Sicily; Antony, Gaul; and Lepidus, Spain. Their power was soon made absolute by the massacre of those unfriendly to them in Italy, and by victories over the republican army in Macedonia, commanded by Brutus and Cassius. After the battle of Philippi, won by A. and Antony, of which the former unjustly claimed all the credit, whereas it mainly belonged to the latter, the triumvirs made a new division of the provinces—A. obtaining Italy and Lepidus, Africa. The Perusian war, excited by Fulvia, wife of Antony, seemed likely to lead to a contest between A. and his rival; but was ended by the death of Fulvia, and the subsequent marriage of Antony with Octavia, sister of Augustus. Shortly afterwards, the claims of Sextus Pompeius and Lepidus having been settled by force and fraud, the Roman world was divided between A. and Antony; and a contest for supremacy commenced between them. While Antony was lost in luxurious dissipation at the court of Cleopatra, A. was industriously striving to gain the love and confidence of the Roman people, and to damage his rival in public estimation. At length war was declared against the queen of Egypt, and at the naval battle of Actium (q. v.), B.C. 31, A. was victorious, and became sole ruler of the whole Roman world. Soon afterwards, Antony and Cleopatra ended their lives by suicide. The son of Antony by Fulvia, and Cæsarion, son of Cæsar and Cleopatra, were put to death; and in B.C. 29, after disposing of several affairs in Egypt, Greece, Syria, and Asia Minor, A. returned to Rome in triumph, and closing the temple of Janus, proclaimed universal peace.

His subsequent measures were mild and prudent. To insure popular favor, he abolished the laws of the triumvirate, adorned the city of Rome, and reformed many abuses. At the end of his seventh consulship (B.C. 27), he proposed to retire from office, in order that the old republican form of government might be re-established, but he was ultimately induced to retain his power. Hitherto, since Cæsar's death, the consul had been named Octavian; but now the title of *Augustus* (meaning 'sacred' or 'consecrated') was conferred on him. In the eleventh consulship of A. (B.C. 23), the tribunitian power was conferred on him for life by the senate. Republican names and forms still remained, but they were mere shadows. A. was in all but name absolute monarch. In 12 B.C., on the death of Lepidus, he had the high title of Pontifex Maximus, or High Priest bestowed on him. The nation surrendered to himall the power and honor that it had to give.

After a course of victories in Asia, Spain, Pannonia, Dalmatia, Gaul, &c., A. (9 B.C.) suffered the greatest defeat that he had sustained in the course of his long rule, in the person of Quintilius Varus, whose army was totally destroyed by the Germans.

This loss so afflicted A., that for some time he allowed his beard and hair to grow, as a sign of deep mourning, and often exclaimed: 'O Varus, restore me my legions!' From this time A. confined himself to plans of domestic improvement and reform, and so beautified Rome, that it was said: 'A. found the city built of bricks, and left it built of marble.' He also founded cities in several parts of the empire; and altars were raised by the grateful people to commemorate his beneficence; while by a decree of the senate, the name Augustus was given to the month Sextilis.

Though surrounded thus with honor and prosperity, A. was not free from domestic trouble. The abandoned conduct of his daughter Julia was the cause of sore vexation to him. He had no son, and Marcellus, the son of his sister, and Caius and Lucius, the sons of his daughter, whom he had appointed as his successors and heirs, as well as his favorite step-son Drusus, all died early; while his step-son Tiberius was an unamiable character whom he could not love. Age, domestic sorrows, and failing health, warned him to seek rest; and, to recruit his strength, he undertook a journey to Campania; but his infirmity increased, and he died at Nola (August 19, A.D. 14), in the seventy-seventh year of his age. According to tradition, shortly before his death, he called for a mirror, arranged his hair neatly, and said to his attendants: 'Have I played my part well? If so, applaud me!' A. had consummate tact and address as a ruler and politician, and could keep his plans in secrecy while he made use of the passions and talents of others to forward his own designs. The good and great measures which marked his reign were originated mostly by A. himself. He encouraged agriculture, patronized the arts and literature, and was himself an author; but only a few fragments of his writings have been preserved. Horace, Virgil, and all the most celebrated Latin poets and scholars, were his friends. His was the *Augustan Age* of literature. His death threw a shade of sorrow over the whole Roman world; the bereaved people erected temples and altars to his memory, and numbered him among the gods.

AUGU'STUS, Elector of Saxony (1553—1586), son of Duke Henry the Pious, and of Katherine of Mecklenburg, was born July 31, 1526, at Freiberg, then the seat of his father's court. While still a youth, he spent some time at Prague, and there formed an intimate friendship with Maximilian, King Ferdinand's son, afterwards Emperor of Germany. In 1548 he married Anna, daughter of Christian III. of Denmark, who was universally popular on account of her devoted adherence to Lutheranism and of her domestic worth. After the death of his brother, Maurice, in 1553, A. succeeded to the electorate. His rule is chiefly noticeable as bearing upon the history of the newly established Protes-

tant Church. Equally intolerant and inconsistent in his theology, A. first used his utmost influence in favor of the Calvinistic doctrine of the sacraments; and then, in 1574, adopted the Lutheran tenents, and persecuted the Calvinists. On the other hand, however, it must be owned, to his honor, that, by his skilful internal administration, he raised his country far above the level of any other in Germany, introducing valuable reforms both in jurisprudence and finance, and giving a decided impetus to education, agriculture, manufactures, and commerce. He even wrote a book on the management of orchards and gardens, and commanded that every newly married pair should, within the first year of their marriage, plant two fruit-trees. The Dresden Library owes its origin to him, as do also most of its galleries of art and science. His own favorite private pursuit was that of alchemy, in which the Electress Anna also took a part. In the January of 1586—the electress having died in the previous year—A. married a young princess of Anhalt, but died a month after, and was buried in the cathedral of Freiberg. He was succeeded by his son, Christian I.

AUGU'STUS II., FREDERICK, commonly called the Strong, Elector of Saxony and king of Poland, second son of the elector, John George III., and of the Danish princess, Anna Sophia, was born at Dresden in 1670. His extraordinary strength was developed by a careful physical education, and his mental faculties more successfully cultivated than his morals. From 1687 to 1689 he traveled over the greatest part of Europe, but was prohibited by his father from visiting Rome. Upon his father's death (1691), he went to Vienna, and there formed an intimacy with Joseph, king of Rome, which materially influenced his politics. When, in 1694, he succeeded to his brother George as Elector, instead of turning his arms against France, according to previous arrangement, he undertook the command of the Austro-Saxon army against the Turks in Hungary.

After the battle of Olasch, in 1696, he returned to Vienna as a candidate for the throne of Poland, vacated by John Sobieski. Bidding higher than Prince Conti for the crown (10 million Polish florins), and adopting the Catholic faith, he was elected king by the venal nobles; and having, by his imposing force, awed the adherents of Conti, he was crowned at Cracow, 15th September 1697. On ascending the throne, he promised to regain, for his new kingdom, the provinces that had been ceded to Sweden; but his efforts to do this only led to the defeat of himself and his allies, his own deposition as king of Poland, the election of Stanislaus Leszcynski, and the ignominious peace of Altranstädt in 1706. So complete was his humiliation, that A. was compelled to send a letter of congratulation to the new Polish king, together with all the crown-jewels and archives. However, on receiving intelligence of the defeat of Charles XII. at Pultowa, in 1709, he declared the treaty of Altranstädt annulled, marched a powerful army into Poland, formed a fresh alliance with the czar, and recommenced a war with Sweden, which continued raging with redoubled fury, till the death of Charles XII. at Frederickshall, in 1718, gave a new aspect to affairs, leading first to a truce, and eventually to a peace with Sweden. Meanwhile, a confederation, headed by a Polish nobleman, had been formed against the Saxons, and repulsed them with much success, till, in 1716, through the mediation of the czar, a compact was made between the Poles and A., agreeably to which the Saxon troops left the kingdom. The king now found himself obliged to employ conciliation, and the splendor of his dissolute court soon won the favor of the Polish nobles, who followed his example but too closely. Saxony had bitter cause to regret the union of the crowns. Its resources were shamefully squandered, even when want and famine were in the land, on the adornment of the capital, on the king's mistresses, his illegitimate children, and the alchemists who deluded him with hopes of the elixir of life. A. supported the fine arts as ministering to luxury, but did little for the cause of science. Despotic in principle, though easy in temper; ambitious as well as luxurious; reckless alike in the pursuit of war and pleasure, death overtook him in the midst of projected festivities. On his way to the Warsaw diet, gangrene of an old wound set in, and he died in February 1733, and was buried at Cracow. By his wife—a Protestant, and daughter of the Margrave of Brandenburg-Kulmbach—he left an only son, who succeeded to him. The most celebrated of his numerous illegitimate offspring—amounting, it is affirmed, to somewhere about 300—was Maurice, Count of Saxony.

AUGU'STUS III., FREDERICK, Elector of Saxony and king of Poland, son and successor of the above, was born in October 1696, and carefully educated by his mother in the Protestant faith. At the age of fifteen, however, he left her tutelage for a tour through Germany, France, and Italy, where he changed his religion, secretly professing Catholicism at Bologna, in 1712, though the fact was not publicly known in Saxony till five years later. It is possible that an eye to the crown of Poland, and to an alliance with one of the Austrian princesses, may have had something to do with this step. After succeeding his father in the electorate in 1733, he was chosen king of Poland by a part of the nobility; and triumphing over the rival claims of Stanislaus Leszcynski, supported by Louis XV., was unanimously proclaimed three years later. He inherited his father's sumptuous tastes, though not his talents; and his love of art, cultivated by his Italian tour, enriched the gallery of Dresden with noble paintings. The government of his country he made over entirely to his prime minister, Count von Bruhl, whose whole political system consisted in complete dependence upon Russia. In 1742, alarmed at the increased power Prussia had obtained by the conquest of Silesia, A. formed an alliance with Maria Theresa; and by the secret treaty of Leipsic, contracted to supply her with 50,000 men. But their united troops were completely routed by the Prussians in 1745; and Frederick II. pushing on into Saxony, A. had to escape from his capital, saving his art-treasures, but leaving his state-papers in the hands of the conqueror. In 1746, the peace of Dresden restored him Saxony; but the close of the year again saw him embroiled with Prussia. Joining the camp at Pirna, he narrowly escaped being taken prisoner, and had to flee to Poland, where his popularity, never very great, was much diminished by his recent reverses in Saxony, added to which the Empress Catharine of Russia used every effort to dislodge him, as being an ally of France. At the conclusion of the peace of Hubertsburg, A. returned to Dresden, where he died in 1763. His son, Frederick Christian, succeeded him in the electorate, and Stanislaus Poniatowski became king of Poland.

AUK (*Alca*), a genus of web-footed birds, the type of a family called *Alcadæ*, which was in great part included in the Linnæan genus *Alca*, and to many of the species of which, now ranked in other genera, the name A. is still popularly extended. The *Alcadæ* are amongst those web-footed birds collectively called *Brachypteres* (i. e., short-winged) or Divers by Cuvier, remarkable for the shortness of their wings, which they employ as fins or paddles for swimming under water, some being even incapable of flying; and for the position of their legs, further backward than in other birds, which makes walking difficult, and compels them, when on land, to maintain an upright attitude. They are distinguished by the very compressed bill, which, in the true auks, is vertically elevated, and so sharp along the ridge as to resemble the blade of a knife; and by their entirely palmated feet, destitute of hind toes. The auks are entirely confined to the seas of the northern hemisphere—the penguins taking their place in the southern—and are most abundant in the colder regions. All of them have a dense plumage, which generally exhibits on its surface a beautifully polished appearance and silvery lustre. The genus *Alca*, as restricted by Cuvier and others, contains only two species, distinguished from the Puffins (q. v.), which also belong to this family, chiefly by the greater length of the bill, and its being covered with feathers as far as the nostrils. The bill, both in the auks and puffins, is transversely and strongly grooved. But even the two known species of the restricted genus *Alca* differ from one another in a most important particular—the wings of the one, the Great A., being so short that it is quite incapable of flight, like the penguins, of which it may be deemed the true northern representative, whilst the other, the Razor-bill, has comparatively long wings, and flies well. —The GREAT A. (*Alca Impennis*), so far as is known, is now extinct. It was as large as a goose.

Great and Little Auks.

It was an inhabitant of the most northerly shores, and a very rare visitant of the Orkney and Shetland Islands and the Hebrides. It was almost equally rare in Norway and Sweden, but was formerly frequent in Iceland and Greenland, and localities on the coasts of Labrador and Newfoundland. The rapidity with which this bird moved under water was extraordinary; one of them having been pursued by a six-oared boat for hours in vain. Like most of the *Alcadæ*, the Great A. laid only one egg, about five inches in length, and three in its greatest breadth. The egg was laid on the bare rock, without any attempt at a nest.—The RAZOR-BILL (q. v.) (*A. torda*) is the only other species now commonly included in the genus *Alca*. The name LITTLE A. is often given to a bird also called the ROTCHE (q. v.) (*Mergulus alle*, formerly *Alca alle*), common in arctic regions.—The common puffin is sometimes called the Labrador Auk. The northern parts of the Pacific Ocean abound in auks remarkable for a somewhat quadrangular bill, notched near the tip, and which form the genus *Phaleris*. One of them, *P. psittacula*, is known as the Parrakeet.

Auk.—All the auks feed upon fishes, crustaceans, and other marine animals, which they pursue under water, and for which they dive to great depths.

AULAPOLAY', or ALEPPI, a town of India, in the native state of Travancore, on the sea-coast, in 9° 30' N. lat., and 76° 24' E. long. There is no shelter for shipping, but ships anchor four or five miles from the shore. There is, however, a considerable trade in timber, betel-nut, coir, pepper, and cardamons. This town communicates with Quilon and Trivandrum on the south, and with Cochin on the north, by canals parallel with the sea-coast, and connecting a series of lakes or back-waters. Between these and the sea is a communication by a wide creek, through which the timber for exportation is floated, which is brought from the forests of the Rajah of Travancore on the Western Ghauts.

AU'LIC COUNCIL (Lat. *aula*, court or hall), one of the two highest courts of the old German empire, co-ordinate with the Imperial Chamber. It came into existence in 1495, and seems to have been at first employed principally in preparing business-matters regarding the crown-lands and the empire generally, in order to expedite the decisions of the Imperial Chamber. It soon, however, began to assume or acquire higher functions. After 1502, the States submitted important grievances to its independent consideration; but it did not receive a fixed constitution before 1559. In 1654, it was formally recognized as the second of the two supreme courts, and equal in dignity to the Imperial Chamber. It was composed of a president, a vice-president, a vice-chancellor, and eighteen councillors, who were all chosen and paid by the emperor, with the exception of the vice-chancellor, who was appointed by the Elector of Mainz. Of the eighteen councillors, six were Protestants, whose votes, when they were unanimous, could not be set aside by those of the others, so that a religious parity was to some extent preserved. The councillors were divided into three classes—counts, barons, and men of learning—all of whom were on a footing of equality, except that the last mentioned received a higher salary, and were usually advanced into the ranks of the nobility.

The Council held aloof from politics, but under its jurisdiction were placed: 1st, all matters of feudality in which the emperor was immediately concerned; 2d, All questions of appeal on the part of the States from decisions in favor of the emperor in minor courts; 3d, Whatever concerned the imperial jurisdiction in Italy. On the death of the emperor, the Council was dissolved, and had to be reconstructed by his successor. It finally ceased to exist on the extinction of the old German empire in 1806.

AUMALE, a town of Algeria, on one of the head-waters of the Sahel, 57 miles south-east from Algiers. It is situated on the great road from Algiers to Constantine. It is a strong military post, with barracks, magazines, and hospitals. Population, 5196, of whom 1468 are Europeans.

AUMALE, Charles de Lorraine, Duc d', born 1554, was an ardent partisan of the League in the politico-religious wars which devastated France in the latter half of the 16th c. The aim of the League was ostensibly to suppress the Huguenots, but in reality to secure the supreme power to the Guises. Closely allied by blood to this crafty and ambitious family, A. from the very first entered with fanatical sympathies into its schemes; and after the murder of the Duke of Guise at Blois in December 1588, he became, along with the Duke of Mayenne, the leader of the party. In 1589, he seized Paris, dissolved the parliament, and imprisoned its members. Shortly after, he put himself at the head of a body of troops to attack the town of Senlis, but was defeated by La Noue, and compelled to retreat. Always unfortunate in war, his presence seemed invariably to insure the overthrow of his friends. He commanded a portion of the forces of the League at the battles of Arques and Ivri, where the Huguenots triumphed under their skilful and sagacious monarch, Henry IV. But A. was as obstinate as he was unlucky, and in the end proved himself as traitorous as he was obstinate. He held out for the League in Amiens until the populace expelled him, when he suddenly allied himself with the Spaniards who had invaded Picardy, refused the royal pardon, and delivered over to the enemy several places in his possession. For this he was impeached, condemned, and sentenced to be broken alive on the wheel. His property was confiscated, but he himself escaped. He lived in exile till his death, which took place at Brussels in 1631. He left no male posterity.

AUMALE, Henri-Eugene-Philippe, Louis d'Orleans, Duc d', born at Paris, January 16, 1822, is the fourth son of the late king of France, Louis Philippe. He enjoyed the privilege—so rare among princes—of being educated along with his fellow-men, at the college of Henri IV., where he exhibited considerable talent, and obtained several honors. When 16 years of age, he entered the army, soon distinguished himself by his bravery, and passed rapidly through the various grades of rank. In 1843, he embarked at Brest for Algeria, where he commanded a subdivision of the French army, and performed some brilliant exploits, the most signal of which was his surprising Abd-el-Kader, when encamped in the environs of Goudjilah. By this *coup de main*, which occurred on the 16th of May 1843, there fell into his hands a multitude of cattle, 4 standards, 3600 prisoners, and the correspondence and treasure of the Emir. He was, in consequence, elevated to the rank of lieutenant-general, and appointed to the government of the province of Constantine. In 1847 he succeeded Marshal Bugeaud in the governor-generalship of Algeria. While holding this high office, he was exposed to a series of bitter attacks by the Democratic 'opposition' in the Chamber of Deputies, but was ably defended by Guizot. After the expulsion of his father, he withdrew from Algeria, having first, with self-denying patriotism, exhorted the colony peacably to obey the orders of the metropolis. He then resided in England till 1871, when he returned to France, and was elected a member of the Assembly. He was elected a General of division in 1872, and presided over the council of war which tried Marshal Bazaine. He was elected a member of the Academy in 1871. His chief writings are *Les Zouaves et les Chasseurs-à-pied*, and *Histoire des Condés*.

AUNE, the French cloth-measure corresponding to the English *ell*. Both words are derived from the Lat. *ulna*. The English ell = 1¼ yard = 45 inches; the French *aune usuelle* (or *nouvelle*) = 1⅛ mètre = 47¼ inches English. The old *aune* was a little shorter.

AUNOY, Marie-Catherine-Jumelle de Berneville, Comtesse d', a celebrated French authoress of the reign of Louis XIV. She was born about 1650, and died at Paris, January 1705. She composed fairy tales, romances, and historical memoirs. Among her fairy tales may be mentioned, *The Yellow Dwarf*, *The White Cat*, and *Cherry and Fair Star*. Many of these fictions have been translated into English, and are greedily read by school-boys. They have, both in France and other countries, gone through numerous editions, and are the sole monuments of her fame; for her sentimental novels, *Hippolyte*, and *Comte de Duglas*, have long ago vanished from the eyes of men; while her historical memoirs are not regarded as at all trustworthy.

AURANTIA'CEÆ (from *aurantium*, modern Latin for an orange), a natural order of exogenous plants, consisting of trees and shrubs, often of great beauty. Both leaves and bark are generally very smooth and all parts are filled with little transparent receptacles of a fragrant volatile oil, which especially abounds in the leaves and in the rind of the fruit. The leaves are alternate, and always articulated with their stalks, which are frequently winged. The flowers have a short, 3—5 toothed, withering calyx, and 3—5 petals, which are broad at the base, sometimes slightly coherent, and imbricated in bud. The stamens are equal in number to the petals, or a multiple of their number; the filaments sometimes slightly coherent, in one or more bundles; the anthers terminal and erect. The stamens and petals are inserted on a disk. The ovary is free; there is one style with a thickish stigma. The fruit (a *hesperidium*) is pulpy, with a leathery or spongy rind, of one cell, or of a number of separable cells; the seeds attached to the axis, with thick cotyledons and no albumen, not unfrequently containing more embryos than one.—The order contains about one hundred known species, natives of warm climates, and almost all of the East Indies. The species of the genus Citrus (q. v.) are the best known, among which are the orange, lemon, citron, &c. But the order contains many other plants producing agreeable fruits, among which the *Ægle Marmelos* (see ÆGLE)—called Bhel, or Bael, in India—*Cookia punctata* (the Wampee) *Glycosmis citrifolia*, and *Triphasia trifoliata* deserves particular notice. The fruits, ripe and unripe, juice and rind, leaves, bark, &c., of a number of species are employed medicinally. The medicinal uses of *Ægle Marmelos* have been already noticed in the article ÆGLE; those of the species of *Citrus* will be mentioned under their proper heads. The leaves of *Bergera Kœnigii* are used by the Hindus as a stomachic and tonic, the bark and roots as stimulants.—*Feronia elephantum*, a large tree growing in most parts of India, yields a gum which closely resembles gum-arabic, and is used for similar purposes. The young leaves of this tree have a smell like that of anise, and are used by the native practitioners of India as a stomachic and carminative.—*Skimmia* (or *Limonia*) *Laureola* and *Skimmia Japonica* are remarkable exceptions in this order, as to the climate to which they are adapted: the former grows on the cold and lofty mountains of the north of India, braving frost and snow; the latter; a beautiful shrub, recently introduced into Britain from Japan, is perfectly hardy even in the severest winters, its evergreen leaves and pretty little red berries remaining quite uninjured by frost, whilst its small white flowers, produced early in the summer, have the fragrance of orange blossoms.

AURE'LIA. See Chrysalis.

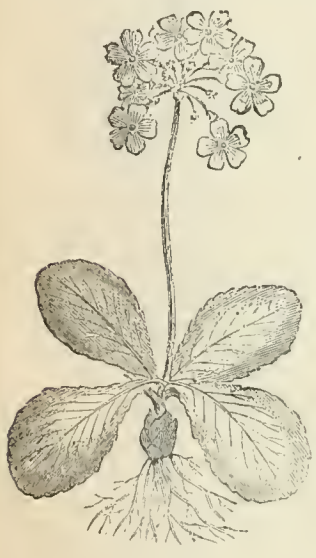
AURELIA'NUS, Lucius Domitius—also named Claudius Domitius and Valerius—one of the most powerful of the Roman emperors, was of very humble origin, his father having

been a husbandman. He was born about A.D. 212, and enlisting early as a common soldier, he rapidly distinguished himself, and held the highest military offices under Valerianus and Claudius II. On the death of Claudius (A.D. 270), A. was elected emperor by the army. He commenced his reign by vigorous opposition to the barbarian Alemanni, or Marcomanni, whom he expelled. Thereafter, he commenced the erection of a new line of fortified walls round Rome, which were not completed till the reign of Probus, A.D. 276). Their ruins still mark the boundaries of Rome in the time of Aurelian. Finding that the province of Dacia (now Wallachia) could not be maintained against the assaults of the Goths, he surrendered it, on certain conditions, and strengthened the frontier of the Roman empire by making the Danube its boundary. He next turned his attention to the East, where the renowned queen, Zenobia (q. v.), had extended her sway from Syria to Asia Minor and Egypt. A. defeated her in two battles, and besieged her in Palmyra, from which she attempted to escape, when she saw defence would prove unavailing. She was, however, taken prisoner, and soon after the city surrendered, and was treated leniently. Shortly after A. had departed, a new insurrection took place. He returned, in 273, and gave the splendid city up to destruction. A. was again called to the East by a rebellion in Egypt, instigated by Firmus, a merchant of great influence, which he speedily quelled. Besides, Tetricus, who had held imperial power in Gaul since before the death of Gallienus, finding himself unable to wield it, surrendered it to Aurelian. By restoring good discipline in the army, order in domestic affairs, and political unity to the Roman dominions, A. merited the title awarded to him by the senate—'Restorer of the Roman Empire.' He fell a victim to conspiracy during his campaign against the Persians (A.D. 276).

AURE'LIUS, MARCUS. See ANTONINUS.

AU'RICLES, two cavities of the heart. See HEART.

AURI'CULA (*Primula Auricula*), a plant of the same genus with the Primrose (q. v.), much cultivated in flower-gardens. The A. has long been a florist's flower. It was highly esteemed by the Romans and has, at least since the beginning of the 18th c., received particular attention from the florists of England and Holland. It is one of those flowers, the cultivation of which is often most successfully prosecuted in the little gardens of operatives near large towns. Lancashire is particularly famous for it.—The A. has smooth, dark-green leaves, scapes (or leafless stems), and calices, covered with a mealy powder. A similar fine meal appears also on the flowers, and adds much to their beauty. The A. is a native of the Alps and other mountains of the middle and south of Europe, and of sub-alpine situations in the same countries. It is found also on the Caucasus and the mountains of Syria; it grows in shady and moist places. In a wild state, it has comparatively small flowers, of a simple yellow color, on short stalks, forming an umbel of generally six or seven on one scape, with the same delightful fragrance which aids so much to make it a favorite flower in cultivation. The leaves are used by the inhabitants of the Alps as a remedy for coughs.

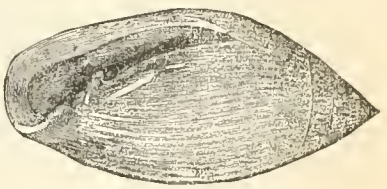


Auricula (wild state).

By cultivation and art, the A. has been brought to great beauty and splendor of color. Red, pink, crimson, apple-green, and mulberry are the chief colors which the different varieties exhibit. More than 1200 varieties have been reckoned, and new ones are continually raised from seed. Some of them are entirely of one color, others of two or more; some are delicately shaded, and some variegated. The mere color of an A. is not of so much consequence, in the eye of a florist, as the form and shading. The chief requisites of a good A. are large flowers, so many of them on one scape as to give fulness to the umbel, the flower-stalks so strong that the flowers do not hang down; the scape itself must be so tall, that the umbel of flowers may rise completely above the leaves, and so strong as to bear it erect; the flower must be nearly round; the white or yellow eye in its center must be distinct and round, its color not mixing with the ground color, which, however, may mix at the outer part with the green of the margin. The green margin adds much to the beauty of many varieties. The mealiness of the flower differs much in different varieties.—The A. blooms in April and May, and often also a second time in the end of autumn, which adds to the charm of the flower-border, although it is to the first or proper flowering-season that the florist looks. It succeeds best in a rich light soil, and cultivators diligently prepare for it composts of various kinds, but in general consisting chiefly of fresh loamy soil, and of well-rotted horse or cow dung, often with the addition of a little sand. The finer varieties are always cultivated in pots, and require great attention. They are protected from the severe weather of winter, and during the flowering-season, from wind and rain. They ought, however, previous to flowering, to stand in an airy, sunny situation. Their delicacy forms a striking contrast to the natural hardiness of the plant; but few sights are more pleasing than that of a collection of choice auriculas, tastefully arranged. They are propagated by offsets, generally in the latter part of August.—When it is proposed to raise the A. from seed, care ought to be taken to select the finest flowers, which are encouraged to ripen their seeds by exposure to sun and air, hand-glasses being placed over them during heavy rains. The seed is sown either in autumn or spring, generally in boxes placed under shelter, or in a slight hot-bed. The more weakly plants are tended with particular care, as they are generally found to produce the finest flowers.

The name A., originally Latin, is derived from *auris*, an ear, on account of a fancied resemblance of the leaves to the ears of an animal.

AURI'CULA, a genus, and AURICU'LIDÆ, a family of Gastropod Mollusca. They have a spiral shell, covered with a horny epidermis, the first whirl very large and the spire short, the aperture elongated and toothed. They belong to that section of Gastropods in which the sexes are united in the individual, and to the same order with the common snails, having respiratory organs adapted for breathing in air, although some of them are capable of subsisting for a considerable time in water. Some of them inhabit fresh-water marshes, and others prefer the vicinity of salt water. They generally belong to warm climates, and some of them attain a large size. *Auricula Midæ*, a native of the East Indies, is known to shell-collectors by the name of Midas's Ear.



Auricula.

AURI'CULAR CONFESSION. See CONFESSION.

AURI'CULATE, in Botany, a term applied to leaves, stipules, &c., and signifying that they have at the base two small ear-like lobes.

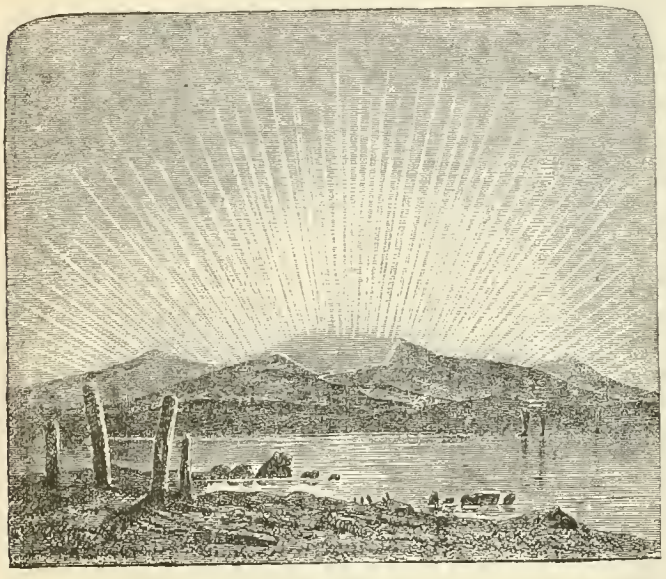
AURILLAC, a town of France, capital of the department of Cantal (Auvergne). A. is situated in a pleasant valley on the banks of the Jourdanne, about 269 miles south from Paris. It is said to owe its origin to a Benedictine monastery founded in the 9th c. by St. Gerard. The English, in the 14th and 15th centuries, often besieged the town, and it was frequently taken and pillaged during the religious wars in France in the 16th c. The streets are wide, but irregular, and are kept clean by streams supplied by a reservoir above the town and by a canal from the Jourdanne. The neighboring quarries supply slates to cover the houses. The principal buildings of A. are the churches of Notre Dame and St. Gerard, St. Stephen's Castle, the theater, college buildings, which contain a valuable public library, and the corn-market. Paper, jewellery, lace, copper utensils, leather, and beer are the chief industrial products. Pop. (1876) 10,399.

AURORA, a city of Illinois, U.S., 40 miles W. by S. of Chicago. There are some thriving manufactories, and railway workshops. Pop. (1880) 11,825.

AURO'RA (styled *Eos* by the Greeks), the goddess of the dawn, or 'morning redness,' was the daughter of Hyperion and Theia, and sister of Helios and Selene, and wife of the Titan Astræus. Zephyrus, Boreas, Notus, Hesperus and the other stars were her children. She was described as rising in the morning from her bed in the ocean, borne along on a chariot drawn by the divine steeds Lampus and Phaëton, ascending heaven from the river Oceanus, where she lifted with her 'rosy fingers' the curtain of night, and announced the light both to gods and men. Homer frequently describes A. as the goddess of day, and the tragic writers identified A. with *Hemera* (the day). She was represented as clothed in a rosy-yellow robe, with a star shining on her forehead, and the torch in her right hand. She had a passion for mortal youths, and carried off Orion, Cleitus, and Tithonus.

AURO'RA BOREA'LIS, or NORTHERN LIGHTS (Ger. *Nordlicht*), the name given to the luminous phenomenon which is seen towards the north of the heavens by the inhabitant of the higher latitudes. During the winter of the northern hemisphere, the inhabitants of the arctic zone are without the light of the sun for months together, and their long dreary night is relieved by the light of this beautiful meteor, which occurs with great frequency

in these regions. Those who have explored the southern seas have seen the same phenomenon in the direction of the south pole, so that the term Polar Lights might be more appropriate than Northern lights to designate the aurora. The appearance of the A. B. has been described by a great variety of observers, both in Northern and Central Europe, all of whom give substantially the same account of the manner in which the phenomenon takes place. It is briefly as follows: A dingy aspect of the sky in the direction of the north is generally the precursor of the aurora; and this gradually becomes darker in color, and assumes the form of a circular segment surrounded by a luminous arch, and resting at each end on the horizon. This *dark segment*, as it is called, has the appearance of a thick cloud, and is frequently seen as such in the fading twilight before the development of the auroral light. Its density must, however, be very small, as stars are sometimes seen shining brightly through it. This dark segment is bounded by a luminous *arch* of a bluish-white color, which varies in breadth from 1 to 6 diameters of the moon, having the lower edge shaply defined, and the upper edge only when the breadth of the arch is small. This arch may be considered to be a part of a luminous ring elevated at a considerable distance above the earth's surface, and having its center corresponding with some point near the



Aurora Borealis.

north pole. An observer several degrees south of this auroral ring would see towards the north only a small arc of it, the larger part being hid by the earth: to one situated not so far south, it would appear as a larger and higher arch; to one placed below it, it would be seen as an arch passing through the zenith; and to one situated within the ring and further north, it would be found as an arch culminating in the south. On this supposition, nearly all the various positions of the auroral arch may be accounted for. The center of the ring corresponds probably with the magnetic north, which is at present situated in the island of Boothia Felix. Hence it is that in Greenland, which is situated to the east of this island, the auroral arch has been seen stretching from north to south with its highest point in the west.

The luminous arch, once formed, remains visible for several hours, and is in a constant state of motion. It rises and falls, extends towards the east and towards the west, and breaks sometimes in one part, sometimes in another. These motions become all the more observable when the arch is about to shoot forth *rays;* then it becomes luminous at one point, eats in upon the dark segment, and a ray of similar brightness to the arch mounts with the rapidity of lightning towards the zenith. The ray seldom keeps the same form for any length of time; but undergoes continual changes, moving eastward and westward, and fluttering like a ribbon agitated by the wind. After some time, it gradually fades in brightness, and at last gives way to other rays. When the aurora attains its full brightness and activity, rays are projected from every part of the arch, and if they do not rise too high, it presents the appearance of a comb furnished with teeth. When the rays are very bright, they sometimes assume a green, sometimes a violet, a purple, or a rose color, giving to the whole a variegated and brilliant effect. The accompanying sketch taken from Müller's *Kosmische Physik*, of the A. B. in Norway, represents a beautiful aurora of this comb-shaped character; the effect of color, however, is wanting to complete the picture. When the rays darted by the luminous arch are numerous and of great length, they culminate in a point which is situated in the prolongation of the dipping-needle, somewhat south-east of the zenith. There they form what is called the *Boreal Crown;* and the whole heavens, towards the east, west, and north, present the appearance of a vast cupola of fire, supported by columns of variously colored light. When the rays are darted less brilliantly, the crown first disappears, then, here and there, the light becomes faint and intermittent, till at last the whole phenomenon fades from the sky.

The preceding description indicates the general features of the appearance of the A. B.; but several auroras have been described which presented striking peculiarities. Sometimes the phenomenon assumed the form of one or more curtains of light, depending from dingy clouds, whose folds were agitated to and fro, as if by the wind. Sometimes this curtain seemed to consist of separate ribbons of light, arranged side by side in groups of different lengths, and attaining their greatest brilliancy at the lower edges. In this country the A. B. seldom occurs with the distinctness and brilliancy which attend it in northern latitudes, but the description just given portrays the type to which such appearance of the meteor more or less approximates.

The height of the aurora has been variously estimated. The first observers were inclined to place the seat of it beyond the atmosphere; but this hypothesis is untenable, as the aurora does not seem to be affected by the rotation of the earth, but appears to be in every respect a terrestrial phenomenon. By taking observations of the altitude of the highest point of the arch of the same aurora at different stations, heights varying from 5 to 500 miles have been calculated. The cause of these widely differing results may be found in the probability that exists of each observer seeing a different arch of the aurora for himself, and he is, in consequence, furnished with no comparable or reliable data for his calculations. It is now, however, generally admitted, on what are considered to be sufficient grounds, that the A. B. occurs at various heights, and that it is seldom found beyond ninety miles above the surface of the earth. The distance of the stations at which the same aurora has been visible, indicates the enormous geographical extent, and likewise the great altitude which the phenomenon frequently attains. One aurora, for instance—that which occurred on the 3d of September 1839—was seen in the Isle of Skye by M. de Saussure; at Paris, by the astronomers of the Observatory; at Asti, in Northern Italy, by Quetelet; at New Haven, in Connecticut, by Mr. Herrick; and at New Orleans, by credible observers. On the other hand, some observers of eminence assert that the aurora sometimes descends to the region of the clouds, and appears almost a local phenomenon. A brilliant aurora was seen by Mr. Farquharson, the minister of Alford, in Aberdeenshire, on the 20th of December 1829, from eight to half-past eleven in the evening, above a thick bank of clouds, which covered the tops of the hills to the north of where he lived, and which never attained an altitude of more than 20°. The same aurora was seen in the zenith, at a quarter past nine, by Mr. Paul, another minister, at Tullynessle, which is about two miles north of Alford, so that the height of it could not have been quite 4000 feet.

The noise that is alleged to accompany the A. B. in high latitudes would indicate for it a comparatively moderate height. Some of those who have heard it, compare it to the noise that is produced by the rolling of one piece of silk upon another; and others, to the sound of the wind blowing against the flame of a candle. In Siberia, it has been related that this noise sometimes resembles that attending the discharge of fireworks; and that the dogs of the hunters, when overtaken by such an aurora, lay themselves with terror on the ground.*

The intimate connection between the A. B. and the magnetism of the earth is shown by various facts. During the occurrence of the phenomenon, the magnetic needle appears very much disturbed, sometimes deviating several degrees from its normal position, and appearing to be most affected when the aurora is brightest; and this oscillation is frequently perceived far beyond the district where the aurora is seen. The vertex, likewise, of the luminous arch is always found to be in or very near the magnetic meridian, and the boreal crown has its seat in the prolongation of the freely suspended needle. There seems, moreover, to be a connection between the magnetic poles of the earth in regard to the aurora, for, as far as has been ascertained, the meteor occurs simultaneously at both. The A. B. appears to be an electric discharge connected with magnetic disturbance. If one of Gassiot's vacuous tubes be brought near an electric machine, or between the poles of an induction coil, flashes of light pass between the ends, which bear a striking resemblance to the A. B. A comparison of the spectra of the two goes far to establish identity. The auroral spectral line, according to Angström, is a yellow line near the sodium line, and is the same as the air line seen in the solar light when the sun is

*Arctic voyagers, such as Parry and Franklin, throw doubt on the existence of any such noise, for not one of the numerous and brilliant auroras seen by them was ever attended with the faintest sound.

near the horizon. Other lines, however, have been seen, which cannot as yet be produced by the physicist from any known substance.

A line drawn through the south of Spain to the north of the Sandwich Islands, and through Cuba, marks the southern limit of the A. B. (in the Northern Hemisphere); though occasional displays have been noticed even further south. To the north of a line passing through Edinburgh, the frequency of the A. B. rapidly increases, until a maximum is reached in a line through the north of Spitzbergen, after which the frequency diminishes as the North Pole is approached.

AURUNGABAD, or *Throne-town*, the name of at least four places in India. The most important is in the territory of Nizam, situated on the Doodna, a tributary of the Godavery. The population is estimated at about 60,000. Its monuments of former grandeur are a palace, now in ruins, built by Aurungzebe, and the mausoleum of Aurungzebe's daughter.

AURUNGZEBE (properly, Aurangzib, 'Ornament of the Throne') was the most powerful of the Great Moguls, the last who ruled with energy and effect. He was born on the 22d October 1618, and was ten years old when, his grandfather dying, his father, Shah-Jehan, ascended the throne. A. early aspired to wield the rod of empire, but he craftily hid his designs beneath the cloak of piety. In 1657, his father, who had previously promoted him to high civil and military offices in the state, in performing the duties of which he greatly distinguished himself, was seized with an illness from which he was not expected to recover. The reins of power were at once seized by his eldest son, Dára, who treated his brothers very arbitrarily—Shujá at the time being governor of Bengal, A. of the Deccan, and Múrad of Guzerat. The first immediately took up arms. A.'s policy was to let the two fight it out, and exhaust each other, and then to play off his third brother against the victor. He conferred with Múrad; assured him he had no earthly ambition; that the crown he strove for was a spiritual, and not a temporal one; and that, for affection's sake, and with a view to promote the interests of the true faith—Dára was liberal in his religious opinions, and had written a book to prove that Mohammed and Brahma agreed in all assential points—he would support his pretensions to the throne. Múrad believed him, and the forces of the two were joined. Meanwhile, Dára having overcome Shujá's army, directed his forces against his other two brothers; but A.'s plausibility prevailed over Dára's generals, who deserted, and Dára had to seek safety in flight. By this time, however, Shah-Jehan had somewhat recovered. A. professed the utmost loyalty, but secretly gave his son instructions to take possession of Shah-Jehan's palace, which was done, and the aged monarch was made prisoner. A. next seized and confined his too confiding brother, Múrad; and after a struggle of two or three years' duration, Dára and Shujá also fell into his power, and all three were put to death. The sceptre was now firmly within the grasp of Aurungzebe. He professed not to care for the imperial insignia, but was ultimately induced to receive them on August 2, 1678. He, at the same time, assumed the presumptuous title of Alemgír, 'Conqueror of the World.' He also took the title of Mohi-eddin, 'the Reviver of Religion.' In the seventh year of A.'s reign, his father died, at a good old age; but there are suspicions, nevertheless, that his death was hastened by slow poison, administered by command of his son.

Aurungzebe.
From a Native Drawing.

A.'s long region of half a century was distinguished by great outward prosperity; but the empire was diseased at its heart. Everywhere there was distrust; A., who had established his empire by fraud, was naturally enough distrusted by all. He lacked confidence in his statesmen, who, in their turn distrusted him and one another. His sons imitated him in his disobedience to his father, and the Hindus, whom he treated with great harshness, excited the Mahrattas against him in the south. Still his great abilities sufficed during his reign not only to preserve his empire intact, but even to enlarge it considerably. Discord between the monarchs of Bijapur and Golconda, which was mainly due to his policy when acting as governor of the Deccan, enabled him to add these two kingdoms to his empire. But the seeds of decay which had been sown in his reign bore ample fruit in the reign of his son. The decadence of the Mogul empire dates from A.'s death, which took place at Ahmednuggur, on the 21st February, 1707, in the eighty-ninth year of his age, and fiftieth of his reign. The latter years of A.'s life were passed in misery. The memory of his own crimes weighed heavy on his soul. He lived in constant dread that he himself would receive of the measure which he had meted out to others. His court was remarkable among Oriental courts for its economy and freedom from ostentation. A.'s character was not without its good features, as instanced by the fact, that in the third year of his reign, when there was a great famine in the land, he gave unreservedly the funds of his treasury, which had been greatly augmented by his frugality, to procure food for his people.

AUSCULTA'TION (Lat. *ausculto*, to listen), a mode of detecting diseases, especially those of the heart and lungs, by listening to the sounds produced in the cavity of the chest. This is done either by the unassisted ear (*Immediate* A.), or by the aid of a simple sound-conveying instrument, the stethoscope (q. v.) (*Mediate* A). By care and attention, the normal sounds produced by respiration and the beating of the heart may be distinguished from the several abnormal sounds indicating disease. A. is classed among the most important of discoveries in modern medical science. See PERCUSSION.

AUSO'NIUS, DECIUS MAGNUS, the most conspicuous Roman poet in the 4th c. after Christ, was born at Burdegala (Bordeaux), about 309 A.D. He was carefully educated; and after practising for a short time at the bar, he turned his attention to literature, and soon distinguished himself as a professor of oratory. Some years later he was appointed by Valentinian tutor to his son Gratian; afterwards quæstor, and by Gratian, prefect of Latium, and subsequently consul of Gaul (379 A.D.). On the death of Gratian, A. retired from public life to his estate at Bordeaux, where he occupied himself with literature and rural pursuits until the time of his death (392 A.D.). The question whether or not A. was a 'Christian,' has occasioned much controversy, and remains yet unsettled. His works include translations of Greek eclogues, a collection of 150 epigrams, epistles in verse and prose, 20 so-called idyls and other descriptive pieces, which, though admired in their day, bear all the marks of the corrupted taste then prevalent. But though destitute of every true poetic quality, A. occasionally displays a certain neatness and grace of expression.

AUSTEN, JANE, a novelist of deservedly high reputation. Her father was rector at Steventon, Hampshire, at which place his daughter was born, December 16, 1775. Mr. Austen, who was himself a gentleman of some literary attainments, bestowed on his daughter an education superior to that usually given to young ladies in her sphere of life in the end of the last century. Jane was distinguished alike by good sense, sweetness of disposition, and personal attractions. Her novels, which are rather limited in subject, are remarkable for the truthfulness with which they portray the everyday life of the middle classes of England in her time, and for their delicate, yet withal distinct discrimination of the various shades and peculiarities of character. Sir Walter Scott said of her: 'That young lady had a talent for describing the involvements, feelings, and characters of ordinary life which is to me the most wonderful I have ever met with. The big bow-wow I can do myself like any one going; but the exquisite touch, which renders commonplace things and characters interesting from the truth of the description and the sentiment, is denied to me.' Miss A.'s first four novels—*Sense and Sensibility*, *Pride and Predjudice*, *Mansfield Park*, and *Emma*—were published anonymously between 1811 and 1816. *Northanger Abbey* and *Persuasion* followed, with her name on the title-page, in 1818, after her death, which took place at Winchester, July 18, 1817.

AUSTEN, WILLIAM, an English metal-worker and designer of the 15th c., celebrated as the constructer of the famous tomb of Richard de Beauchamp, Earl of Warwick, in St. Mary's Church, Warwickshire.

AU'STERLITZ, a small town in Moravia, about 12 miles east-south-east of Brünn, stands on the Littawa, and has a population of 3500. It is celebrated chiefly as the place were Napoleon I., in December 1805, defeated the combined forces of Austria and Russia, under the command of their respective emperors. After the occupation of Vienna by the French, Napoleon fixed his headquarters at Brünn, and on this place the allied armies advanced. Their movements were ill conducted. The French army amounted to about 80,000 men; while the allied armies numbered 84,000, of which 16,000 were cavalry. The battle commenced at seven, on the morning of December 2; and in this disastrous battle the allies lost 30,000 in killed, wounded, and prisoners, and the French 12,000.

AUSTIN, JOHN, a distinguished writer on jurisprudence, was born on March 3, 1790. At the age of 16, he entered the army, and served as a subaltern with his regiment in Sicily. But he left the service after the peace, and in 1818 was called to the bar. In 1820, he married Miss Sarah Taylor of Norwich (see following article), to whom he had been attached for many years, and went to live in Queen Square, Westminster, next door to Jeremy Bentham and Mr. James Mill. In their society, his at-

tention was naturally turned to the subjects he afterwards cultivated with success. He was compelled by bad health to abandon his practice at the bar, about the time when the university of London was founded, and he then received the appointment of Professor of Jurisprudence. To fit himself for the chair, in the autumn of 1827 he settled at Bonn, then the residence of Niebuhr, Brandis, Schlegel, Arndt, Welcker, and Mackeldey, and he remained there throughout the winter. He returned to England well acquainted with the writings of some of the most eminent of the continental jurists. His lectures were well received by few distinguished men; but the subject was not recognized as a necessary branch of legal study, and evidently did not supply that kind of knowledge best calculated to promote practical success in the legal profession. A. believed the position of a German professor of law to be the most enviable in the world; and with a small but sure income, he would have devoted his great powers to the exclusive cultivation of the subjects discussed in his lectures. But, unfortunately, no provision was made for the Chair of Jurisprudence beyond class fees, and in the absence of students A., in 1832, was reluctantly compelled to resign his appointment. In the same year, he published his *Province of Jurisprudence Determined*, a work, at the time, little appreciated by the general public, and the small success it met did not encourage him to undertake other publications on the allied subjects. In the estimation of competent judges, however, it placed its author in the highest rank among writers on jurisprudence. In 1833, he was appointed by Lord Brougham a member of the Criminal Law Commission. The post was not much to his taste, as he did not believe that the public received any advantage from such bodies, in the efficacy of which for constructive purposes he put no faith. 'If they would give me £200 a year,' he said, 'for two years, I would shut myself up in a garret, and at the end of that time I would produce a complete map of the whole field of crime and a draft of a criminal code.' These, he thought, a commission might with some profit revise and amend.

A. was afterwards appointed a member of a commission to inquire into the grievances of the Maltese. He returned to England in 1838, not in good health, and was advised to try the springs at Carlsbad. During his stay in Bonn he had been delighted with the respect the Germans manifest for knowledge, their freedom of thought, and the simplicity of their habits. With his slender means; decent existence in England was scarcely possible, and he removed with his family to Germany, living at Carlsbad in summer, at Dresden and Berlin in winter. The revolution of 1848 drove him back to England, and he then settled at Weybridge, where he died in December 1859, universally respected for the dignity and magnanimity of his character. His lectures on the principles of jurisprudence had remained in manuscript and imperfect. Since his death they have been prepared for the press by his widow, and published between 1861 and 1863, under the title of *Lectures on Jurisprudence, being a Sequel to 'The Province of Jurisprudence Determined,' &c.* On this work his fame now rests.

A.'s great merit consists in his having been the first English writer who attached precise and intelligible meaning to the terms which denote the leading conceptions underlying all systems of jurisprudence. With a perfect knowledge of the methods of Roman and English law, he displayed genius of the highest order in devising a novel system of classification for the subject-matter of his science. The work he did is incomplete, but it forms a sure foundation to future laborers in the same field. It is universally recognized as an enduring monument of learning and genius, and it entitles its author to take rank with Hobbes and Bentham, as one of the three Englishmen who have made contributions of importance to the philosophical study of law. A. said of himself that his special vocation was that of 'untying knots'—intellectual knots; and it was so. He set himself to the task of exposing the errors hid under the phrases and metaphors current among writers on law, and this he accomplished with such skill and subtlety as to make his works models of close and sound reasoning. In education, they now perform a most important part—that of disciplining the mind of those who devote themselves to the study of law and of the mental sciences generally in the difficult art of precise thought; and in this way they exercise an influence it is scarcely possible to over-estimate on the rising generation of lawyers, publicists, and statesmen.—See Memoir of A. prefixed to the *Lectures on Jurisprudence*, and an article on A. in J. S. Mill's *Dissertations and Discussions*.

AUSTIN, Mrs. Sarah, wife of the preceding, is well known as the translator of many of the best contemporary French and German works. She belonged to the Taylors of Norwich, a family remarkable for the men and women it has produced distinguished by literary and scientific ability. A faithful and devoted wife, she spent a great many years with her husband abroad, and she enjoyed the friendship of many of the most eminent persons in continental society. Mrs. A. translated from the German, *Characteristics of Goethe*, by Falk, &c., with notes (1833); *Fragments from the German Prose Writers*, with notes (1841); and *The Story without an End*, by F. W. Carove (several editions). She also translated from the German, Ranke's *Popes of Rome* and his *History of Germany during the Reformation*. Such is the excellence of these works, that they have been commended by the best judges as deserving to retain a place in English historical literature. Mrs. A. translated from the French M. Cousin's *Report on Public Education in Prussia* (1834), and M. Guizot's work on *The English Revolution* (1850). She published in 1839 a work *On National Education*; and in 1857, *Letters on Girls' Schools and on the Training of Working-women*. From 1861 to 1863, she was engaged in editing her husband's lectures from his manuscripts, a duty she discharged with very great ability. She died at Weybridge, on the 8th of August 1867.

AU'STIN, the capital of Texas, lies on the left bank of the Colorado, 200 miles from its mouth. In winter, A. is accessible to steamboats from the sea. Pop. (1870) 4428; (1880) 10,960.

AUSTRALA'SIA is a term etymologically equal to *Southern Asia*, but generally used to indicate Australia and the adjoining islands, mainly Tasmania, New Zealand, Papua or New Guinea, New Caledonia, New Hebrides, New Ireland, and New Britain. The term would thus exclude the Malay Archipelago, Micronesia and Polynesia proper; but some authors use A. so as to include these great groups of islands also, making the name therefore equivalent to *Oceania*. The former seems the more convenient usage. The several islands will be found discussed each under its own name.

AUSTRALIA, by far the largest island of the Australasian group, and for extent describable as a continent, lies in the form of a rectangle, though with some projections on the north and south sides, between 10° 39′ and 39° 1½′ S. lat., and between 113° and 153° 16′ E. long.; having a maximum length, from west to east (from Dick Hartog's Point to Point Cartwright), of about 2400 miles; and maximum breadth, from north to south (from Cape York to Wilson's Promontory), of 1971 miles; making a total area of 2,996,030 square miles, about one-fifth less than that of Europe, or more than twenty-six times that of Great Britain and Ireland. Its nearest distance to England is about 11 000 miles. On the north, it is separated from New Guinea by Torres Strait, 90 miles broad, and the Arafura Sea, and from the Sunda Islands by the Indian Ocean; on the west, it is washed by the Indian Ocean; on the south, it is bounded by the Indian Ocean, and divided from Tasmania by Bass Strait, 140 miles wide; on the east, it is washed by the South Pacific Ocean. This island-continent is, above all other continents, exceedingly compact, with an almost unbroken seaboard on the east and west, which, notwithstanding, offers a considerable number of good harbors on both these sides. Parallel with the east coast, at a distance of about 60 miles, stretches for 1200 miles the Great Barrier Reef, offering but one safe opening for ships.

The sea encircling A. is, on the whole, remarkably shallow, especially on the north; and, except on the south-east, reaches to a depth of only some 200 fathoms. At a distance of from 300 to 500 miles, however, on the east, south, and west coast, a depth of 15,000 feet is attained. Bass Strait is rather dangerous for navigation.

Of rivers, again, communicating between the coast and the interior, A. is remarkably poor. The mountains rising to any great elevation are all on the east side; and there is but one great river, the Murray, collecting into itself (by the Darling and other great tributaries) almost the whole western drainage of that eastern range. The few straggling series of mountains on the west side of the continent feed but a few short intermittent streams, and nearly the whole vast expanse, between that narrow, partially knotted selvage on the west, and the Murray Country (Queensland, New South Wales, Victoria, and the eastern slip of South A.) on the east, is but a slightly relieved barren desert. The lack of natural irrigation over this arid area is further aggravated by the enormous evaporation, which, for long periods, more or less dries up what rivers it possesses.

Discovery and Settlement.—The earliest trace of A. in human records is found in a French chart of 1542, where it figures as 'Jave la Grand.' It is next distinctly referred to in a book by Cornelius Wytfliet (Louvain, 1598), in which it is conjectured to measure one-fifth of the world. The present Torres Strait refers to the presence of Torres there in 1606. Dick Hartog's Island in the west carries us back to Dick Hartog and the year 1616. Arnhem Peninsula is a reminiscence of the Dutch vessel *Arnhem*, which, in 1618, explored the coast of that land. The Dutch ship, *Guldene Zeebard*, in 1627, sighted a large part of the south coast from Cape Leeuwin eastwards. The Gulf of Carpentaria is the memorial of General Carpentier's visit to those waters in 1628. In 1688, this British colony was first seen by British eyes (so far as now known) in the person of Dampier, who names an archipelago in the north-west. Near a century later (1770) we find Captain Cook at this island-continent, on his course of circumnavi-

vation of the globe, exploring the whole eastern coast from Gipps Land on the south-east (in Victoria) to Cape York. This expedition stayed a week in 'Botany' Bay, while Sir Joseph Banks and Dr. Solander were collecting some thousand species of the wonders of Australian botany to show at home. Bass Strait, on the south, brings us down twenty years later (1790), when Mr. Surgeon Bass was there with Lieutenant Flinders. In 1792, Flinders (who names a range of hills in South A., and a river in the north, discharging into Carpentaria) was surveying Moreton Bay and Hervey Bay; in 1801, Spencer Gulf and the Gulf of St. Vincent, as also the coast on the east and north. In 1800 Captain Grant, in 1802 Lieutenant Murray, surveyed Victoria; the latter discovering the bay of Port Phillip, at the head of which now stands Melbourne. The exploration of the whole coast was completed by the *Beagle* (in which Charles Darwin sailed), 1837–43.

The first British settement having been made in 1788 at Port Jackson (on which Sydney now stands,) inland explorations necessarily followed; but for the first twenty-five years was confined inside the Blue Mountains, to a district of some 50 miles in diameter. In 1813, however, that barrier was passed over, and the Fish River and Bathurst Plains were for the first time brought within the limits of civilization. Two years later (1815), the Lachlan River (tributary of the Murrumbidgee), was first lighted on, and traced 300 miles in a south-westerly direction to a 'marsh.' Next the Macquarie (tributary of the Darling) was discovered and followed likewise to a 'marsh'—experiences which suggested the theory of a sea in the interior of A. Mr. Oxley pushed exploration through New South Wales into Queensland, laying open the Brisbane River. In 1819 Hamilton Hume unveiled the Murrumbidgee; and in 1824, the Murray, thence traversing the country southward to Port Phillip. Captain Sturt and he next followed the Macquarie to the Darling, and made known the junction of the Darling and Murray; then sailed down the Murray to its discharge into Alexandrina Lake. Major Mitchell tracked the Lachlan through the 'marshes,' discovered (1835) the Loddon (tributary of the Murray) and Wimmera (intermittent stream to west of it), crossed the Grampians, descended the Goulburn to the Murray, and altogether surveyed the fairest and richest part of Victoria, 'Australia Felix,' as he admiringly named it. In 1839, Mr. Eyre (of the 'Jamaica massacre') discovered Lake Torrens (in South A.); and in 1840, after exploring its eastern shores, and the Flinders Range to the South, accomplished a successful but most perilous and distressing march of 1209 miles from Adelaide to King George's Sound. In 1844–45, Captain Sturt started from the Darling (130 miles above its confluence with the Murray), travelled 250 miles north-westward, then north to the Grey Ranges, over endless deep red sand-ridges, over a barren mud-plain, through 'Spinifex' (spiny lacerating 'porcupine grass'), to the margin of the blank of A., a 'terrible' country. In 1843–46, Leichardt, explored Queensland from the south borders to the Gulf of Carpentaria. In 1844, he crossed from Fitzroy River to the head of the Gulf of Carpentaria, whence he made his way westward along the north coast as far as Port Essington. The next great successful feat (one of the greatest and most successful of all Australian explorations) was the passage across the whole continent, from south to north, from Adelaide to a point west of Chambers Bay, in 1862, by M'Douall Sturt; opening up the Albert River, the Finke River, the Macdonnell Ranges, the Ashburton Ranges, &c., altogether a quite practicable route across the continent through a fairly continuous, if narrow belt of upland and stream, a route utilized in 1872 for a telegraph line, with fixed stations. About the same time with this fortunate expedition, falls the most tragic one of Burke and Wills. Starting from Melbourne, these two explorers reached Cooper's Creek, the lower course of the Interior Barcoo River. There, leaving the larger portion of their cumbrous cavalcade, Burke and Wills pushed on, passing the M'Kinlay Mountains, and reaching the Gulf of Carpentaria, near the mouth of the Flinders, the first passage made across the continent. On their return journey, they perished miserably of starvation at Cooper's Creek. M'Kinlay sent in search of the lost party, traversed the whole continent to Albert River, thence eastward to Burdekin River and Port Denison.

In 1861, F. F. Gregory explored 800 miles of the north-west of A., at a distance of some 200 miles from the coast along the upper courses of the De Grey, Ashburton, Fortescue, and Oakover. The west side of York Peninsula was explored by Jardine in 1864. The telegraph line of 1872, as a base or goal of adventure to or from the west coast, could not but provoke expeditions to draw communicating lines between it and the west coast. Accordingly, in 1872, Ernest Giles started from Chambers Pillar, near the Charlotte Waters telegraph station; but in spite of the most stubborn resolution, reached only 100 miles to the north of Lake Amadeus. In 1873–74, starting 200 miles farther south, he reached half-way across to the west coast. In 1873, however, Colonel Warburton, starting in April from Alice Springs (just north of the tropic), arrived in December of that year at Oakover in Western A. In 1874, Forrest passed from Murchinson River on the west coast, to the telegraph line a little to the north of Peake Station. In 1875, Giles crossed from the head of St. Vincent Gulf to Perth on the west coast, having traversed 2500 miles through a wholly unavailable country, and for 100 miles of which he had to bore his way through interminable scrub. These expeditions were taken to demonstrate that the interior of A., between the west of the Murray Country and the strip of elevated coast-land to its north, and the east of the narrow hilly border of Western A., was all little better than one hopeless desert, either unmitigated sand or vast frightful mattings of scrub or porcupine grass, the one considerable exception being the strip of the central telegraph line; and that, altogether, there was nearly a half of the continent which defied being made anything of.

The first civilized settlement in A. was made at Botany Bay in 1788 by 1030 persons, mostly convicts. In 1825, Moreton Bay (now Queensland) was settled as a part of New South Wales, attaining, in December 1859, the position of a separate colony. The settlement of Western A. (the Swan River Settlement, as it was then called) dates from 1829. It continued to be a penal settlement from 1851 to 1868. Port Phillip (now Victoria), then a part of New South Wales, was first colonized in 1835, and on 1st July, 1851, was constituted an independent colony. The colonization of South A. by British emigrants dates from 1836. A large proportion, it may be noticed, of the geographical nomenclature of A. is Scotch.

Geology.—The surface of A. rests on strata for the most part of palæozoic and cainozoic or tertiary formations, though mesozoic or secondary deposits have of late also been laid open in various quarters. In Victoria, the Grampians and Pyrenees (with the Ballarat gold-fields to the south) in the south-west, the great Dividing Range running south-east and north-west about the center, the Warragong or Australian Alps in the north-east, and projecting into New South Wales; in New South Wales, the Blue Mountains; and in Queensland, the Dividing Range, are all mainly of silurian formation, broken in upon, however, by intrusive igneous rocks of granite, syenite, and porphyry. The same Silurian formation largely pervades South A., running in a broad diagonal from the south-east coast, north-westward across the whole province. Though traps and granites occupy a large area to the south and west of Western A., traces of palæozoic formations are to be found in the Darling Range. No carboniferous rocks are known in South and West A. Detached sprinklings of metamorphic rocks occur in Queensland, along the central line of the continent from Ashburton to the Macdonnell Ranges, and in the north-west of Arnhem Land. The older settlements of New South Wales, including the coal-field of the Hunter River, rest on sandstone. Carboniferous strata, abounding in fine coal, and containing fossils of fish, corals, zoophytes, sigillaria, calamites, &c., extend over 50,000 square miles of Queensland, between 29° and 15° S. lat. The tin-mines of Queensland are imbedded in granite, rising through the carboniferous rock. Sandstone and limestone, of carboniferous or Permian formation, are found in the south-east of Victoria; and the two southern peninsulas of this province consist largely of limestone and carbonaceous deposits of mesozoic age. The secondary formation lies principally, however, in Queensland, where a cretaceous bed, having fossils of belemnites, ammonites, plesiosauri, and ichthyosauri, extends for about 200,000 square miles, from near the Gulf of Carpentaria to the south of the Darling River. The valley of the Wannon (which runs into the Glenelg River) is mesozoic, as is also the coal deposit of Parramatta to the south of Sydney. The Clarence River, to the north of New South Wales, runs through Trias.

Tertiary deposits, mostly pliocene, it is supposed, occupy an immense area of A., comprehending the desert sandstone, the coral limestone, and a large part of the conglomerates and clays of the gold-diggings. Western A., to the east of the unstratified area, rests on desert sandstone, which also stretches north and eastward far into the interior, taking in likewise all South A. outside the diagonal Silurian bed above mentioned, penetrating into the interior plains of Victoria and New South Wales, and skirting the eastern edge of the cretaceous strata of Queensland.

Quaternary deposits forming 'flats' in the gold districts, occur in the Upper Macquarie and Upper Murrumbidgee Rivers. These, with clay-deposits in the Liverpool Plains and Darling Downs of New South Wales, have yielded some very interesting fossils throwing light on the past fauna of A. A kangaroo, for example, has been found one-third larger than any kangaroo of the present times; also, a nototherium (an animal between the wombat and kangaroo) as large as a rhinoceros. Remains have also been discovered of a bird, named by Professor Owen dromornis, larger than an ostrich, kindred to the now existing emu and cassowary.

Though there are no active, yet numerous extinct volcanoes are to be found in A. In South A., in Mount Gambier, are a large group which have broken through the horizontal coral beds, and whose craters now present beautiful lakes. In Victoria, a large part of the soil is basaltic, the debris of volcanoes of all periods, from the primary to the tertiary. Looking from any high emi-

nence in the neighborhood of Ballarat, you may count extinct volcanoes by the score, some nearly closed up; but others having rims of some miles in circumference, from a few to a hundred feet deep, some rising to a height of 2000 feet above the sea.

The tertiary gold-drifts of A. extend through four epochs; the 'oldest,' 'older,' 'recent,' and 'most recent,' all belonging to the lower Silurian strata (the 'bottom,' or 'rock-drift,' as the miners call it), and contain the reef or auriferous quartz from which the gold is extracted by crushing and amalgamation; the pure gold averaging about ½ oz., but sometimes amounting to 3½ oz., per ton. The miners are employed on drifts mostly of 200 to 500 feet deep, at the bottom of which, in the 'gutters' (leads, or old river-beds), the precious metal is found. The 'oldest' drifts occur in patches, capping the Silurian heights. In the valley, above the first lava flow (which rests immediately on the Silurian bed-rock), is placed the 'older' drift. Above that is another lava flow, covered by the 'recent' drift; then over that, another lava flow, on which rests the 'most recent' drift.

The abundance of palæozoic deposits in the east of A., suggests a great extension of land in that direction to supply the plants which their dimensions presuppose; and the Great Coral Reef along the east coast indicates land which, it may be supposed, at one time formed part of the continent, just as the shallow seas and numerous islands to the north seem to indicate an ancient conjunction of A. with Asia. The abundance, again, of mammalia entirely isolated from those of all other lands, the evidence the strata of A. give us of their greater opulence and no less uniqueness in the past than now, and the testimony of all other departments all demonstrate the existence, during the tertiary epoch, of a much more fertile continent than the A. of the present age, comprising lands now sunk beneath the sea. The flora of West A., so peculiar and so singularly rich, and its affinity in some degree with the flora of South Africa, would point to a western extension of A. The islands of St. Paul and Amsterdam, lying between A. and the Cape, suggest to Mr. A. R. Wallace the relic of a past line of communication between the two lands.

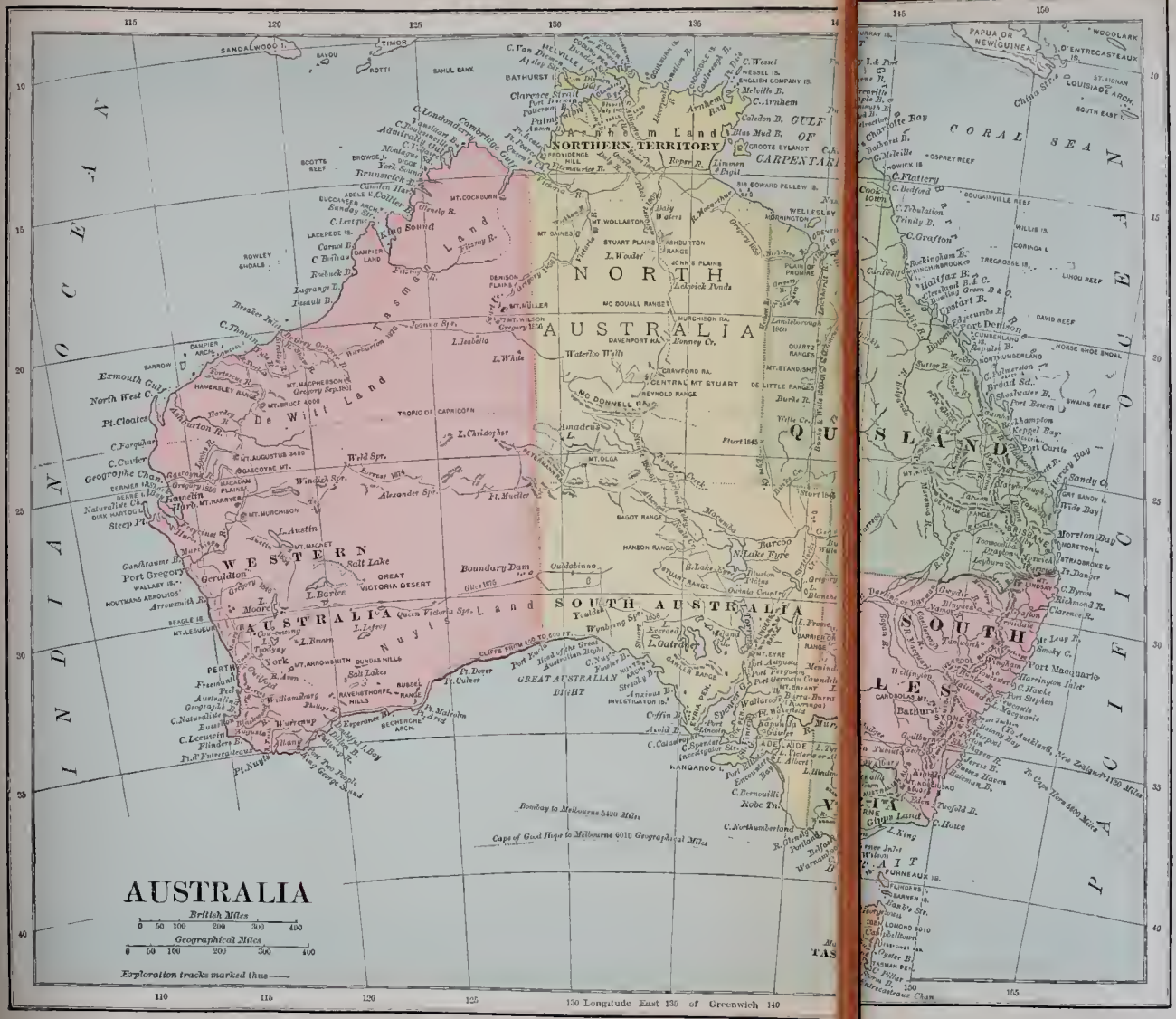
Minerals.—Gold is distributed more or less through all the Australian colonies, but its principal seats are in Victoria, Queensland, and New South Wales. Diamonds and other precious stones have also been found in different parts of the continent. The carboniferous strata of New South Wales, extending over a vast area, are very rich in coal, the coal-fields of that colony being among the most extensive in the world, containing also cannel coal and mineral oils. The whole basin of the Hunter River, with its tributaries, down to Newcastle on the sea-coast, abounds in true coal of palæozoic age. Coal is also found at Cape Otway, and Western Port in Victoria, but belongs to the mesozoic formation, and is of great value. In the south of Queensland is an oolitic coal-field. Palæozoic coal, of great extent and great prospective value, has been discovered in the central regions of that colony, along the basins of the Mackenzie and Dawson Rivers; while near Brisbane and the upper courses of the Darling Downs Rivers, almost equally extensive and valuable beds of coal of mesozoic age have been found. Rich copper mines have been opened in the palæozoic limestones of South A. They were first discovered near Adelaide. The most important mine, however, is that of Burra-Burra, 90 miles to the north, discovered 1842. A still more extensive deposit of copper-ore lies at Wollaroo, at the northern end of York Peninsula. In all, nearly 30 copper mines have been opened in South A. Silver-lead has been worked near Cape Jervis (southern point of peninsula west of Alexandrina Lake), and bismuth in the mountains of the Lofty Range to the east of Adelaide. Lead exists largely in West A., over 2000 tons of it having been exported from that colony in 1876. Iron exists in large masses in West and South A., but in neither of these colonies has coal been found to work it. Very valuable tin-mines have been opened in Queensland, especially in the neighborhood of the Wild River, as also to the north of New South Wales.

Climate.—In proportion to its size, A., lying mostly within the temperate zone, enjoys a singularly equable climate; in general, hot and dry, and remarkably salubrious. Within the tropics, it has its rainy season in summer (November to April); south of the tropics, almost exclusively in winter. The principal mountains, both for extent and height, lying to the east or windward side, absorb by far the heaviest tribute of moisture brought by the winds from the Pacific; and, as a rule, the amount of rainfall on the east side is in inverse proportion to the distance from the east coast. The west side has far less rain than the east, and there the rainfall is proportionate to the proximity to the west coast. Thus, Sydney appropriates a mean of some 50 inches rain in a year, while Bathurst, 96 miles from the sea, gets only 23 inches; Deniliquin (287 miles removed) 20 inches, and Wentworth (476 miles) but 14 inches. Melbourne and Adelaide in the south, receive respectively 25 and 20 inches.

The Queensland coast usurps from 40 to 80 inches; the west getting proportionately less. The elevated lands of West A. enjoy about 30 inches rainfall. What moisture is left in the winds after their passage across the highlands, the intense heat rising from the central plains tends to dissipate instead of allowing it to condense into rain. The parched traveller over those arid deserts looks up again and again into gathering clouds which argue possibility of rain, but never do come to rain. South A., Victoria, and in a less degree, New South Wales, are exposed to winds from the interior likened to the 'blast of a furnace,' instantly raising the temperature of the lands they visit to as high as 115° or higher, and sometimes producing extensive bush fires. Melbourne has a mean temperature of 58°; Sydney, 63°; Adelaide, a little higher; Perth, about the same as Sydney. Captain Sturt found the mean temperature of the interior for three months over 101° F. in the shade, and the drought such as to unloosen the screws of his boxes, split his combs into thin laminæ, make the leads drop out of his pencils, and his finger-nails become brittle as glass. The east highlands have a greater proportion of snow than their latitude and height would argue. At 5000 feet high, in certain situations, snow remains all the year, and many of the higher mountains are covered with snow all the winter. One instance of snow is chronicled at Sydney for 28th June 1836. The worst feature in the climate of A. is the total uncertainty and inequality of the rainfall in all parts of the continent, menacing the whole country with almost equally distressing alternations of drought and flood. Droughts sometimes completely wither up vegetation over large tracts of land, to the destruction of many thousands of cattle. On the coast of New South Wales, for example, hardly any rain fell in 1814 and 1815; and again, in 1827, 1828, and 1829. The ordinary drought itself renders almost all the rivers of A., with the exception of the Murray proper, merely intermittent; shrunk for months together in straggling pools or puddles, with or without some connecting thread of water, or perhaps only a series of damp hollows. As *rivers*, they really cease to exist for a longer or shorter period every year. Even the Murray proper, which, in any case, dwindles every summer into meagre proportions, dried up, in the drought of July 1838 to August 1839, into a concatenation of pools. The rainy season, on the other hand, swells these pools into terrific floods, inundating the country, and often most seriously destroying property. The caprices of Australian drought and flood are well illustrated by the metamorphoses of Lake George, 25 miles to the south-west of Goulburn, and having an elevation of 2260 feet above the sea. In 1824, Lake George was a sheet of water, 20 miles long by 8 miles broad; in 1837 a grassy plain; in 1865, it was 17 feet deep; in 1867, two feet deep; in 1876, 20 miles long and 20 feet deep. If only the weather could, within any approximate degree, be calculated on, there are, no doubt, many tracts in the interior which could be utilized.

Population.—Especially since the discovery of gold in 1851, A. has been advancing in all departments of material well-being, at a rate surpassing that of any other country on the globe. In 1788, the first settlement at Sydney numbered only 1030 persons; in 1835, the European settlers of A. (including Tasmania), had amounted to 80,000. By 1851, the population had risen to 350,000. The discovery in that year of the gold-fields caused a sudden and enormous inrush of emigrants from all parts of the world, and at the present time the inhabitants of A. count over 2,000,000. From 1870 to 1880, the immigration to A., Tasmania, and New Zealand averaged daily 160 persons, or 58,000 per annum, the increase of population for that decade doubling the rate of the United States. The population to the square mile is: in Victoria, 10·197; in New South Wales, 2·361; in Queensland, .325; in South A., ·287; in West A., ·029. The population is, of course, almost all of European origin, the predominating element being British. In 1881, half the population had been born in the colonies, 800,000 in the United Kingdom, 36,000 were Germans, 5500 Americans, and 3000 French. Chinese laborers, 31,000 in number, are found chiefly in Victoria and Queensland; and there are many Polynesians ('Kanakas'—many from Fiji) in Queensland.

Produce.—The chief and most general staple produce of A., for which the country is peculiarly adapted, and which constitutes its largest export, is wool. Over all the highland and river-lands of the sea-border, wherever, in fact, there is water, sheep thrive remarkably, except perhaps within the tropics, and the wool is of the finest quality, realizing the highest prices in the English market. The produce of wool in A. (including Tasmania and New Zealand), rose from £193,000,000 in 1870 to £392,000,000 in 1880. The cereals of Europe and maize have been introduced into the island-continent with the happiest success, and from 1870 to 1880, the grain crop of the five colonies rose from 18,600,000 bushels to 33,433,000 bushels. South A. is the principal wheat-growing colony. Potatoes everywhere yield abundantly. The vine is being extensively cultivated. Sugar is a very important and increasing product of Queensland, and is also considerably cultivated in New South Wales. Cotton is grown in Queensland. The fruit-trees of Europe and of many of the tropical and sub-tropical climates also thrive luxuriantly. The native timber is distinguished for its hardiness, durability, and building properties. Tobacco is also grown for sheep-washing. From 1870 to 1880,


AUSTRALIA
British Miles
0 50 100 200 300 400
Geographical Miles
0 50 100 200 300 400
Exploration tracks marked thus
Bombay to Melbourne 5490 Miles
Cape of Good Hope to Melbourne 6010 Geographical Miles
NORTHERN TERRITORY
NORTH AUSTRALIA
WESTERN AUSTRALIA
SOUTH AUSTRALIA
QUEENSLAND
NEW SOUTH WALES
VICTORIA
TASMANIA
Van Diemen Land
Nuyts Land
De Witt Land
Tasman Land
Queen Victoria Spr. Land
Arnhem Land
Gulf of Carpentaria
Great Victoria Desert
Great Australian Bight
Boundary Dam
Coral Sea
Indian Ocean
Pacific Ocean
Longitude East from Greenwich

pastoral industry has increased about 30 per cent. Agriculture (according to the number of bushels of grain raised) has within the same decade advanced over 60 per cent.

The following table gives a comparative view of the agricultural produce of the colonies:

HARVEST OF 1880–1881.

Colonies.	*Wheat.*	*Oats.*	*Barley.*	*Maize.*	*Other Cereals*	*Potatoes.*	*Hay*	*Wine Made.*
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bush.*	*Tons.*	*Tons.*	*Gallons.*
Victoria ...	9,719,049	2,358,459	1,063,751	49,299	415,900	124,706	300,184	484,028
New South Wales	3,708,737	356,121	160,602	4,483,457	22,290	51.9 6	173,071	584,282
South Australia.....	8,606,510	50,070	151,886	....	58,963	16,170	261,371	500,955
Queensland...	223,243	2,081	31,433	1,409,607	....	16,177	23,440	85,455
Western Australia	413,644	25,080	114,552	448	11,543	1,649	24,454	....
Total....	22,671,183	2,791,811	1,522,224	5,942,811	508,696	210,638	782,523	1,654,720

Mining.—Mining is a great and growing industry of A., though gold-mining has for some years been steadily declining. Gold is distributed more or less through all the colonies, but the chief mines hitherto opened are in Victoria, where are seven mining districts: Ballarat, Sandhurst, Maryborough, Beechworth, Castlemaine, Ararat, and Gipps Land; the first three being the most productive. The principal gold district of Queensland is in the Peake Downs. These gold-fields employ a large number of Chinese. The total yield of gold in A., from 1851 to 1879, was £292,000,000 (£102,000,000 from 1851–59, £118,000,000 from 1860–69, £72,000,000 from 1870–79). In 1880, the yield of gold was only £4,000,000. Other kinds of mining, however, are greatly on the increase. The value of copper and tin raised in A. (including Tasmania and New Zealand), rose from £708,000 in 1870 to £1,771,000 in 1880; of coal, from £260,000 in 1870 to £710,000 in 1880.

Commerce.—The trade of A. is in an exceedingly flourishing state, the average of trade per inhabitant being about five times that of Europe, and nearly five times that of Canada. The imports of A. (including Tasmania and New Zealand) have risen from £28,881,000 in 1870 to £47,379,000 in 1879; the exports in the same period from £28,421,000 to £41,277,000. The exports consist principally of wool, frozen meat, preserved meat, tallow, skins of all kinds, hides, wheat, cotton, sugar, and wine. The return for 1880–81 of the Merchant Shipping and Underwriters' Association, gives the number of sailing-ships and steamers belonging to the Australian colonies at a total of 1600, with a net tonnage of 269,597.

Government, Religion, Education, &c.—Each colony forms a separate province, exercising its own administration, passing its own laws, and levying its own fiscal duties; and all of them enjoying responsible government, with the exception of West A., in which the Executive Council, as well as the governor, are exclusively the nominees of the Home Government. The government in each colony consists of the goveror, representing and appointed by the Queen; the Legislative Council, corresponding with the House of Lords; and the Legislative Assembly, corresponding with the House of Commons. The Legislative Council of New South Wales and Queensland is nominated purely by the crown; that of Victoria and South A. is elected by the inhabitants possessing a certain property qualification. The Legislative Assembly is, in all four colonies, elected by manhood suffrage. In West A., representative government was so far introduced in 1870, through the appointment of a Legislative Council of 21 members, 7 of whom are nominated by the government, and 14 by £10 householders.

There is, however, a strong agitation in this province towards a more popular and self-responsible government. Imperial laws in all the colonies are in force, unless superseded by local enactments and all acts passed by the Local Legislature must receive the assent of the Home Government. All votes are taken by ballot. In Victoria, the members of both houses are paid £300 each per annum, for the three years for which they are elected. There is in all the colonies a strong feeling in favor of a general confederation for common interests, and one great congress for all A. is regarded as an event likely to be realized in no very distant future. The question of common defence has for some time been engaging the attention of the colonies. On the recommendations of Major-general Sir William Jervis and Colonel Scratchley, most of the capitals are now strongly fortified towards the sea; the batteries defending Port Jackson, in particular, being extensive and well armed. Victoria has a navy of its own, comprising a line-of-battle ship, an ironclad, and a sloop of war. At Sydney, the rendezvous and head-quarters of the Australian squadron, are stationed permanently several men-of-war.

With the exception of New South Wales, where religious denominations all receive support from the government according to the strength of their membership, and in West A., which constitutes a diocese of the Church of England, all religious sects in A. are self-supporting. In respect of numbers, Episcopacy is the dominant form of religion.

Education has of late been rapidly diffusing itself. In all the colonies now, education is either free and compulsory, or the primary schools are all so liberally endowed by the government, as to place elementary instruction within the reach of all classes of this young, well-to-do and thriving settlement; while libraries, museums, botanical gardens, schools of art, mechanics' institutes, &c., are multiplying in all the colonies under the liberal patronage of the several governments. There is no deficiency in newspapers, those of the Australian colonies, inclusive of Tasmania and New Zealand, numbering already 550, many of them dailies. The amount of bank deposits and the rapid increase of public revenue and debt in all the colonies demonstrate a highly satisfactory and hopeful economical state. The revenue of all the five colonies, which in 1870 was £7,581,000, had grown in 1880 to £13,345,000; and the debt in the same period increased from £27,060,000 to £59,383,000. Though house-rent is higher than in England, meat, bread, and groceries are all far cheaper, while clothing is not much dearer than at home. Wages, again, are much higher; and there is a constant demand for agriculturists, artisans, and female domestic servants.

Statistics.—The following are the official statistics of the Australian colonies at the close of 1880. For comparison we add those of Tasmania and New Zealand:

Colonies.	*Area in Sq. Miles.*	*Population of 1880.*	*Revenue of 1880.*	*Imports for 1880.*	*Exports for 1880.*	*Miles of Railway open, Dec. 31, 1880*	*Miles of Telegraph open, Dec. 31, 1880.*	*Acres under Crop.*	*Public Debt, Dec. 31, 1880.*
			£	£	£				£
Victoria.....	87,884	860,067	4,621,982	14,556,891	15,954,559	1,199	3,215¾	1,993,916	22,060,749
New South Wales. ..	310,937	739,385	4,904,230	13,950,075	15,525,138	849½	7,955¾	706,408	14,903,919
South Australia.....	903,690	267,573	2,027,961	5,581,497	5,574,505	667	4 75	2,574,489	9,865,570
Queensland.....	669,520	226,077	1,612,314	3,087,296	3,448,160	623½	5,768	120,881	12,192,150
West Australia.....	1,000,000	29,019	180,050	353,669	499,183	72	1,553¾	63,903	361,000
Australia.....	2,972,031	2,122,121	13,345,840	37,529,431	41,001,545	3,421	23,217¾	5,459,687	59,383,318
Tasmania....	26,215	114,762	439,780	1,369,223	1,511,931	172¼	878	373,299	1,943,700
New Zealand	105,342	484,864	3,283,396	6,162,011	6,352,692	1,258	3,706	1,029,764	28,583,231
Grand Total. ...	3,103,588	2,721,747	17,069,016	45,060,665	48,866,168	4,851¼	27,831¾	6,862,750	89,910,249

For further information, see the separate articles on the several Australian colonies; the articles Tasmania, New Zealand. See also Supplementary Article on Australia given below.

Railways and Telegraphs.—Since 1870, railways and telegraphs have been increasing at a ratio, in relation to the population, far

exceeding that of the United States. Two main trunk lines of railway connect the southern seabord of Victoria with her northern frontier. There is a railway line from Melbourne running into New South Wales, and shortly it will be continued to Brisbane. Queensland is perforated by three trunk lines, already running from the east coast for many miles into the west, and their continuation across the whole breadth of the colony, and northwards to the Gulf of Carpentaria, is in active progress, or in assured prospect. She has a line already touching the border of New South Wales. A trans-continental line, on the land-grant principle, is being agitated in the Queensland parliament, with every prospect of success. Railway extension is proceeding actively in South A. also, and a line of 90 miles is running in West A. Altogether, the railway lines of A. already working, measure 3359 miles. Telegraphically, the colonies are now all linked together with Tasmania and New Zealand, and with the mother country *viâ* Java and India. The telegraphic traffic is enormous, doubling that of Great Britain in proportion to the population. The telegraph lines at the end of 1880 measured 35,783 miles.

Magnificent lines of steamers, too, maintain frequent communication with Europe and America, between the various colonies, and with the Fiji Islands and New Caledonia. Manufactures suitable to the country are rapidly developing. Throughout all the colonies a postal system is working, modelled on that of Great Britain.

AUSTRALIA: Result of Recent Explorations and Scientific Investigation. The following article, which is supplementary to that on Australia given above contains fuller information as to the physical geography of the island-continent, and gives an account of its flora, its fauna, and its aboriginal inhabitants. These are in large measure due to recent journeys through the interior (of which a historical sketch is given in the section on *Discovery and Settlement* in the previous article on AUSTRALIA, and the scientific research of late years.

Details of Configuration of the Surface.—The main features of the surface of A. have been mentioned in the former article; and the mountains of Victoria have been noted in describing its geology. The eastern highlands of A., running parallel with the coast for some 1700 miles, now in a series of ranges, and now in a single chain or series of detached hills, are continued into New South Wales by the Warragong, or Australian Alps, where in Mount Kosciusko (7308 feet) the continent attains its highest elevation. Thence upland valleys merge northward into the Blue Mountains, which, again, send offshoots towards the Liverpool Range, that, sweeping east and west, curve round the southern edge of the lovely Liverpool Plains. The main chain skirting the east of New England, runs north to the frontiers of Queensland, where it branches into an eastern arm, the Macpherson Range; and a western arm, the Herries Range. Inclosing the western valley of the Brisbane River, and sinking northward to the valley of the Burnett, is the Dividing Range of Queensland, from whose west side slope the Darling Downs. To the north of the Brisbane and Condamine Rivers, the highlands expand to their greatest breadth, but contract again to the north of the Fitzroy River into a comparatively narrow chain, which sinks into the depression of the valley of the Burdekin. North of this river, uplands, with an average elevation of 2500 feet, again start north, terminating at 17° S. lat. In South A., the Lofty Range skirts the east of St. Vincent Gulf, and the Flinders Range the east of Spencer Gulf and Lake Torrens.

Almost the whole of this vast region to the south-east of A. (the eastern part of South A., Victoria, New South Wales, and Queensland) is drained by the Murray and its tributaries, whose arterial system has an area of about half a million miles, an area as large as the Austrian empire. The Murray, rising in the Australian Alps, flows between Victoria and New South Wales, then through South A., discharging, after a course of 2400 miles, into Alexandrina Lake. On its southern or left bank, it receives all the northern streams from the mountains of Victoria, the principal of which are the Goulburn and Loddon. On its northern or right bank, it absorbs all the south-western rivers from the eastern highlands, the principal being the Murrumbidgee (1350 miles long), which also rises in the Australian Alps, and collects the waters of the Lachlan; and farther west, the Darling (1160 miles), which has for its tributaries the Barwan, Culgoa, and Warrego. North of the Murray, the two most important rivers are the Fitzroy, and the Burdekin in Queensland. The other rivers to the east of the eastern highlands are short and rapid, unfit for navigation. All those hilly and partially river lands consists of grassy park-like uplands, clothed with scattered thin forests of magnificent trees, for the most part evergreen and vertical-leaved, diversified by bush and heath and scrub; all of excellent pasture, intersected by wide valleys of remarkable fertility well adapted for agriculture.

From the head of the Gulf of Carpentaria stretches a table-land westward along the border of the Gulf and the base of Arnhem Land, then south-west along the coast, pierced by the Flinders Rivers, the deep valley of the Alligator, the Roper, and the Victoria; the two latter navigable for a considerable length, and flowing through fertile lands and picturesque scenery.

West A., towards the coast, is in its northern half crossed by ranges, running mostly east and west, of detached mountains, and intersected by the fertile valleys of Ashburton, Gascoyne, and Upper Murchison. In its southern half, West A. is, for the most part, a barren tract of salt or mud steppes, almost destitute of fresh water, and extensively overgrown with dreary thickets. In the south, it is pierced by the Upper Swan River and the Blackwood. On the south coast, from King George's Sound to Spencer Gulf, is neither mountain nor river.

To the north of Spencer Gulf is an area of some 1000 square miles, 'the Lake District' of A., set with lakes not deficient in number; Torrens, straight to the north of Spencer Gulf, over 100 miles long, with Eyre to the north of it and much larger, and Gairdner to the west of it. To the east of Eyre are Lake Blanche and Gregory; and far to the north-west, Lake Amadeus. These dead masses of salt water fluctuate greatly in body as the season is dry or rainy, now sheets of water, and now almost grassy plains, set in the dreariest wide-spreading steppes. A comparatively verdant belt of country lies to the east of this district, and runs to the extreme north, as the axis of A., along the telegraph line.

The whole interior of the country, with the exception of this axis-like belt measuring about 1,500,000 square miles, presents one vast dreary plain, sometimes of stifling, scorching, low-lying, deep-red sand-ridges; sometimes matted over for hundreds and thousands of miles with 'scrub,' a species of eucalyptus, growing to a height of 8 to 10 feet, occasionally higher—either the 'mallee,' a hard, dreary, sapless shrub, thickets of which are almost impenetrable, or worse still, the 'mulga.' Worst of all, however, is the 'spinifex' or 'porcupine grass,' lacerating the feet of horses and the clothes and flesh of men; a grass, which in one district alone, to the north and north-west of Lake Eyre, overspreads 10 degrees of latitude. To the east of the central telegraph line, as far as to the western plains of Queensland, is an unknown country, supposed to be sandy or otherwise uninhabitable.

Botany.—The vegetation of A. is altogether unique, standing at a long interval from that of all other quarters of the globe; but is exceedingly abundant in species. These, it is calculated, number about 10,000, of which 8,000 have been already determined; considerably more than are to be found in all Europe. A peculiarity of the trees covering its seaboard highlands, is their uniform sombre olive shade, alike on upper and under surface; and the generally vertical direction of their foliage, which thus allows much freer entrance to the blazing summer sun. Another peculiarity of Australian vegetation is the 'scrub'—the 'mallee,' 'mulga,' and 'porcupine grass,' above referred to—which is the chief matting of the desert, presenting anything but a cheering prospect, with perhaps hardly one tree within visible distance, and scarcely a bird to be descried overhead in flight. There is, however, one agreeable scrub formed by the tea-tree, a flowering shrub, a species of melaleuca, abounding in almost all parts of A.; not so dense as the 'mallee,' and mingled with other flowering plants.

Next is the 'heath,' composed of a dwarf shrub about two feet high, clothing tracts boggy in winter and dusty in summer, mingled with bushes of melaleuca and banksia (or 'native honeysuckle'), all bright colored and aromatic. The highlands are rich in wood, such as that of the gum-trees of the genus eucalyptus, growing to a height of 250 feet, with a girth of 12 to 20 feet. In the Dandenong Range, 40 miles east of Melbourne, are many trees over 420 feet high; one felled giant measuring as much as 480 feet. Then in the south and west, and even a little into the interior, though less abundantly there, are the valuable shea-oaks, beef-woods, or casuarinas — leafless trees, with rigid drooping branchlets something like our 'horsetails,' their wood of the color of beef (whence the name), and as good as our oak. The grass-tree (xanthorrea), shoots up into a rugged stem, varying in height from 2 to 10 feet, and is surmounted by a tuft of wire-like drooping foliage, from the center of which rises a spike like a bulrush, flowering in winter into white stars. The 'wattles' or acacias, abounding everywhere in the country, and comprising over 300 species, are also a most characteristic and highly grateful feature of A., with lovely yellow blossoms, and generally fragrant. The Australian bush is fragrant all the year. The traveler in the highlands, especially of New South Wales, will not unfrequently light, in some sheltered valley or deep ravine, on a scene of the most luxuriant vegetation, such as that of Illawarra, 50 miles to the south of Sydney, where palms rising to 70 or even 100 feet, Indian figs draped with strange parasites, creepers, ferns, stag-ferns, 'flame trees,' and vines, and the loftiest trees, are all intermingled into a labyrinth of the most graceful forms and brilliant colors. The 'flame-tree,' with its clusters of red flowers, gives signal of the Illawarra Mountains to ships miles out at sea. The 'fire-tree' of West A., the only non-parasitical plant of the same order as our mistletoe, burns with orange-colored blossoms like a

tree on fire. The *Stenocarpus Cunninghami* of Queensland presents one 50 feet high mass of orange-tipped crimson stamens. The 'warratah' of New South Wales shows a single stem of 6 feet supporting a crimson blossom, like a full-grown peony. The Alpine vegetation, again, of the higher mountains in Victoria and New South Wales, intermingles the ranunculus, geum, gentiana, gaultheria, &c., analogous to the Alpine plants of Europe, with the purely Australian oxylobium, brachycome, acacia, hovea, and bossiæa.

Zoology.—The zoology of A. is even more peculiar than its botany. The mammalia of other lands are totally awanting here, while the marsupials or pouch-bearing mammalia of A. have but the opossums of America to represent them in any other part of the world. There are in A. 'no apes, no oxen, antelopes, or deer; no elephants, rhinoceroses, or pigs; no cats, wolves or bears; none even of the smaller civets or weasels; no hedgehogs or shrews; no hares, squirrels, porcupine, or dormice;' only some peculiar species of rats and mice, and the 'dingo,' a wild dog. The largest of the marsupials is the kangaroo, attaining a height of 5 feet, and a weight of 200 lbs. Smaller species are the wallaby, the hare kangaroo, and rat kangaroo. The fruit-eating bat, or flying fox, is found in New South Wales and Queensland. The shores of A. are frequented by Antarctic-like seals and sea-lions; and on the coast of Queensland is the dugong or sea-cow; Then there are phalangers—nocturnal animals, feeding on leaves, and living in the hollows of trees. In the moonlight stillness of the forest, flying opossums may be seen gliding through the air. The flying-mouse, 'able to sleep in a good-sized pill-box,' is decidedly Australian. The tarsipes of West A. is a honey-sucker, no larger than a mouse, with extensile tongue. The koala of the eastern district is 4 feet long, thick-limbed, and tailless. The wombat, the largest of the marsupials, next to the kangaroo, is 3 feet long, feeds on roots and grass, burrowing deep in the ground, and is nocturnal. The 'native cats' are carnivorous marsupials, variously marked and spotted, but fierce and intractable, dwelling among rocks and in holes, and feeding on small mammals and birds. The ant-eater of West A. is of the size of a squirrel, beautifully white-striped, with long and rather bushy tail. It has 52 teeth, a greater number than in any known quadruped, and feeds on ants. The platypus, having no teeth nor marsupial pouch, and inhabiting the rivers and lagoons of the south and east of A., is 20 inches long, having very short legs, and broad-webbed feet. From its flat head project two flat horny jaws, like the bill of a duck.

The birds, if not quite so unique and strange a feature of A. as are its other mammalia, excel those of all other temperate lands for beauty of plumage and fineness of form. Passing over the splendid parrots and cockatoos, we note for their singularity of figure, or brilliancy of feather, the regent-bird, rifle-bird, fly-catcher, and lyre-bird. The abundant flora, conjoined with scarcity of fruit, in this isolated continent, develops flower-feeding birds wanting in other lands, such as the melipagidæ or honey-suckers, and the tricho-glossidæ or brush-tongued lories. Peculiar to A. are, too, the megapodiidæ or brush-turkeys, the menuridæ or lyre-birds, and the atrichidæ or scrub-birds. The megapodiidæ do not sit on their eggs, but bury them under mounds of earth or vegetable matter, to be hatched by the sun or fermentation. The emu and cassowary of A. correspond with the ostrich of Asia and Africa. The podargi, of enormous mouth—'more-porks,' as they are called, from their singular cry—are a strange and unsightly Australian type, Among song-birds are the piping-crow or musical magpie, and the lyre-bird, with its mocking notes. Noteworthy for their curious habits are the satin-birds or bower-birds, which build their domiciles of twigs and branches, decorated with colored feathers, bones, and shells, sometimes several feet long, arched over at the top, and which are made the rendezvous of many birds of both sexes. Altogether, A. has 650 distinct species of birds to muster against Europe's 500. Of reptiles, A. has no less than 140 different kinds, its largest lizard measuring from 4 to 6 feet. Nor does A. want for snakes. Though destitute of both the vipers and pit-vipers, it makes up for this loss by the elapidæ (a family including the Indian cobras), constituting two-thirds of the snakes of A., all poisonous, though only five kinds are fatally so. The black snake of A. measures from 5 to 8 feet long. A. abounds, moreover, in insects, beautiful and peculiar, though the butterfly is rare in the temperate zone, becoming numerous towards the tropics.

Aborigines.—Almost as much as its botany and zoology the human natives of A. are isolated and peculiar, separated by a wide remove from the Papuans, the Malays, and the Negroes. Of a dark coffee-brown complexion, rather than actually black, the Australian stands not much short of the average European in height, but is altogether of much slimmer and feebler build; his limbs, in particular, very lean and destitute of calves (a defect common to dark races). His head is long and narrow, with a low brow prominent just above the eyes, but receding thence in a very marked degree. The nose, proceeding from a narrow base, broadens outwardly to a somewhat squat end, the eyes on either side of its thin root appearing drawn together. The face bulges into high cheek bones. The mouth is big and uncouth, the jaw-bone contracted, the upper jaw projecting over the lower, but with fine white teeth, the chin cut away. The whole head and face, and indeed, the whole person, is covered with a profusion of hair, which, when freed of its usually enclogging oil and dirt, is soft and glossy. His ears are rather pricked forward. The effluvium of his skin, offensive in itself, is exaggerated by the fish-oil he uses to anoint his person. The intellect of the Australian, directed almost exclusively on the means of procuring food, operates wholly within the range of the rudest bodily senses; but inside that elementary sphere, displays no little nimbleness and skill. He is unsurpassed in tracking and running down his prey; and his weapons, though of the most primitive kind, are well adapted to assist him in that purpose, as his rude culinary and domestic apparatus manifests equal skill. Nay, he has some exuberance of rude sense, some imitative facility or elementary art in him, as may be observed in the crude figures of sharks, lizards, &c., carved on caves in the north-east, and on the rocks of New South Wales; as also in his language, which, within its very circumscribed sensuous sphere, is fairly expressive and complete; and likewise in the facility with which he learns to chatter foreign languages. Outside this circle, however, all is blank to the Australian. He has no architecture, almost no weaving, no pottery, and may be said to have no religion. His sensations have hardly, if at all, reached the length of sentiments, far less sentimentalities. The man lords it over the woman, who is as much his property as is his 'boomerang' or 'dingo.' The male offspring is, indeed, in considerable estimation; and a father will lament the death of his son for months, or even years. Old men and old or infirm women, on the other hand, are mercilessly abandoned. In summer, they roam about naked, and sense of shame seems almost wholly undeveloped in them. Their decalogue is, for simplicity's sake, all reduced to the notion of property, wives being one item in a man's chattels, the stealing of which has a definite punishment meted out to it. Where caves abound, some of the tribes seek no further, but live in those ready-made tenements. Fixed habitations none of them have; at best, only a screen of twigs and bushes, covered with foliage or turf; sometimes, however, logs of wood and turf to serve for a few days' or weeks' shelter, till the pursuit of food calls them elsewhere.

Thrift is unknown, and the life of the Australian alternates between satiety and semi-starvation. In summer, he goes naked; in winter he wraps himself in kangaroo skins. To hold his dowak or digging-stick, he binds a girdle of hair about his loins; and for protection against shrubs, he hangs an apron of skins to the girdle. By way of food, he devours many animals alive, including lizards, snakes (of which the head is rejected), frogs, larvæ, white ants, moths. Other animals are roasted. Cannibalism is also general, and in seasons of dearth, when he cannot get hold of an enemy, the Australian has his wife and children to fall upon. The wife is bound to keep her lord in vegetable food; roots of wild yam, seeds of acacia, sophoræ, leaves of the grass-tree, &c.; and if she fails to produce enough, she is liberally treated to maulings and spearings, so that a wife generally appears bruised and gashed all over. The 'boomerang' is a flat stick 3 feet long, curved at the center, and thrown in the air among birds, jerks in zigzag, spiral, or circular fashion, usually bringing down a few. In addition, they have the throwing-stick, flint-pointed spears, shields, stone-hatchets, digging-sticks, netting needles, nets of sinews, fibres, or hair, water-skins, canoes. There is no government among this people outside that of the family, and no laws except traditionary rules about property. In the way of religion, they have little save their terror of ghosts and demons, and some superstitious traditional rites applicable to certain epochs in a man's life, more particularly at his burial. At ten years of age, a boy is covered with blood; at twelve to fourteen, he is circumcised (in the south or north, not in the west or on the Murray); and at twenty, he is tattooed or scarred. Felicity after death is the reward of proper burial. A man dying in battle or rotting in the field, becomes an evil spirit. For their curious exogamous marriage customs, see TRIBE. Their language is wholly sensuous, their abstraction tending only in the way of arithmetic as far as the number 5, and that itself quite an unusual stretch; it is of polysyllabic formation, and the accent falling on the penultimate is not in harmonious. Though it comprehends many divergent forms, they seem to be all fundamentally connected, forming a group wholly isolated from any of the linguistic families of the rest of the world. Within its narrow limits the language is well developed and sensuously copious and expressive. Like almost all other savages, the native Australians are rapidly vanishing before the advance of civilization. The European settlers oust them out of all the more fertile and habitable lands, pressing them ever more into the desert of the interior; while the diseases and vices they acquire from the new possessors, are another potent fact of their destruction. The lowest estimate of their number, prior to Euro-

pean settlement among them, gives over 150,000, the natives still surviving being calculated now at about half that figure.

AUSTRA'SIA, or the East Kingdom, the name given, under the Merovingians, to the eastern possessions of the Franks, embracing Lorraine, Belgium, and the right bank of the Rhine, and having their central point at Metz. At the time of the rise of the Frankish power, these districts were of great importance, as they formed the connection with the German mother-country, and were the most thickly inhabited by Franks. After the time of Charles Martel, the division of the Frankish kingdom into A. and Neustria, lost its political importance. Under Charlemagne's successors, A. merged into Germany—and Neustria, or West Frank-land, into France.

AU'STRIA, ARCHDUCHY OF, the cradle and nucleus of the Austrian empire, lies on both sides of the Danube, from the mouth of the Inn to Presburg, on the borders of Hungary, and embraces an area of about 15,000 square miles, with a population, in 1854, of 2,624,237. It now forms three of the crown-lands, or administrative provinces of the empire—viz., Lower and Upper Austria (or Austria below, and Austria above the Ens), and the Duchy of Salzburg. See AUSTRIA, EMPIRE OF. The south and west portions are mountainous; the north and east are more level and fertile, containing the great plain of Vienna, the Marchfeld, &c. The population is mostly German and Catholic. The chief towns, besides Vienna, are Wiener-Neustadt, Salzburg, Steyer, Linz, and Ischl (q. v.).

AU'STRIA, EMPIRE OF, or AUSTRO-HUNGARIAN MONARCHY. The Austrian dominions form a compact territory, with a circumference of about 5350 miles. The body of the empire lies in the interior of Europe, though it has about 500 m. of sea-coast on the Adriatic. A. borders on Italy, Switzerland, Bavaria, Saxony, Prussia, Russia, Roumania, Servia, Turkey, and Montenegro. With the sanction of the Berlin Congress of 1878, the small territory of Spizza, on the Montenegrin frontier and formerly Turkish, has been incorporated with Dalmatia; the Turkish provinces of Bosnia and Herzegovino, though occupied and also administered by Austria, cannot of course be regarded as part of the Austro-Hungarian monarchy. The following table shows the area and population of the empire at the census of Dec. 1880:

	Area in Sq. Miles.	Population in 1880.
I. AUSTRIAN LANDS—		
Lower Austria	7,654	2,329,021
Upper Austria	4,631	760,879
Salzburg	2,767	163,566
Styria	8,670	1,212,367
Carinthia	4,005	348,670
Carniola	3,856	481,176
Görz, Gradiska, Istria, and Trieste	3,084	650,897
Tyrol and Vorarlberg	11,324	911 887
Bohemia	20,060	5,557,134
Moravia	8,583	2,151,619
Silesia	1,987	565,772
Galicia	30.307	5,951,954
Bukowina	4,035	569,599
Dalmatia	4,940	476,164
Total for Austria	115,903	22,130,705
II. LANDS OF THE HUNGARIAN CROWN—		
Hungary and Transylvania	107,858	13,700,005
Fiume	8	21,363
Croatia and Slavonia (including since 1881 the former Military Frontier)	16,767	1,889,351
Total for Hungary	124,633	15,610,719
Total for the Monarchy	240,536	37,741,424

This population comprise the military establishment, which, including the landwehr, was, at the end of 1881, on a peace footing, 285,485 men; and on a war footing (with gendarmerie, &c.), 1,119,220. The naval forces of the monarchy consisted, in 1881, of 11 armor-clads, 30 other steamers, with 20 tenders, and 10 sailing-vessels.

Surface.—Three-fourths of A. is mountainous or hilly, being traversed by three great mountain chains—the Alps, Carpathians, and Sudetes (q. v.), whose chief ridges are of primitive rock. The Rhætian and Noric Alps stretch from Switzerland to the Danube, and contain the highest points of the Austrian territories, the Ortler Spitze rising to 12,779 English feet. Their height declines gradually towards the east, where the Leitha Hills (3000 feet), overlooking the plain of Vienna, form the transition to the Carpathians. This chain rises on the left bank of the Danube, near Presburg, and sweeping in a curve, first east, and then southward through Transylvania, again meets the Danube. The highest point is Butschetje in Transylvania, where a height of 9528 feet is reached. The central part, or Tatra Mountains, are vast granitic masses, resembling the Alps in character; the highest of these is the Lomnitz, in the longitude of Cracow, 8133 feet. The Alps are accompanied, north and south, by parallel ranges of calcareous mountains, covering whole provinces with their ramifications. The Carpathians are lapt on their northern side by sandstone formations; mountains of the same character also occupy Transylvania.

Springing from the north-west bend of the Carpathians, the Sudetes run through the north-east of Moravia and Bohemia, in which last the range is known as the Riesengebirge, or Giant Mountains. The boundary between Bohemia and Prussian Silesia passes over the Schneekoppe, the highest peak of these mountains, which is 5275 feet in height. Continuous with this range, and beginning on the left bank of the Elbe, are the Erzgebirge, or Ore Mountains, on the confines of Saxony; and veering round to nearly south-east, the range is further prolonged in the Bohemian-Forest Mountains, between Bohemia and Bavaria.—The chief plains of the Austrian empire are the great plains of Hungary (the smaller of these is in the west, between the offsets of the Alps and Carpathians, and is about 4200 square miles in extent; the other, which is in the east, and traversed by the Danube and the Theiss, has an area of 21,000 square miles), and the plain of Galicia.

From the Gulf of Triest to the south point of Dalmatia, A. has a sea-line of about 1000 miles, not counting the coasts of the numerous islands, the largest of which is Veglia, 23 miles by 12. The chief lakes are the Platten See (about 400 square miles), and the Neusiedler See (about 100 miles), both in Hungary. The first is navigable by steamers, and both are rich in fish, and have fruitful vineyards around them. The Alps and Carpathians enclose numerous mountain lakes. The Long Lake in the Tatra Mountains lies at an elevation of 6000 feet. The most remarkable of all is the Zirknitz Lake (q. v.) in Illyria. There are extensive swamps or morasses in Hungary. One connected with the Neusiedler See covers some 80 square miles. A good deal has been done in draining morasses.

The leading rivers that have navigable tributaries are: the Danube (q. v.), which has a course of 849 miles within the Austrian dominions, from Passau, at the mouth of the Inn, to Orsova, on the frontier of Walachia, and receives, on the right, the Inn, Traun, Ens, Leitha, Raab, Drau, and Save; and, on the left, the March, Waag, Neutra, Gran, Theiss, Bega, and Temes: the Vistula (q. v.), with its tributary the Bug: the Elbe (q. v.), with the Moldau and Eger: the Dniester and Adige (q. v.) have no navigable tributaries; this last, which rises in the Rhætian Alps, and flows past the famous city of Trent, enters Lombardy above Verona, and confers on that country the benefits of what commercial importance it possesses—being navigable only up to a point below Legnago. The Rhine only bounds the empire for about fourteen miles above Lake Constance. The Isonzo, Zerumagna, Kerka, and Narenta flow into the Adriatic.

The canal system of Austria is in general not extensive. Canal construction is recent. The Vienna and Neustadt Canal, in Lower Austria, has a length of 40 miles; the Bacser or Franz Canal, between the Danube and Theiss in Hungary, 69 miles; and the Bega Canal, constructed by the Romans, between the Bega and Temes, 83 miles. Extensive lines are still capable of being opened up, affording the only possible communication with many places now inaccessible, and, at the same time, the means of rescuing tracts of arable land from inundations.

The *climate* of A. is on the whole very favorable; but from the extent and diversity of surface, it presents great varieties. In the warmest southern region between 42°—46° lat., rice, olives, oranges, and lemons ripen in the better localities; and wine and maize are produced everywhere. In the middle, temperate region from 46°—49°, which has the greatest extent and diversity of surface, wine and maize still thrive in perfection. In the northern region, beyond 49°, except in favored spots, neither wine nor maize succeeds; but grain, fruit, flax, and hemp thrive excellently. The mean temperature of the year is, at Trieste, 58° F.; at Vienna, 51°; at Lemberg, in Galicia, 44°.

The raw products of A. are abundant and various; and in this respect it is one of the most favored countries in Europe. What one province lacks, another supplies. Its mineral wealth is not surpassed in any European country; it is only lately that Russia has exceeded it in the production of gold and silver. Mining has been a favorite pursuit in A. for centuries, and has been encouraged and promoted by the government. Bohemia, Hungary, Styria, Carinthia, Salzburg, and Tyrol take the first place in respect of mineral produce. Except platina, none of the useful metals is wanting. The mines are partly state property, and partly owned by private individuals. The value of their yearly produce is estimated at about £9,000,000. Of this sum coal yields about a half, iron a fifth, salt a tenth, and gold and silver together one fourteenth. The number of persons employed in mines and smelting-works is about 150,000, a third of whom are in Hungary. Gold is found chiefly in Hungary and Transylvania, and in smaller quantity in Salzburg and Tyrol. The same countries, along with Bohemia, yield silver. The discovery of quicksilver at Idria (q. v.) first brought this branch of mining industry into importance. This metal is now also found in Hungary, Transylvania, Styria, and Carinthia. Copper is found in many districts—tin, in Bohemia alone. Zinc is got chiefly in Cracow and Carinthia. The most

AUSTRO-HUNGARIAN
MONARCHY
Railways represented thus:
Geographical Miles, 60—One Degree
0 20 40 60 80 100
German Miles, 15 One Degree
0 5 10 15 20
English Miles, 69 One Degree
0 10 20 40 60 80 100
Longitude East from Greenwich
10 12 14 16 18 20 22 24
50 48 46 44 42
BOHEMIA
MORAVIA
SILESIA
GALICIA
LOWER AUSTRIA
UPPER AUSTRIA
SALZBURG
TYROL
CARINTHIA
CARNIOLA
HUNGARY
TRANSYLVANIA
CROATIA
SLAVONIA
DALMATIA
BOSNIA
HERZEGOVINA
SERVIA
WALLACHIA
MONTENEGRO
VENICE
MEDITERRANEAN SEA
Vienna
Prague
Pesth
Trieste
Danube R.

productive lead-mines are in Carinthia. Iron is found in almost every province of the monarchy, though Styria, Carinthia, and Carniola are chief seats. The production, though great, is not yet equal to the consumption. Antimony is confined to Hungary; arsenic is found in Salzburg and Bohemia; cobalt in Hungary, Styria, and Bohemia; sulphur in Galicia, Bohemia, Hungary, Salzburg, &c., though not enough to supply home consumption. Graphite is found abundantly in Bohemia, Moravia, Carinthia, &c.

The useful earths and building-stones are to be had in great profusion; all sorts of clay up to the finest porcelain earth (in Moravia, Bohemia, and Hungary), and likewise marble, gypsum, chalk, &c. Of precious and semi-precious stones are the Hungarian opal (which passes in commerce as oriental), Bohemian garnets (the finest in Europe), cornelians, agates, beryl, amethyst, jasper, ruby, sapphire, topaz, &c.

In 1870—1880, the minerals of A. proper were worth £8,500,000 a year, and of Hungary about £2,000,000. In 1872, the items for the empire were:

		Weight.	Value in Florins.
Gold	(Austrian pound)	2,804	1,892,287
Silver	"	74,043	3,331,925
Quicksilver	(Austrian hundredweight)	7,170	1,240,798
Zinc	" "	45,013	477,179
Copper	" "	30,886	1,342,033
Lead	" "	102,339	1,305,646
Iron, raw and cast,	" "	8,477,115	....
Graphite	" "	648,318	....
Mineral coal	" "	93,971,990	....

A. is peculiarly rich in salt. Rock-salt exists in immense beds on both sides of the Carpathians, chiefly at Wieliczka (q. v.) and Bochnia in Galicia, and in the county of Marmaros in Hungary, and in Transylvania. The annual produce of rock-salt is greatly above 3 million cwt. Salt is also made at state salt-works by evaporating the water of salt-springs. The chief works are those at Ebensee, Aussee, Hallstadt, Ischl, Hallein, and Hall in Tyrol. From two to three million cwt. are thus produced annually. A considerable quantity is also made from sea-water on the coasts of the Adriatic. The sale of salt is in A. a government monopoly. Of other salts, alum, sulphate of iron, and sulphate of copper are the chief. There are inexhaustible deposits of coal in the monarchy; but they have not yet been rightly explored, nor are nearly all that are known yet worked. They are spread over all the provinces; but the richest are in the mountain-systems of Moravia and Bohemia. Of recent years, however, a great deal has been done to develop this particular branch of mining. A. has abundant of mineral springs, frequented for their salubrity; 1600 are enumerated, some of them of European reputation, as the sulphurous baths of Baden in Lower A., the saline waters of Karlsbad, Marienbad, and Ofen, &c.

The *vegetable productions*, as might be expected from the vast variety in the soil and position of the different provinces, are extremely various. Although three-fourths of the surface is mountainous, more than five-sixths is productive, being used either for tillage, meadows, pasture, or forest. Grain of all kinds is cultivated, most abundantly in Hungary and the districts south of it on the Danube; in Bohemia, Moravia, Silesia, and Galicia. Agriculture is not yet far advanced; the prevailing system is still what is called the three-field system, introduced into Germany by Charlemagne, in which a crop of winter wheat is followed by one of summer grain, and that by fallow. In Hungary, the Magyar adheres to his primitive husbandry, the German and Slav are adopting rational methods. Rice is cultivated in the Banat, but not enough for the consumption. Potatoes are raised everywhere; and in elevated districts are often the sole subsistence of the inhabitants. Horticulture is carried to great perfection; and the orchards of Bohemia, A. proper, Tyrol, and many parts of Hungary, produce a profusion of fruit. Great quantities of cider are made in Upper A. and Carinthia, and of plum-brandy in Slavonia. In Dalmatia, oranges and lemons are produced, but not sufficient for the requirements of the country; twice as much olive-oil is imported as is raised in the monarchy.

In the production of wine, A. is second only to France. With the exception of Galicia, Silesia, and Upper Austria, the vine is cultivated in all the provinces; but Hungary stands first, yielding not only the finest quality of wine, but four-fifths the amount of the whole produce of the empire. The average produce of the whole empire is estimated at about 200 million gallons, which is mostly consumed by the inhabitants themselves.

Of plants used in manufactures and commerce, the first place is held by flax and hemp. Flax is cultivated almost universally; white hemp in Galicia, Moravia, and Hungary. Tobacco is raised in great quantities, especially in Hungary, which also is first in the cultivation of rape-seed. Bohemia raises hops of the first quality, which are partly exported; though other provinces require to import from abroad. The indigo plant has been lately successfully acclimatized in Dalmatia. Nearly a third of the productive surface is covered with wood (66,000 square miles), which, besides timber, yields a number of secondary products, as tar, potash, charcoal, bark, cork, &c.

As to *animals*, bears are found in the Carpathians, Alps, and Dalmatia; wolves, jackals, and lynxes in these same districts, and also in the Banat, Croatia, Slavonia, and the Military Frontiers. The marmot, otter, and beaver are also found in Dalmatia. Game has of late sensibly diminished. The wild goat lives in the highest, the chamois and white Alpine hare in the middle regions of the Alps and Carpathians. More productive than the chase are the fisheries of the Danube, Theiss, and numerous streams, lakes, and ponds. The chief sea-fishing is in Dalmatia. Leeches, procured chiefly in Hungary and Moravia, form an article of considerable trade. For foreign commerce the most important branch of rural industry is the rearing of silk. A. produces about a quarter of a million of silk cocoons annually. The silk trade is very extensive in the Tyrol—the yearly supply of cocoons in that country being 32,000.

The breeding of *domestic animals* has not yet advanced to what the home wants require. In some districts it is excellent, in others quite neglected. Horse-breeding is promoted by what are called 'military studs.' Besides a number of imperial studs, there are a great many private establishments, especially in Hungary, for the same purpose. The supply of black-cattle is not equal to the demand; great numbers are furnished by Hungary and Galicia. The breeding of sheep, like that of horses, has been a special object of care to the government. The finer wools are furnished by Moravia, Bohemia, Silesia, Lower Austria, and great part of Hungary and Galicia. The great mass is, however, composed of what is known as middling and inferior sorts. Goats are reared chiefly in Dalmatia, and swine in Hungary. In 1880, the number of horses in the monarchy was stated at 3,282,790; cattle, 13,181,620; sheep, 13,193,463; goats, 1,243,027; swine, 7,164,820; besides 50,000 mules and asses in A. proper. Nearly three-fourths of the population are engaged in husbandry, so that A. is an agricultural state, though its capabilities have not been fully developed.

The *population* is very unequally distributed. The most populous districts are those of the south-west and of the north-west. The Alpine regions and those of the Carpathians are the sparsest; and generally the density diminishes towards the east. At the end of 1880, Austria had, besides Vienna, three cities of above 100,000 inhabitants, and 33 others with more than 20,000. Vienna, with 834,284 inhabitants in 1869, was found by the census in 1880 to have, with suburbs, 1,103,857. The population of Austria embraces a greater number of races, distinct in origin and language, than that of any other European country except Russia. The proportions in this respect are here given from the official statements of 1880. The Slavs are the most numerous race, amounting to 15,720,000, nearly 42 per cent. of the whole population in the census year. They form the bulk of the population of Bohemia, Moravia, Carniola, Dalmatia, Croatia, Slavonia, the Military Frontiers, the Woiwodina, the north of Hungary, and Galicia. They are, however, split up into number of peoples or tribes, differing greatly in language, religion, culture and manners; so that their seeming preponderance in the empire is thus lost. The chief branches of the Slavic stem are the northern Czechs (the most numerous of all), Ruthenes, and Poles, and the southern Slovenians, Croats, Serbs, and Bulgarians. The Germans numbered 9,807,000, or above 25 per cent. They are dispersed over the empire, but predominate most in the duchy of A., Salzburg, Tyrol, Styria, Carinthia, the west of Hungary, &c. The Romanic peoples (speaking languages derived from that of ancient Rome) amounted to 3,185,000, or fully 9½ per cent., and are divided into western and eastern. To the first, the Germans give the general name of Welsch. They consist of Italians, inhabiting the south of Tyrol, Istria, and Dalmatia; the Ladins (Latins), occupying some valleys in Tyrol; and the Friauls about Görtz, north of Triest. The eastern Romans are the Valaks or Walachians, styled by themselves Rumuni, who are found in Transylvania, Hungary the Woiwodina, Bukowina, and Military Frontiers. The Magyars, or Hungarians proper, numbered 6,180,000 (over 16 per cent.); they are located chiefly in Hungary and Transylvania; also in the Woiwodina, and a few in Croatia and Slavonia. The small remaining portion is composed chiefly of Jews, Armenians, and Tsigani or gipsies.

As to *religion*, the great bulk of the nation is Roman Catholic. In 1880, there were 24,173,000 Roman Catholics; 4,026,000 Grecks and Armenians united with the Roman Church; 2,425,000 non-united Greeks and Armenians; 3,596,000 Protestants (Lutherans, Calvinists, Unitarians)—of whom over 3,100,000 are in the Hungarian section of the monarchy; 1,630,000 Jews. The Church of Rome has 11 archbishopries and 40 bishopries, and an army of secular priests. At the accession of Joseph II., there were 2024 convents; but at the end of the French war (1816), they have been reduced to 800. There are at present nearly 300 abbeys and above 500 convents in the empire.

Education, since 1849, is under the care of a minister of Public Worship and Instruction. As compared with other German

states, the education of A. presents some peculiarities. There is a greater prevalence of establishments where the pupils both live and receive instruction; also of schools for special callings. Instruction, again, whether high or low, is mostly gratuitous, or of trifling cost, being provided from general or local public funds. The government has recently made liberal allowance for elementary education. Another peculiarity is the sway of the clergy, both in schools and universities. The primary schools are, to a very large extent, in their hands. The number of elementary schools has increased greatly in recent times. The law enforces compulsory attendance at the 'Volks-schulen,' or national schools, of all children between the ages of six and twelve; and parents are liable to be punished for neglecting to send them. Hungary is still backward in elementary education. There are eight technical schools in the empire. The eight universities are at Vienna, Prague, Grätz, Innsbrück, Pesth, Cracow, Lemberg, and Czernowitz (the latter founded in 1875). The first four of these, ranking as German universities, had in 1872—

	Vienna.	Prague.	Gratz.	Innsbruck.
Professors and Teachers—				
Ordinary Professors,.....	68	48	40	41
Extraordinary Professors,..	38	22	10	7
Assistant Professors,.....	86	21	17	9
Teachers of Languages, &c.,	8	6	3	1
Total,	200	97	70	58
Students—				
Faculty of Theology,.....	198	207	103	197
" Jurisprudence,..	1304	640	312	104
" Philosophy,.....	697	265	143	148
" Medicine, ...	1383	500	292	79
Total Matriculated Students,	3564	1612	850	528
Non-Matriculated Students,	317	97	76	84
Total,	3881	1709	926	612

In 1875, Vienna had 3920 students; Prague, 1751; Pesth, 122 teachers and 1912 students; Cracow and Lemberg, the universities of Galicia, and the other Slavonian provinces, number 70 professors and 1800 students. There are also a large number of establishments where the pupils are received young, and educated and trained for special professions, for the army and navy, for the counting-house, for the mine and the farm, as accoucheurs, &c. There are besides a large number of institutes for the promotion of science and art. The fruits of this extensive educational system are not what might be expected, in consequence of the priestly and monarchical restrictions which hedge it round. The chief libraries are the Imperial and University libraries of Vienna. There are in the whole monarchy 755 newspapers and other periodical prints, of which fully the half are in German. Such of them as are political are fettered by conditions which render them quite worthless as organs of public opinion.

The *manufacturing industry* of A. is not yet adequately developed, but of late years has made great strides. The annual value of its manufactures—not including small trades—is estimated at 1200—1500 million florins, while that of its husbandry may reach 2500 millions. Bohemia takes the lead in this industry, then follow Austria proper, Moravia and Silesia, and Hungary. Vienna is the chief seat of manufacture for articles of luxury; Moravia, Silesia, and Bohemia for linen, woollen, and glass wares; Styria and Carinthia, for iron and steel wares. The chief manufactured articles of export are those of silk and wool; the only others of consequence are linen twist, glass wares, and cotton good. The yearly value of manufactured iron is about 54 million florins. The glass wares of Bohemia are of special excellence. The hemp and flax industry is one of the oldest and still most important. No branch of industry has risen more rapidly than that of cotton. The manufacture of silk is very extensive. The manufacture of tobacco is a state monopoly, and brings a revenue of nearly 60 million florins; the salt monopoly, 18 millions.

In respect of *commerce*, A. is most unfavorably situated. High mountains oppose great obstacles on all hands to communication, and separate the producing districts from the only sea that touches the empire; while the chief navigable rivers have their mouths in other countries. Much has been done to remedy these obstacles. Since 1809, a length of 20,000 miles of highways has been made. The great Alpine roads over the Stelvio Pass and the Semmering (q. v.) are among the most remarkable constructions of our times. More remarkable still are the railways over the Brenner Pass and the Semmering. The first railway in A. was a horse-railway, constructed in 1825—1832. The state, in 1841, resolved to undertake the construction of railways, and since then a great extent has been laid down. A tolerably complete network of railway now brings all places of importance into easy communication with each other. The total length of railways in the empire open for traffic in October 1881, was 11,550 English miles. The length of lines under construction was about 2000.

The length of the telegraph lines in the empire in 1881 was upwards of 30,000 English miles. The number of messages carried in 1880 was 8,370,000. In 1880, there were in A. proper 4025 post-offices; and in Hungary, 2300. The number of letters and packets passing through the post in 1880 in A. was 324,344,000; and in Hungary, 98,709,000.

River-communication received a great impulse from the introduction of steam. By means of the Danube Steam-company, formed in 1850, and a second company (1852) confined to tug-navigation, passengers and goods are now conveyed on the Danube between Ulm and Galatz, and on to Constantinople. The Austrian Danube Steam-company has a fleet of steamers plying on the Danube, the annual receipts from conveyance of goods being more than 7 million florins. This traffic would be vastly greater were the Lower Danube freed from the influence of Russia.

A great number of the political impediments to commerce have been removed or diminished. The customs-boundary that separated Hungary and the adjoining provinces from the rest of the empire, was done away in 1851, so that the whole was included in one customs-district, with the exception of Dalmatia, the free ports of Triest, Fiume, &c. These have been gradually incorporated with the rest of the empire; Triest ceased to be a free port in 1882. By the tariff of 1852, A. passed from a prohibitive to a protective system. No article is admitted duty-free; but absolute prohibition is confined to articles of state monopoly (salt, powder, and tobacco). But the foreign commerce of A. is nothing compared with that between the different provinces.

Between the years 1871 and 1881, the total imports were smallest in 1876 (£53,428,000), and highest in 1881 (£63,442,000); the exports smallest in 1872 (£38,796,000), and highest in 1881 (£71,579,000). The chief article of import is grain and pulse, the value of which amounted to £6,747,900 in 1880; the raw cotton imported was valued at £4,273,600; wool, £3,657,300; coffee, £2,780,100; tobacco, £2,770,200; and coal and coke, £2,242,400. The chief exports are grain and pulse, which amounted to £8,234,200 in 1880; sugar and molasses, £5,841,900; timber, £4,477,800; animals, except horses, £3,584,000; jewellery and fancy wares, £3,459,400; and wool, £2,648,300. Nearly two-thirds of the whole commerce of the empire is carried on with Germany. Its next best market is Turkey (it sends thither exports worth £5,000,000 a year, and imports thence a value of £3,000,000); next come Italy and Russia. The direct trade with Great Britain is comparatively small; the board of trade returns recognizing only the trade by way of the Austrian seaboard. Between 1870 and 1880, the imports from A. to Great Britain varied from £800,000 (1876) to £1,685,000 (1879); and the British exports direct to A. from £1,590,000 (1871), to £593,570 (1880). The total trade of the free port of Triest in 1881 was: imports, £15,720,000; exports, £13,433,000.

The chief harbors of A. are those of Istria—Triest, Rovigno, Pirano, Citta Nuova, &c.; of Croatia—Fiume, Buccari, Novi; of Dalmatia—Zara, Spalatro, Ragusa, Cattaro, Curzola, &c.

As to *form of government*, A. is a monarchy hereditary in the House of Hapsburg-Lothringen. In the case of the reigning family dying out, the states of Bohemia and of Hungary have the right of choosing a new king; but for the other crown-lands, the last sovereign appoints his own successor. The reigning House must profess the Roman Catholic faith.

Till 1848, Hungary and Transylvania had a constitution limiting the monarchy, which was absolute for the rest of the empire; though the several provinces had each its consultative council composed of clergy, nobles, and burghers. After the Revolution of 1848, and the subsequent reaction, all marks of independence of the separate provinces disappeared. The imperial constitution granted (*octroyirte*) March 4, 1849, as well as the provincial constitutions that followed, were abolished, and government was organized in the most absolute form by the imperial 'patent' or charter of December 31, 1851. The patent guaranteed to every religious body recognized by law protection in the observance of public ordinances, in the management of its own affairs, and in the possession of buildings and funds for the purpose of worship and instruction. The relation of the Roman Catholic Church to the state was put upon a new footing. It was no longer under the oversight of the secular authority, the *placetum regium* and church-patronage were abolished, ecclesiastical jurisdiction for discipline, and the independent administration of church-property, were conceded, and the intercourse of bishops and of all Catholics with Rome left free. The clergy had no longer to submit to examination or tests on the part of the state; they were nominated by the state, but only with the concurrence of the bishops, and without that concurrence they could not be deprived of their office. Along with all this, they obtained an overwhelming influence over education, even in the universities; and by the concordat signed in the early part of 1856, this influence was very greatly increased. The patent further guaranteed the equality in the eye of the law of all citizens, irrespective of nation, rank, or religion, and the liberation of the

land from all serfdom. Subsequent patents (e. g. for Hungary, Croatia, &c. in 1853) regulated the claims between existing proprietors and their vassals, and determined the indemnities due to the former for their seignorial rights.

But since the year 1867, Austria has been reconstructed as a two-fold empire, consisting of a German or 'Cisleithan' monarchy, and a Magyar or 'Transleithan' kingdom. The former is generally known as Austria proper, and the latter as Hungary. Each of the two countries has its own laws, parliament, ministers, and government; and the formal tie between them is a body known as the Delegations. These form a parliament of 120 members: the one-half is chosen by the legislature of German Austria, which is represented by it, and the other half represents Hungary. The person of the sovereign is another knot in the tie between the two members of the empire. The Magyars claim, under certain conditions, the right of freely electing their monarch. The Delegations have jurisdiction over all matters affecting the common interests of the two countries, especially foreign affairs, war, and finance; the ministries of which three departments are responsible for the discharge of the official functions to the Delegations, a committee of whom sits permanently. The acts of the Delegations require to be confirmed by the representative assemblies of their respective countries; and in this manner it is attempted to leave the self-government of both Austria proper and Hungary free.

The administration of Austria proper is divided at present among seven ministries—Public Education and Ecclesiastical Affairs, Agriculture, Finance, Interior, National Defence, Commerce, and Justice. Formerly the ministry was merely the collective organ of the emperor, and was responsible to him alone. But a bill passed by the Reichsrath in 1867, and sanctioned by the emperor, renders it responsible to that parliament of the western empire.

The Reichsrath consists of an upper and lower house. The upper house is constituted by princes, nobles, archbishops, bishops, and life members nominated by the emperor. The lower house numbers 353 members, elected by the 14 provincial diets of the empire in the following proportions: Bohemia, 92; Dalmatia, 9; Galicia, 63; Higher Austria, 17; Lower Austria, 37; Salzburg, 5; Styria, 23; Carinthia, 10; Carniola, 9; Bukowina, 9; Moravia, 36; Silesia, 10; Tyrol, 17; Vorarlberg, 3; Istria and Triest, 4. The members of the Reichsrath are elected in the Provincial Diets, and no one who is not a member of one of these is eligible to the wider sphere of legislation. The emperor nominates the Presidents and Vice-presidents of both houses. The rights claimed by the Reichsrath are: 1. *Consent* to all military laws; 2. *Co-operation* in legislature affecting trade and commerce, customs, banking, posting, telegraphs, and railways; 3. Examination of the estimates, and general control of the public debt. To give validity to bills passed by the Reichsrath, the consent of both chambers is required, as well as the sanction of the emperor.

The executive of Hungary is carried on in the name of 'the king' by a responsible ministry.

Finance.—The protracted wars of the first 15 years of the 19th c. had so exhausted the resources of A., and shattered her credit, that paper-money, after being already twice reduced, had again sunk 25 per cent. of its nominal value; and even 5 per cent. loans could only be obtained at a sacrifice of sometimes more than 50 per cent. During the 30 years that followed the war, much was done to restore the state credit, and 4 per cent. state paper was bought at par. The revolution of 1848 brought new difficulties, from which the finances had not recovered, when the Crimean war increased the expenditure; the war with Prussia and Italy in 1866 increased the public debt by about 300,000,000 florins, but on the other hand freed Austria from the Lombardo-Venetian debt of about 35,000,000 florins.

According to the budget of 1881, the receipts for the affairs common to the whole empire were £11,584,591; the expenditure £12,218,401. For Austria: receipts, £40,964,599; expenditure, £46,311,230. For Hungary: receipts, £26,441,471; expenditure, £28,718,009. For Croatia and Slavonia: the receipts £360,346, just balancing the expenditure. In all the other cases, there was a deficit. The common debt of the monarchy in 1881 was £41,199,906; for Austria, £333,459,949; for Hungary, £100,133,035.

*History.**—The nucleus around which this great empire has grown was that part of the Archduchy of A. that lies below the Ens. In the age of Charlemagne, about 800, the defence of the south-eastern frontier of Germany against Asiatic hordes gave rise here to a Margraviate, called the Eastern Mark or boundary of the empire, or Ostreich (Austria), the eastern government; which, being united in 1156 to the country above the Ens, was raised to a duchy. After coming, in 1282, into the possession of the House of Hapsburg (q. v.), it rapidly rose to a powerful state. The princes of that House extended their dominion by marriage, purchase, and otherwise, over a number of other states, and from 1438 held almost uninterruptedly the throne of the German empire. By the acquisition (1526 and 1527) of the crowns of Bohemia and Hungary, the House of A. rose to the rank of a European monarchy. In 1804, Francis declared himself hereditary Emperor of A., and, two years afterwards, laid down the title of Emperor of Germany and King of the Romans.

In the earliest times, what is now the Duchy of A. was inhabited by the Taurisci, a Celtic people; but their name subsequently disappeared before that of the Norici. After the conquest of the Norici by the Romans (14 B.C.), the country to the north of the Danube belonged to the kingdom of the Marcomanni (q. v.); on the south of the river lay the Roman provinces of Noricum and Pannonia, in which last was the municipal city of Vindobona (Vienna). Tyrol formed part of Rhætia. All these boundaries were swept away by the irruption of the northern peoples; and the regions in question were occupied in succession, during the 5th and 6th centuries, by Boii, Vandals, Goths, Huns, Lombards, and Avari. After the Lombards had settled in Italy, the Ens came, about 568, to be the boundary between a tribe of German origin and the Avari, a people who had penetrated thither from the east. The Avari having, in 788, crossed the Ens, and fallen upon Bavaria, then part of the Frankish empire, Charlemagne drove them back (796) as far as the Raab, and united the district from the Ens to that river with Germany, under the name of the East Mark, Marchia Orientalis, or Austria. He sent colonists, mostly Bavarians, into the new province, and appointed over it a margrave. It came into the possession of the Hungarians in 900, but was reconquered by Otto I. in 955, and reunited with Germany.

As margrave of the reconquered province, the emperor, in 983, appointed Leopold of Babenberg (q. v.), whose dynasty ruled A. for 260 years. Under Henry Jasomirgott (1141—1177), the Mark above the Ens was annexed to the Lower Mark, the united province raised to a duchy, and important privileges conferred on the newly named duke and his heirs. This Henry Jasomirgott took part in the second crusade; he also removed the ducal residence from Leopoldsberg to Vienna, now first called a city, and began the building of the cathedral of St. Stephen. Under his successors, numerous additions (Styria, Carniola) were made to the possesions of the House. Leopold VI. undertook numerous expeditions against the Hungarians and the infidels, and is reckoned the best of the Babenberg princes. The line became extinct with his successor, Frederic, who fell in battle with the Magyars (1246).

Then followed an interegnum from 1246 to 1282. The Emperor Frederic II. at first treated the duchy as a lapsed fief of the empire; shortly, claims were set up by Count Herman of Bavaria, who was married to a niece of the deceased margrave, Frederic; and when Herman died, and the empire was distracted by the contests between rival emperors, the States of A. and Styria chose Ottokar, son of the Bohemian king, as duke, who made good his nomination about 1260. Ottokar, refusing to acknowledge Rudolf of Hapsburg as emperor, was defeated, and lost his life and possessions, in the battle of Marchfield (1278); and the emperor shortly afterwards (1282) conferred the duchies of A., Styria and Carinthia on his son Albrecht.

The accession of the Hapsburg dynasty with Albrecht I. (q. v.) was the foundation of A.'s subsequent greatness. The despotic Albrecht contended successfully with Hungarians and Bavarians, but while attempting to subdue the Swiss, he was murdered near Rheinfelden (1308) by his nephew, John of Swabia, whom he had deprived of his hereditary possessions. Of his five sons, Frederic was chosen (1314) by a party to the imperial throne, but was defeated (1322) by his rival, Ludwig of Bavaria. Duke Leopold was defeated at Morgarten (1315) in his attempt to reduce the Swiss cantons that had thrown off their allegiance to Albrecht I. At last, by the death of his brothers, Albrecht II. reunited the Austrian possessions, increased by various additions. After his death (1358), two sons, Rudolf and Albrecht III., successively followed in the Duchy of Austria. Another son, Leopold, held the other lands, but lost his life at Sempach, in seeking to regain the Hapsburg possessions in Switzerland. The posterity of Albert and Leopold formed the two lines of A. and Styria. During Albrecht III.'s reign, Tyrol and other districts were ceded to Austria. After his death (1395), the dukedom was held by his son, Albrecht IV. Albrecht V., who succeeded his father in 1404, by marrying the daughter of the Emperor Sigismund, succeeded (1438) to the thrones of Hungary and Bohemia, and was at the same time raised to the dignity of German Emperor, as Albrecht II. With his death, in 1439, Bohemia and Hungary were for a time lost to the House of A., as were also, after a bloody struggle, the last of the family possessions in Switzerland. But the imperial dignity was henceforth uninterruptedly held by them. With Ladislaw, Albrecht's son, the Austrian line of the House closed (1457), and their possessions went to the Styrian line. Of this line was the Emperor Frederic III., who raised the dignity of his house by making A. an archduchy. After the death of Ladislaw and of his own brother, Albrecht, Frederic came into the undivided possession of the archduchy (1464).

* As the history of A. and its rulers involves, for many centuries, the main strand of the thread of European history, it is given at somewhat more than the usual length.

His son, Maximilian I., by marrying Maria, daughter of Charles the Bold, acquired (1477) the Netherlands. Becoming emperor on the death of his father (1493), he ceded the government of the Netherlands to his son Philip. Under Maximilian Tyrol fell again to the chief branch of the House of A., several districts were acquired from Bavaria, and fresh claims were established on Hungary and Bohemia. The court of Vienna began to be the seat of German art and science. The marriage of the emperor's son Philip with Johanna of Spain set the House of Hapsburg on the throne of Spain and the Indies. Philip died in 1506; and on the death of Maximilian I., in 1519, Philip's son, Charles I. of Spain, was elected German emperor as Charles V. (q. v.). Charles resigned by treaty all the German possessions, except the Netherlands, to his brother, Ferdinand I. (q. v.).

Ferdinand I. had married the sister of Lewis II. of Hungary; and on the death of the latter in the battle of Mohacz (1526), he claimed the kingdoms of Hungary and Bohemia, along with Moravia, Silesia, and Lausatia. His claim was contested by John Zapolya, who secured the aid of Sultan Soliman II.; and Ferdinand, after contests extending over twenty years, had finally to pay an annual tribute of 30,000 ducats to Soliman for possession of Lower Hungary. Ferdinand was also fain to surrender Würtemberg to Duke Ulrich (1534), on condition of its reverting to A. on the death of the male line. Nevertheless, the possessions of the House of A. (in the German line) were at this time already of the extent of 110,000 square miles. On the abdication of Charles V. (1556), Ferdinand succeeded to the imperial dignity; he died 1564, with the reputation of a good ruler, though he was strongly conservative of everything established, and introduced the Jesuits.

In the partition of the inheritance that took place among his three sons, the eldest, Maximilian II., received the imperial crown along with A., Hungary, and Bohemia; the second, Ferdinand, Tyrol and Upper A.; the third, Karl, Styria, Carinthia, &c. Maximilian was more fortunate in Hungary than his father. The death of Soliman before Szigeth (1566) led to a truce; he got his eldest son, Rudolf, crowned king of Hungary in 1572, and shortly after, of Bohemia, and also chosen king of Rome. But his attempt to bring the crown of Poland into his House failed. Maximilian II. was fond of peace, tolerant in religion, and a just ruler. He died 1576; and of his five sons, the eldest, Rudolf II., became emperor. Under him, the possessions of the Archduke Ferdinand of Tyrol, who had married Philippine Welser (q. v.), the beautiful daughter of an Augsburg burgher, reverted to the other two lines, Ferdinand's children not being considered noble. Rudolf II. adhered to the old feudal usages, and was a negligent sovereign, leaving everything to his ministers and the Jesuits. His war with the Porte and Transylvania brought him little credit; and the Protestants of Bohemia, oppressed by the Jesuits, extorted from him a charter of religious liberty. At last he was obliged, in 1608, to cede Hungary, and, in 1611, Bohemia and A., to his brother Matthias (q. v.). Matthias, who became emperor in 1612, concluded a 20 years' peace with the Turks, and ceded (1617 and 1618) Bohemia and Hungary to his cousin Ferdinand, son of the Archduke Karl of Styria, third son of Maximilian II. Matthias lived to see the outbreak of the Thirty Years' War (q. v.), and died March 20, 1619.

Bohemia refused to acknowledge his successor, Ferdinand II. (q. v.), to whom all the Austrian possessions had again reverted, and chose the Elector Palatine, Frederick V., the head of the Protestant union, as king. The states of A. and the Hungarians were also refractory. But the battle of Prague (1620) subjected Bohemia to Ferdinand; who formally set about rooting out Protestantism in that country and in Moravia, annulled their right of electing their king, and the patent of their religious freedom granted them by Rudolf II., and set up a Catholic reformation tribunal which drove thousands into exile. The emperor also succeeded in extorting acknowledgment of his sovereignty from the States of A., among which Protestantism predominated; after which Protestantism was rigorously prohibited. Hungary also was at last compelled to yield, which had revolted under the Prince of Transylvania. But this religious war and persecution cost the House of A. the life-blood of its possessions. Of 732 cities in Bohemia, only 130 were left; of 30,700 villages, only 6000; of 3 million inhabitants, only 780,000. Under Ferdinand's successor, the Emperor Ferdinand III. (1637—1657), A. continued to be a theater of war; and at the peace of Westphalia (1648), had to cede Alsace to France. Ferdinand III.'s son and successor, Leopold I., provoked the Hungarians to rebellion by his severity. Tekeli (q. v.) received aid from the Porte, and Kara Mustapha besieged Vienna (1683); which was rescued only by an army of Poles and Germans under John Sobieski hastening to its assistance. The emperor's generals now reduced the whole of Hungary, which was declared a hereditary kingdom in the male line (1687). Prince Eugene compelled the Porte (1699) to restore the country between the Danube and Theiss, and, in 1718, to cede other important provinces to Hungary. The struggle between Leopold and Louis XIV. of France for the heirship to the king of Spain, led to the war of the Spanish Succession (q. v.), during which Leopold died, May 5, 1705. He was of sluggish phlegmatic character, and wholly under the influence of the Jesuits.

His eldest son and successor, the enlightened Joseph I. (q. v.), continued the war. He died childless, April 17, 1711, and was succeeded by his brother, Karl VI. The peace of Utrecht concluded under his reign (1713) secured to A. the Netherlands, Milan, Mantua, Naples, and Sicily. The monarchy now embraced 190,000 square miles, with 29 million inhabitants, and had a revenue of 14 million florins, with an army of 130,000 men. Its strength, however, was soon much exhausted by fresh wars with France and Spain. At the peace of Vienna (1737), Karl VI. had to give up Naples and Sicily to Don Carlos of Spain, and part of Milan to the king of Sardinia; receiving only Parma and Piacenza instead. He also lost at the peace of Belgrade (1739) nearly all the fruits of Eugene's conquests, giving back to the Porte Belgrade, Servia, and the parts of Wallachia and Bosnia that had belonged to Austria. The emperor conceded all these points with the view of securing adhesion to the Pragmatic Sanction (q. v.), which conferred the succession on his daughter Maria Theresa.

With his death (October 20, 1740), the male line of the Hapsburgs was extinct, and Maria Theresa, who was married to Franz Stephan, Duke of Lorraine, assumed the government. But counter-claims were raised on all sides, and a violent war arose, in which England alone sided with Maria. Frederic II. of Prussia conquered Silesia. The Elector of Bavaria took the title of Archduke of A., was crowned king of Bohemia at Linz and Prague, and elected emperor as Karl VII. (1742). The Hungarians alone stood by their heroic queen; who, at the peace of Breslau (1742) was forced to yield Silesia to Prussia. Frederic renewed the war by coming to the assistance of the emperor; but Karl dying (1745), Maria Theresa's husband was elected German emperor as Franz I. A second treaty of peace (1745) secured Silesia anew to Prussia; and at the peace of Aix-la-chapelle (1748), A. had to cede Parma, Piacenza, and Guastalla to Don Philip of Spain, and several districts of Milan to Sardinia. These sacrifices secured the existence of the Austrian monarchy; but Maria Theresa wished to recover Silesia, and with this view, entered into alliance with France, Russia, Saxony, and Sweden; but after a bloody Seven Years' War (q. v.), Prussia retained Silesia, and A. had spent her blood and treasure in vain. At this time, paper-money first appeared in A., under the name of state-bonds. At Franz's death (1765), his son, Joseph II., became German emperor, and joint-regent with his mother of the hereditary states. Collateral branches of the House of A. were planted by the younger sons of Maria Theresa, the Archduke Leopold in Tuscany, and the Archduke Ferdinand, who married the heiress of Este (see MODENA). In the first partition of Poland (1772), A. acquired Galicia and Lodomeria, and the Bukowina was ceded by the Porte in 1777. At the death of the empress in 1780, the monarchy had an extent of 234,000 square miles, with a pop. of 24 millions, and a debt of 160 million florins. The administration of Maria Theresa was distinguished by unwonted unity and vigor, both in home and foreign relations.

Her successor, Joseph II., was an active reformer in the spirit of the enlightened despotism of the times; though often rash and violent in his mode of proceeding. He introduced economy into every department, remodelled the censorship of the press, granted liberties and rights to Protestants, abolished 900 convents, and revised the school-system. His protective system of duties, though exhiting his narrowness as a statesman, gave a start to native manufactures. But his reforming zeal and passion for uniformity excited opposition; the Netherlands rose in insurrection, and other disturbances broke out, which hastened his end (1790). He was succeeded in the government by his brother, the Grand Duke of Tuscany—as German emperor, Leopold II.—who succeeded in pacifying the Netherlands and Hungary. Peace was concluded with Prussia and Turkey (1790). The fate of his sister, Marie Antoinette, and her husband, Louis XVI., led Leopold to an alliance with Prussia; but he died (March 1, 1792) before the war with France broke out. The war was declared by France on his son Franz II., the same year (see FRANCE). By the treaty of Campo Formio (q. v.), 1797, A. lost Lombardy and the Netherlands, receiving in lieu the Venetian territory; two years later, at the second partition of Poland, it was augmented by West Galicia. Franz, in alliance with Russia, renewed the war with France in 1799, which was ended by the peace of Luneville. It is needless to follow all the alterations of boundary that the Austrian dominions underwent during these wars. The most serions was at the peace of Vienna (1809), which cost A. 42,000 square miles of territory, and 11 million florins of her revenue. It was in 1804, when Napoleon had been proclaimed Emperor of France, that Franz declared himself hereditary Emperor of Austria, uniting all his dominions in one empire. On the establishment of the Confederation of the Rhine, he laid down the dignity of German emperor, which his family had held for nearly five hundred years, and now took the title of Franz I., Emperor of Austria.

The humiliating peace of Vienna was followed (1809) by the marriage of Napoleon with the Archduchess Maria Louisa; and in March 1812, Napoleon and Franz entered into alliance against Russia. But when the Russian campaign of 1812 had broken the power of the French emperor, his father-in-law declared war on him (August 1813), and joined the alliance of England, Russia, Prussia, and Sweden. The active part which the Emperor Franz now took in the downfall of Napoleon, his consenting to the banishment of his son-in-law to Elba, and the firmness with which he signed the declaration of outlawry against him on his return from France, and contributed to his final overthrow, thus deciding the fortunes of his own daughter and her son—all furnished grounds of claim to that full indemnity for her losses which A. obtained at the close of the war. In the remodelling of the map of Europe that took place in the Congress of Vienna (1815) 32,000 square miles were added to the 253,000 possessed by A. after the last partition of Poland, besides the advantages she gained in point of compactness, and facilities for trade, especially by the acquisition of Venice and Dalmatia. Ferdinand, the emperor's uncle was also restored to the grand duchy of Tuscany, of which he had been dispossessed by Napoleon.

After that time, A. exerted a powerful influence in European politics generally, and more especially in the German Confederation; and that influence was uniformly hostile to constitutionalism (see METTERNICH). When the Polish revolution broke out, a strict neutrality was assumed; but a Polish corps that was driven into the Austrian territories was disarmed, and sent into Hungary, while a Russian division that had taken refuge on Austrian soil was let go, and equipped with the Polish weapons.

The death of Franz I. (March 2, 1832) made little alteration in the policy of A.; Ferdinand I. trod in his father's footsteps. The political alliance with Russia and Prussia was drawn closer by a personal conference of the emperor with Nicolas I. and Frederick William III. at Teplitz, October 1833. The wonted calm was interrupted in 1840 by the war against Ibrahim Pacha in Syria, in which A. took part in union with England. An attempt at insurrection in Italy in 1844 was a complete failure.

But under this long-continued peace and superficial calm, the internal condition of the empire was coming to a crisis. The stifling bureaucratic system of government and police supervision, had produced only irritation and discontent, and was powerless to compress the fermentation. The opposition in the several nationalities became stronger and stronger, and the tactics of playing these nationalities off against one another, no longer succeeded. The Polish insurrection, which led to the incorporation of Cracow with the monarchy (November 1846), had turned into a frightful rising of the peasantry in Galicia against the nobles. This enabled the government to overpower the political rising; but the success only increased the danger of the crisis, by encouraging it to proceed in the old reckless way. In the meantime the opposition to Austrian rule in Italy, Hungary, and Bohemia, was becoming uncontrollable, and even the states of Lower Austria insisted on some control in the management of the state.

The revolutionary movement was already in full swing in Italy, when the fall of Louis-Philippe (February 24, 1848) shook Europe to its foundations. A host of petitions and addresses was followed, March 13, by a popular movement in Vienna, to which the government and military, after a feeble resistance, succumbed. Metternich resigned, the arming of the citizens and freedom of the press were granted, and the emperor promised to convoke a consultative assembly from all parts of the empire. At the same time, the opposition in Hungary had carried their demand for an independent ministry responsible to the national diet, and the emperor was not in a position to withstand it. The 22d of March saw the insurrection break out at Milan, and Radetzky, the military commander, forced to retire on Verona. Venice rose at the same time, and drove out the Austrians.

While the revolution was thus victorious in the provinces, the central authority was in a state of dissolution. The authority passed into the hands of the national guards and the students' legion (the *Aula*). A rising of the people (May 15), in support of the Central Committee, formed from the national guards, which the government had attempted to dissolve, compelled its continuance, and also a revision of the electoral law, so as to convert the new diet into a constituent assembly. These proceedings led to the flight of the court to Innsbruck (May 17). An unsuccessful attempt of the government to break the power of the 'Aula,' resulted in the appointment of a Committee of Safety, to whose influence the government had to submit. A Slavic insurrection broke out in Prague after Easter, which was repressed with bloody severity by Prince Windischgrätz. While the emperor was thus lingering at Innsbruck, leaving Vienna in the power of the populace, and the Hungarians were pursuing an independent course, it was in Italy that the power of A. began to recover itself.

Radetzky had at first been reduced to the maintaining of a defensive position at Verona, against Charles Albert of Sardinia, who had declared war on A. at the outbreak of the revolution, and the forces that came to his aid from Tuscany, Rome, and Naples; and the foreign policy of A. was in such a state of discouragement, that negotiations were entered into under the mediation of Great Britain, offering the Lombards independence on moderate conditions. But in June, Radetzky took up the offensive, reduced in succession Vicenza, Padua, and other cities, and then turning against the chief Sardinian force, defeated it at Custozza (25th July), and drove it from the field. The fruits of the victory were the dissolution of Charles Albert's army, and a truce which again delivered Lombardy to Austria.

In the meantime, the government at Vienna was more powerless than ever. The emperor remained at Innsbruck, and the constituent diet was opened, July 22, by the Archduke John, as his representative. But a new crisis was ripening in Hungary. The Croats, under their Ban, Jellachich (q. v.) opposed the predominance of the Magyars, and refused obedience to the Hungarian government, which, under the Batthyanyi-Kossuth ministry, was pursuing a policy almost independent of Austria. Jellachich's resistance was officially condemned by the emperor, and he was threatened with deposition; but, as subsequently appeared, his conduct was secretly approved by the court. The Archduke Palatine, Stephen, now left Hungary, after a last attempt at conciliation; and the emperor, who had returned to Vienna after repeated invitations, named Count Lamberg commissioner, with the supreme command in Hungary. Lamberg, however, was murdered on the bridge of Pesth (September 28). The Hungarian parliament was now dissolved, and the command given to Jellachich. But the parliament continued its sittings, and appointed Kossuth president of the committee of defence. When the imperial troops now began to march against Hungary, a frightful insurrection broke out in Vienna (October 6), which was attributed to Hungarian instigation. The arsenal was stormed, and the war-minister, Latour, murdered; the court fled to Olmütz, a committee of safety was appointed, the armed populace organized, and the Polish general, Bem, put at the head of military affairs; while the diet wavered between loyalty and revolution. In the meantime, the military forces had withdrawn, and joined Jellachich, in order to prevent the Hungarians coming to the aid of the Viennese. Windischgrätz now approached with an army, and declared Vienna in a state of siege. The attack began on the 23d of October, and after a resistance of 8 days, Vienna surrendered.

Severe measures were then taken; and a number of leaders, among others, Robert Blum (q. v.), were condemned and shot. The diet now met at Kremsir, and a new ministry was formed, into which Prince Schwarzenberg, Count Stadion, Bach, Bruck, and others entered. But the vigorous policy thought to be necessary for the restoration, and advocated by the Archduchess Sophia, was not responded to by the easy nature of Ferdinand I. Accordingly, the emperor abdicated, December 2, as did also the Archduke Franz Karl, and the latter's son, Franz Joseph (q. v.), was declared emperor.

In winter, Windischgrätz entered Hungary, and began the Hungarian war. After the encounters at Raab and Babolna, Ofen was besieged (January 1849), and the Hungarians retired beyond the Theiss, and had time to organize themselves under such able leaders as Görgei and Klapka, and to prepare for the struggle of the following summer.

In the meantime, important events took place elsewhere. In March (21—23), Radetzky made his rapid and decisive campaign, which, by the victory of Novara, led to the abdication of Charles Albert, and an indemnification for war expenses from Sardinia of 15 million lire. With the surrender of Venice, which took place in August, the subjugation of Italy was complete.

At Kremsir, the diet proving intractable, was dissolved, March 4, 1849; and a constitution was granted (*octroyirt*), with two elective chambers, responsible ministers, and other constitutional provisions. In the National Assembly at Frankfurt, A. opposed the project of a confederated state under the leadership of Prussia, and managed to thwart the conferring of the empire of Germany on the Prussian king (March 1849).

In Hungary, the Magyars, though the Germans and Slaves within the country itself were hostile to them, began the campaign with decided success. Bem conquered Transylvania in spite of Russian aid; and the rest of the Hungarian army advancing westward in spring, were successful against the imperial forces at Szolnok and Waitzen. Windischgrätz was replaced in command by Welden, but the imperial cause was not improved. Kossuth's hopes rising he proclaimed the deposition of the House of Hapsburg, and virtually made Hungary a republic. By May, Pesth and Ofen were again in the hands of the Magyars; and although General Welden was recalled, and the command given to Haynau, there was little prospect of success against the Magyars, if a treaty with the czar had not brought the aid of a Russian army under Paskewitsch. The Austrians still suffered several reverses, and the Hungarians performed splendid feats of arms, such as Görgei's victory at Watzen, and Klapka's sally from

Komorn; but from June, the war on the whole began to be more favorable to A., whose forces were well managed by Haynau and Jellachich; and the intervention of the Russian's brought an irresistible weight of numbers against the Magyars. After the affairs of Szegedin and Debreczin, Haynau's engagements on the Theiss, and the raising of the siege of Temeswar, it was in vain that Kossuth transferred the dictatorship to Görgei. Görgei, whether from treachery, as the other Magyar leaders maintain, or from necessity, as he himself avers, laid down his arms to the Russians at Vilagos (August 13). The surrender of Komorn, in Semptember, completed the subjugation of Hungary, which was treated as a conquered country, and the officers taken in Arad were dealt with by Haynau with a blood-thirsty rigor.

A. was now free to attend to politics, internal and external, and the spirit of the restoration soon showed itself. One important fruit of the revolution was retained—the liberation of the soil from the burdens and trammels of feudalism. All other liberal concessions very soon disappeared. For a time, the forms of the constitution of March 1849 were retained; but the rigorous military government and the surveillance exercised over the press, showed the tendency of things. The fundamental principles of the constitution turned out to the profit only of the Catholic Church, which got rid of the placetum regium. In the beginning of 1851, Schmerling and Bruck, the liberal element of the ministry, retired; and in August appeared a number of imperial decrees rendering the ministers accountable to the emperor alone. At last, January 1, 1852, it was announced that the constitution and the fundamental rights were abolished, trial by jury set aside, the old press law revived, &c. This was followed by still greater concessions of influence to the clergy. The emperor did not conceal his predilection for absolute military government. All this was not effected without manifestations of discontent. The fires of revolution were still smouldering in Hungary and Italy; and in Lombardy, though still under strict military law, a tumult broke out, February 1853, in which a number of officers and soldiers were stabbed. The finances, too, notwithstanding vigorous measures for improving the material resources of the country, continued in a bad state, so that incessant loans were required to cover the current deficit.

On the confused arena of German politics, the struggle for ascendency was kept up between A. and Prussia. In October 1850, the two powers were armed and ready to come to blows; but the bold and determined policy of Schwartzenberg prevailed, and Prussia gave way. The points in dispute it might be difficult for any but a German to understand, even if it were worth trying. See GERMANY, HESSE-CASSEL. The result was that Prussia's scheme of a union was given up, and also A.'s admission with all her territories into the German Confederation; and in 1851, the old diet was restored. After the death of Schwartzenberg, the foreign policy of A. was more conciliatory, and her interference in German affairs less dictatorial. Prussia and A., after December 1852, were more friendly, on the whole, though the war in Italy gave rise to considerable ill-feeling between the two powers. In February 1853, a commercial treaty was concluded, which was of the utmost consequence to the prosperity of A., as removing a great part of the obstructions to her commerce with the rest of Germany.

In 1853, a difference took place between A. and Turkey, which formed, as it were, a prelude to the war in the Crimea. In the quarrel between the Montenegrines and the Porte, A. took the part of the Montenegrines; she had also complaints as to the infringement of rights possessed by her on the Adriatic coast, and regarding the treatment of Christians in Turkey. The threatening mission of Count Leiningen, February 1853, procurred redress of these grievances. As if following up this movement, Russia came forward as the special protector of the Greek Christians of the Ottoman empire, and made demands on the Porte which were held inconsistent with his sovereign rights. It was the interest of A., as well as of the rest of Europe, to maintain the integrity of the Ottoman empire; but although she united with England and France in endeavoring to settle the question by negotiation, when the war broke out, her peculiar relations to Russia led her to remain neutral during the contest.

The conduct of A. in Italy, especially after 1849, was such as to make that country a 'standing menace to Europe.' The government of A. in that portion of Italy of which she obtained possession by the treaty of 1815, was far from satisfactory; but what was chiefly complained of by the other powers was her interference in the affairs of the independent states of the peninsula. By means of secret treaties (copies of which were laid before the British Houses of Parliament this year, 1859), A. obtained a most undue influence in Parma, Tuscany, Modena, the States of the Church, and in the kingdom of the Two Sicilies. That influence was of course exercised in the interests of despotism, and in opposition to the welfare of the people, whose wishes their rulers, backed by Austrian troops, were enabled to set at defiance. The position of A. in Italy was canvassed at the meetings which followed the signing of the treaty of peace at Paris in 1856, but nothing resulted from the discussions. Sardinia seeing herself gradually environed by, and afraid to fall a victim to the prevailing Austrianism, after all remonstrances of a peaceful kind had failed, began to arm. A. demanded her immediate disarmament, on pain of war; but Sardinia, whose army was swelled with volunteers from every part of the peninsula, and who had previously entered into a treaty, offensive and defensive, with France, refused. A. accordingly commenced hostilities by crossing the Ticino on the 29th of April 1859. On the 3d May, France, as the ally of Sardinia, formally declared war against A.; but in anticipation of what was to follow, she had several days before despatched troops into Piedmont. The Austrian troops were beaten in every engagement that followed, and so effectually, that on the 6th July, the emperor, who latterly had taken the chief command of his army, was fain to conclude an armistice with the Emperor Napoleon, who also commanded in person. On the 12th of the same month, the two potentates met at Villafranca, and agreed to come to terms of peace, the chief conditions of which were to be the cession of Lombardy to Sardinia. See ITALY. In 1866, a short and bloody war occurred between A. on the one hand, and Italy and Prussia on the other (see GERMANY), issuing in the cession of Venice to Italy, and the dual reorganization of the empire as described above. Since then, the Slavonic Bohemians have continued to struggle in vain for the separate crown rights of their ancient kingdom. The part taken by the government in the Russo-Turkish war of 1877–78, which led to the occupation of Bosnia and Herzegovina, provoked very bitter feeling in the Hungarian section of the empire.

AUTEUIL, formerly a country village at the entrance of the Bois de Boulogne, now inclosed within the fortifications of Paris. It is known as the residence of famous literary men—such as Boileau and Molière.

AUTHE'NTIC (Gr.) is a term applied to any writing or document, the contents of which may be depended upon for their truth or accuracy. It is frequently employed as synonymous with *genuine*, though a distinction has been drawn, especially by biblical critics, between the two words. *Authenticity*, it is said, refers to the statements made by an author; *genuineness*, to the authorship itself. Thus, we speak of a *History of England* as *A.*, when the narrative is admitted to be correct; and we say of such and such a gospel or epistle that it is *genuine*, when we are convinced that it is the composition of the writer to whom it is attributed. See Bishop Watson's *Apology for the Bible*, and Dean Trench's *Study of Words*. Unfortunately, however, for the value of the distinction, some authors use the words precisely in the converse way, calling that *authentic* which Bishop Watson called *genuine*.

AU'TO, entering into many compound scientific terms of Greek extraction, is the Greek pronoun *self*. In some compounds, it denotes the agent or subject, as in *autocrat, automaton, autonomy;* in others the object, as in *autobiography, autocritic, autodidactic;* in others, again, a mere reference to the subject, as in *autochthonous*. This variation in the grammatical relation of *A.* sometimes occasions ambiguity in the meaning of the compound. Thus, *autograph* means both a machine that writes of itself, and also a writing done with the person's own hand; *autocracy*, both the mastery over one's self, and the sole rule or absolute authority over a people or state.

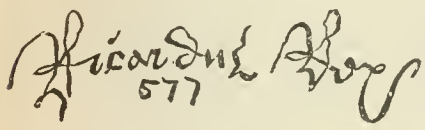
AUTO'CRACY (Gr. *self-mastery*, or *sole mastery*) signifies that form of government in which the sovereign unites in himself the legislative and the executive powers of the state, and thus rules uncontrolled. Such a sovereign is therefore called an autocrat. Nearly all eastern governments are of this form. Among European rulers, the Emperor of Russia alone bears the title of Autocrat, thus signifying his constitutional absoluteness.—Kant used the word *A.*, in philosophy, to denote the mastery of the reason over the rebellious propensities.

AU'TO DA FÉ (Port. Act of Faith) was the name given to the procession or ceremony that used to take place in Spain and Portugal at the execution of heretics condemned to death by the inquisition. It was generally held on a Sunday between Witsunday and Advent, very often on All-saints Day. At dawn, the dismal tolling of the great bell of the high church gave the signal to begin the drama of the day; for as such it was looked upon by the people, who thronged to it in troops, believing that they did a good work in merely looking on. Men of the highest rank reckoned it prudent to give their countenance to the 'holy' tribunal at these processions, and even grandees of Castile did not disdain to make themselves familiars of the inquisition.

The procession was led by the Dominicans, carrying the flag of the inquisition; next followed the penitents, on whom only penance had been laid; behind them, and separated by a great cross which was borne before, came those condemned to death—barefoot, clad in the sanbenito, and with a pointed cap on the head; then, effigies of the fugitives; and lastly, the bones of dead culprits, in black coffins painted with flames and hellish symbols. The frightful train was closed by the army of priests and monks.

The procession went through the principal streets to the church, where, after a sermon on the true faith, the sentence was announced. In the meantime, the accused stood before a crucifix with extinguished torches in their hands. After the sentence had been read to them, an officer of the inquisition gave each of the condemned a blow on the breast with his hand, as a sign that they were given over by that tribunal to the secular power; on which a secular officer took them in charge, had them fettered, and taken to prison. A few hours afterwards, they were brought to the place of execution. If they yet, at the last, made profession of the Catholic faith, they were so far favored as to be first strangled; otherwise, they were burned alive, and with them the effigies and bones of the fugitive and dead culprits. As a rule, the king, along with his whole court, had to exalt by his presence the solemnity of the horrid transaction. The most splendid Auto da Fé took place at Madrid, under Charles II., in 1680; the last was held as recently as towards the middle of last century.

AU'TOGRAPH (Gr.) is a term applied to what is written with the person's own hand, and not by an amanuensis. In relation to manuscripts, it is used in opposition to a *copy*. The collection of autographs has, especially in recent times, become an object of eager pursuit, and consequently they form a branch of literary trade. Their value is determined by the interest felt in the writer, the scarcity of such relics of him, and the contents of the writing. Besides portraits of famous persons, we wish, particularly in the case of distinguished contemporaries, to possess the specimen of their handwriting, or at least their signature, as the peculiarity of the style—the physiognomy of the handwriting—completes our knowledge of their personalty. Lithography is particularly serviceable in this matter, not only by supplying fac-similes for biographical and historical works and for portraits, but also by multiplying impressions of collateral autographs, such as have appeared in England by Smith, in Holland by Nathan, and in Germany by Dorow. But deserving mention before all others are the *Isographie des Hommes Célebres* (3 vols. Par. 1828—1830), to which a supplement appeared in 1839; the collection of French autographs by Delpech (1832), and of German ones by Schlodtmann (3d ed. 1860). There have been works published containing the sign-manuals of distinguished musicians, of the great poets, &c. The autographs of most of the English sovereigns are in Nichol's *Autographs*. See Fontaine, *Manuel de l'Amateur d'Autographes* (1836); and Günther and Schulz, *Handbuch für Autographensammler* (1856). Charavay began in 1862 a periodical called *L'Amateur d'Autographes*.



Signature of Richard III. (Ricardus Rex).
From the Paston Letters.

AUTO'LYCUS, a Greek astronomer and mathematician of Pitane in Æolia, about 330 B.C., wrote on the Revolving Sphere, and on the Rising and Setting of the Fixed Stars. Both works, printed in Dasypodius's *Propositiones Doctrinæ Sphericæ* (Strasb. 1572), contain, for the most part, only such propositions of spherical astronomy as can be solved by means of a globe; and, instead of presupposing the knowledge of spherical trigonometry, they seem rather to prove that A. himself was unacquainted with it.

AUTO'MATON is derived from two Greek words signifying self-movement, and is usually applied to machinery constructed to represent human or animal actions. The construction of automata has occupied the attention of mankind from very early ages. Archytas of Tarentum is reported, so long ago as 400 B.C., to have made a pigeon that could fly. Albertus Magnus and Roger Bacon, in the 13th c., are said—but there is some dubiety about the matter—to have made respectively a porter to open the door, and a speaking head. In France, in the beginning of the 18th c., many persons busied themselves in the construction of automata; and among other things, a pantomime, in five acts, was represented by actors moved by machinery. The most perfect A. about which there is absolute certainty, was one constructed by M. Vaucanson, and exhibited in Paris in 1738. It represented a flute-player, which placed its lips against the instrument, and produced the notes with its fingers in precisely the same manner as a human being does. In 1741, M. Vaucanson made a flageolet-player, which with one hand beat a tambourine; and in the same year he produced a duck. This was a most ingenious contrivance, the mechanical duck being made to conduct itself in every respect like its animated pattern. It swam, dived, ate, drank, dressed its wings, &c., as naturally as its live companions; and, most wonderful of all, by means of a solution in the stomach, it was actually made to digest its food! An A., produced by M. Droz, drew likenesses of public characters; and, some years ago, Mr. Faber contrived a figure, exhibited in various places, Edinburgh among others, which by means of certain keys, was made to articulate simple words and sentences very intelligibly, but the effect was not pleasant. The chess-player of Kempelen was long regarded as the most wonderful of automata. It represented a Turk of the natural size, dressed in the national costume, and seated behind a box resembling a chest of drawers in shape. Before the game commenced, the artist opened several doors in the chest, which revealed a large number of pulleys, wheels, cylinders, springs, &c. The chessmen were produced from a long drawer, as was also a cushion for the figure to rest its arm upon. The A. not being able to speak, signified when the queen of his antagonist was in danger by two nods, and when the king was in check by three. The A. succeeded in beating most of the players with whom it engaged; but it turned out afterwards that a cripple Russian officer—a very celebrated chess-player—was concealed in the interior of the figure. The figure is said to have been constructed for the purpose of effecting the officer's escape out of Russia, where his life was forfeited. So far as the mental process was concerned, the chess-player was not, therefore, an A.; but great ingenuity was evinced in its movement of the pieces (see *Chambers's Journal*, vol. xii., p. 66). M. Houdin, the celebrated conjurer, was the inventor of some striking automata.—See Hutton's *Mathematical Recreations; Memoirs of Robert Houdin*. Lond. 1859. Chapman and Hall.

AUTO'NOMY (Gr. *self-legislation*) is the arrangement by which the citizens of a state manage their own legislation and government; and this evidently may, with certain restrictions, be the case also within limited bodies of the same people, such as parishes, corporations, religious sects. The term A. is used to designate the characteristic of the political condition of ancient Greece, where every city or town community claimed the right of independent sovereign action. The idea of two or more town communities sinking their individual independence, and forming the larger aggregate unity which we understand by a state, seems to have been intolerable to the Greek mind.

AU'TOTYPE, one of the names given to a peculiar kind of photographic print. Gelatine, to which bichromate of potash has been added, has the property of being, like paper treated with certain salts of silver, sensitive to light, but in a different way. Light renders the bichromated gelatine insoluble, so that by the use of an ordinary photographic negative, we can produce a picture on the gelatine by exposure to light, as in the ordinary photographic printing process (see PHOTOGRAPHY). The picture so obtained is developed by removing with hot water those portions of the gelatine which have not been acted upon. Two groups of processes are founded on this property of bichromated gelatine. In the one, the gelatine is used for every copy of the picture; while in the other, it is only used to produce one picture, which is then made by various devices to serve as a printing matrix for throwing off by mechanical means, many impressions. What is called carbon-printing comes into the first group, and an autotype is one kind of a carbon print. It is produced by simply mixing carbon or other pigment with bichromated gelatine, coating a sheet of paper with the mixture, and then exposing it to light under a negative as above described. When no pigment is used, the picture is merely in relief and depression, but the addition of carbon gives it ordinary light and shade, so as to resemble a print in ink. There are, however, some niceties in the manipulation, which we have not room to detail.

In those processes where the gelatine picture serves only as a matrix, electrotypes, impressions in soft metal, or other kind of reverses, are made, from which impressions can be taken mechanically, in any kind of printing-ink. Photo-galvanography and the Woodburytype belong to this group.

AUTUN (Bibracte, Augustodunum), a town in France, department of the Saône-et-Loire, in the Burgundian district of Autunois. Pop. (1876) 11,358. It is situated on the river Arroux, is the seat of a bishop, and has a fine cathedral. Cloth, carpets, leather, stockings, and paper are manufactured in the place.—The ancient Bibracte was the chief city of the Ædui, and had a much frequented Druid school; and at a later period, under the Romans, when it got the name of Augustodunum, it was no less famous for its school of rhetoric. A. was pillaged by the Saracens in 725, and nearly destroyed by the Normans in 888. There still exist at A. many ruins of Roman temples, gates, triumphal arches, and other antiquities. At the Council of A. (1094), King Philip I. was excommunicated for divorcing his queen, Bertha.

AUVERGNE, a southern central district of France, was before the revolution a separate province, composing almost exclusively the modern departments of Cantal and Puy-de-Dôme. Between the Allier and the upper course of the Dordogne and the Lot, A. rises into a highland region, having Bourbonnais, Limousin, and Rouergue, as terraces of descent into the western plains, while on the east it joins the Cevennes and the southern highlands. Not only do the cone and dome-like shapes of the summits betray a volcanic formation, but also the great masses of basalt and trachyte that break through the crust of granite and gneiss, render it probable that this was a chief focus of plutonic action. Among the summits that have apparently been at one time volcanoes, the most

remarkable are Cantal (6093), Mont-d'Or (6188), Puy-de-Dôme (4806), and Pariou; the latter, adjoining Puy-de-Dôme, is basin-shaped on the top, and one of the finest specimens of an ancient and extinct volcano: all are now covered with verdure. A. falls naturally into two divisions—Upper A., to the south, and Lower A., to the north; in which last the valley of Limagne, on the left bank of the Allier, is distinguished for extraordinary fertility. The climate is colder in the mountainous districts than the southern position, with a less elevation, would lead us to expect, and is remarkable for furious winds and violent thunder-storms; but in the deep valleys the heat of summer is often oppressive. The lava-covered plateaus are desert, but the pulverized volcanic earths that cover the slopes and valleys form a rich and fruitful soil, as is shown by the crops of grain, garden produce, fine fruits, wine, abundance of chestnuts in the south, and of walnuts in the north, as well as by extensive thriving forests, along with flax and hemp fields and meadow-lands, in the poorer districts. Agriculture is in a rather neglected condition; but the breeding of cattle, especially of mules, is well managed. A. produces iron, lead, copper, antimony, and coal, and is rich in mineral springs.

The Auvergnese are a highland people, rude in their manners, poor, ignorant, at the same time honest and kind, though not free from the propensity to revenge. They live by cattle-keeping and agriculture, and by going to Paris as laborers. Domestic manufactures, therefore, remain confined to weaving, tanning, and paper-making. A. has, however, produced distinguished men. It was the native place of statesmen and warriors of the 15th and 16th centuries; and also of the Arnauld (q. v.) family, so distinguished in the history of Port Royal and Jansenism. In more recent times, Lafayette and Polignac may be named. Chief towns, Clermont and Aurillac (q. v.). The country derived its name from the Averni, who long defended their fastnesses against Cæsar, as later against the Goths, Burgundians, and Franks, with whom they at last coalesced.

AUXERRE (anc. *Autissiodorum*), chief town of the dep. of Yonne, France, stands on the Yonne, 90 miles S.E. of Paris. It is situated on the slope of a hill, in a rich and beautiful district abounding in vineyards. The city is mostly ill built; but its aspect from a distance is very imposing, the most prominent feature being the cathedral church of St. Stephen, which dates partly from the 13th c. The chapter of A. was once one of the richest in France. The churches of St. Germain and of St. Pierre (16th c.) are fine and interesting buildings. There is a curious old clock-tower over a gate-house, with an ugly skeleton spire of iron bars. The ancient walls of the city have been converted into boulevards. A. was a flourishing town before the Roman invasion of Gaul. It successfully resisted the Huns under Attila, who only ravaged its suburbs. Clovis took it from the Romans. After his death it became part of the kingdom of Burgundy. The English took it in 1359, but it was retaken by Du Guesclin. Charles VII. gave it up to the Duke of Burgundy. It was finally united to the kingdom of France by Louis XI. The principal manufactures are of strings for musical instruments, woollen cloths, hosiery, earthenware, and leather Pop (1876) 15,656.

AUXI'LIARY SCREW. See SCREW-PROPELLER.

AUXI'LIARY VERBS. See VERBS, CONJUGATION.

AUXONNE (*Assonium, Ad Sonam*, 'near the Saône'), a French town on the left bank of the Saône, 20 miles S.E. of Dijon. It is a fortress of the second class. Pop. 5000.

AVA, a ruined city of Burmah, of which it has repeatedly been the capital, the honor having been transferred again and again between it and Monchobo, Sagaing, Amarapura, and Mandalay, the present capital. It stands in lat. 21° 51′ N., long. 95° 58′ E., on the bank of the Irawaddy, here about 4000 feet broad. The river at this point receives two affluents, and these being joined by a canal, the city is rendered circumnavigable. The name is a Hindu and Malay corruption of Aengwa or Aaen-ua, meaning *fish-pond*, given it from being built where there were formerly fish-ponds, of which some still remain; but in official documents it is designated as Ratnapura, i. e., City of Pearls. The city, which was 8 or 10 miles in circumference, was surrounded by walls and ditches. A. is now almost a desert, having been reduced to ruins by an earthquake in 1839.—On the opposite bank stands Sagaing, which has twice been the seat of government. The united pop. of the three cities of Ava, Sagaing, and Amarapura was at one time estimated at 400,000.

A'VA, ARVA, YAVA, or KAVA (*Macropiper methysticum*), a plant of the natural order *Piperaceæ* (q. v.), possessing narcotic properties. Until recently, it was ranked in the genus *Piper* (Pepper). It is a shrubby plant, with heart-shaped, acuminate leaves, and very short, solitary, axillary spikes of flowers. It is a native of many of the South-sea islands, where the inhabitants intoxicate themselves with a fermented liquor prepared from its root or (more accurately) rhizome. The rhizome is thick, woody, rugged, and aromatic. A tincture of it is useful in chronic rheumatisms. The intoxicating liquor is prepared by macerating it in water. The savage Tahitians were accustomed to prepare it in a very odious manner; much as the Indians of the Andes prepare *Chica* or Maize beer—chewing the root, depositing it in a bowl, straining through cocoa-nut husk, and mixing with water or cocoa-nut milk, after which fermentation speedily ensues. The taste is unpleasent to those unaccustomed to it, and has been likened to that of rhubarb and magnesia. The intoxication is not like that produced by ardent spirits, but rather a stupefaction like that caused by opium. It is succeeded by a copious perspiration. The habitual use of ava causes a whitish scurf on the skin, which, among the heathen Tahitians, was reckoned a badge of nobility, the common people not having the means of indulgence requisite to produce it.—The leaf of the ava plant is in some places used with the betel-nut, instead of that of the betel-pepper.

A'VALANCHES are masses of snow or ice that slide or roll down the declivities of high mountains, and often occasion great devastation. They have various names, according to their nature. Drift or powder avalanches (*Staub Lavinen*) consist of snow, which, loose and dry from strong frost, once set in motion by the wind, accumulates in its descent, and comes suddenly into the valley in an overwhelming dust-cloud. A. of this kind occur chiefly in winter, and are dangerous on account of their suddenness, suffocating men and animals, and overturning houses by the compression of the air which they cause. Another kind of avalanche resembles a landslip. When the snow begins to melt in spring, the soil beneath becomes loose and slippery; and the snow slides down the declivity by its own weight, carrying with it soil, trees, and rocks. The greatest danger is where elevated tracks of moderate declivity are separated from the valleys by precipitous walls of rock; the softened snow of spring beginning to roll or slide on these slopes, is hurled over the precipices with fearful force into the valleys. The very wind caused prostrates forests and houses. Ice A. are those that are seen and heard in summer thundering down the steeps, e. g., of the Jungfrau. They consist of masses of ice that detach themselves from the glaciers in the upper regions. They are most common in July, August, and September.

AVALLON (anc. *Aballo*), a town of the dep. of Yonne, France, 26 miles south-east of Auxerre, on a steep hill of red granite, nearly surrounded by the Cousin. A. is a very ancient town, of Celtic origin, and has been often besieged and taken. Pop. 5500.

AVA'NTURINE, a variety of quartz, remarkable for the brilliancy with which it reflects light, which is supposed to result from small particles of mica enclosed in it. It is of a yellow, red, or brown color. It is used in jewellery, but is not so much valued as amethyst or Cairngorm stone. It is found in India, Spain, and Scotland.

AVA'RI, a tribe of eastern origin, made their appearance 100 years later than the Bulgarians, in the countries about the Don, the Caspian Sea, and the Volga. One part of them remained at the Caucasus, another part pressed forward (about 555 A.D.) to the Danube, and settled in Dacia. Here they served in Justinian's army, and assisted the Lombards to overturn the kingdom of the Gepidæ; and about the end of the 6th c., under the mighty Khan Bajan, they conquered Pannonia. Later, they made themselves masters of Dalmatia; made devastating incursions into Germany, as far as Thuringia; and into Italy, where they warred with the Franks and Lombards, and extended their dominion over the Slaves living on, and northwards from, the Danube, as well as over the Bulgarians as far as the Black Sea. These nations at last rose against them, and, in 640 A.D., drove them out of Dalmatia. Confined to Pannonia, they were subdued by Charlemagne, and well-nigh extirpated by the Moravians, so that, after 827, they disappear from history. They usually surrounded their settlements with fortifications of stakes driven into the ground, and earth, of which traces, under the name of Avarian Rings, are yet found in the countries formerly occupied by them. The results of the most recent criticism show that, in all probability, the A. belonged to the same great Turanian stock as the Huns, and that their original residence was the land lying east of the Tobol, in Siberia.

AVA'ST, one of the peculiar terms employed on shipboard. It is a command to stop or cease in any operation going forward—such as, 'avast heaving.'

AVATA'R primarily signifies, in Sanscrit, a descent, but is specially applied to the descent of a Hindu deity upon the earth in a manifest shape, either for beneficent or retributive ends. It is thus almost synonymous in its signification with the Christian term *Incarnation*. The word is sometimes rhetorically employed in English literature. The avatars of Vishnu (q. v.) are the most famous in Hindu mythology.

AVA'TCHA, a mountain and bay of Kamstchatka. The bay is on the east coast, being by far the best harbor of the whole peninsula, and containing the capital city of Petropaulowsk (q. v.). The mountain, 9055 feet in height, is about 20 miles to the north, and not far from the sea, in lat. 52° 15′ N., and long. 158° 50′ E.

It is a volcano with two craters—one at the summit, and the other rather more than half-way up, on the seaward side.

A'VEBURY, A'BURY, or A'BIRY, a small village of Wiltshire, situated in N. lat. 51° 25′, and W. long. 1° 50′, 25 miles north of Salisbury, and 6 west-by-north of Marlborough. It is a place of no importance in itself, having a population of 769; but is remarkable as the site of the largest so-called Druidical temple in Europe—in fact, occupying the most of the sacred enclosure itself—and as having in its neighborhood several remarkable barrows and cromlechs of remote antiquity.

What is called the temple occupies a flat area of ground on the south of the Kennet, a diminutive tributary of the Thames. It consists, or rather consisted, of a hundred large blocks of stone, placed on end in a circular form, around a level area of about 470 yards in diameter, bounded by a deep ditch and a high embankment forming the enclosure. There are also the remains of two small circles of stone within the enclosure, supposed to be inner temples. Of these, one consisted of two concentric circles of 43 upright stones, having a single stone near the center; the other, a similar double circle of 45 stones, to the north-west of the former, with three large and high blocks in the center. The stones that remain of this ancient work are not of uniform size; they measure from 5 to 20 feet in height above the ground, and from 3 to 12 in breadth and thickness.

The embankment, which is broken down in several places, had originally two entrances to the temple, eastward and westward, from which issue two long walks, bending round to the southward, each furnished with a range of blocks on either side similar to those of the temple itself. These avenues are each upwards of a mile in length, the width varying from 56 to 35 feet. That which issues to the east, or rather south-east, after turning southward, bends near its extremity to the south-east again, and closes on a knoll called Overton Hill in two concentric oval ranges of blocks. That which issues to the west, also bends to the south, and then to south-west, ending in a point with a single block.

Of the surrounding antiquities, that which appears most closely connected with the temple is a large barrow, or lofty conical mound, called Silbury Hill, lying due south of it, at a distance of three-quarters of a mile. It is situated nearly midway between the two avenues, in the line of the ancient Roman road between London and Bath. Close to the base, it measures 2027 feet in circumference; the sloping height is 316 feet; the perpendicular height, 170 feet; the diameter of the level area at the top, 120 feet; the space covered by the whole work, over 5 acres. What proves the structure to have been more ancient than the time of the Romans, if such proof were necessary, is, that the Roman road, as it comes from the west, is straight for several miles till it reaches Silbury, when it bends round it to the south, and again proceeds in a direct line to Marlborough.

About a mile north of A. there are remains of a large cromlech, the stones of which have been overturned; and about 3 miles east there is another, which has two upright blocks standing apart, with a larger one surmounting them. In the neighborhood, all round the Marlborough Downs, there are remains of earthworks and upright stones, and the sites of other antiquities now nearly obliterated.

Very little was known of A. temple and the antiquities in its vicinity till the year 1740, when Dr. Stukeley, a somewhat fanciful antiquary, published his work, *Stonehenge and Abury; Two Temples Restored to the British Druids;* although Aubrey, an ardent student of antiquarian lore, had written an account of them in 1663, by command of Charles II., the manuscript of which still exists. None of the earlier topographers or antiquaries appear to have left any description of them. When Sir Richard Hoare, in collecting materials for his *Ancient Wiltshire*, made his examination of them in 1812, 72 years after the appearance of Stukeley's work, and 164 after the first survey by Aubrey, a great number of the stones had disappeared, and in many places it was difficult to trace out even the plan of the works. In 1849, in order to satisfy the curiosity of the lovers of antiquity as to the nature and intention of the great barrow, Silbury Hill, a tunnel was cut to its center, but nothing was discovered to throw light on the subject. Some modern archæologists altogether reject the conclusion of Stukeley and his followers, and call for proof of any connection between the Druids and the stone-circles which it has been the fashion for the last century to call Druidical.

AVE'IRO, a maritime town of Portugal, in the province of Beira, between Oporto and Coimbra, situated in an unhealthy locality at the mouth of the Vouga, which forms a wide but shallow harbor, is the see of a bishop, has 5000 inhabitants, and trade in oil, wine, oysters, sardines and other fish, oranges, and sea-salt. Pop. 7200.

AVE'LLA (anc. *Abella*), a town of Central Italy, in the province of Avellino, 20 miles east-north-east of Naples. Pop. of commune, 5228.

AVELLI'NO (anciently *Abellinum*), chief town of the province of the same name in the south of Italy. It is situated at the foot of Monte Vergine, on which is the famous monastery founded by S. Guglielmo da Vercelli, on the ruins of a temple of Cybele, in 1119. Pop. (1881) 16,376. A. suffered greatly from earthquakes in 1694, 1731, and 1805. It has manufactures of woollens, paper, macaroni, and considerable trade in corn and hazel-nuts. The *nuces Avellanæ* were famous even in Pliny's time. Between A. and Benevento is the Val de Gargano, where the Samnites defeated the Romans in 433 A.U.C. Pop. of province (1881) 393,228.

A'VÉ MARI'A, also ANGE'LICA SALUTA'TIO, or the Angelic Salutation, are names given by the Roman Catholics to a very common form of address to the Virgin Mary. *Ave Maria* are the first two words of the prayer, in Latin, which is taken from the angel Gabriel's salutation (Luke i. 28): 'Hail, Mary, highly favored, the Lord is with thee; blessed art thou among women, and blessed is the fruit of thy womb.' In this form, according to an ordinance of Gregory I., the invocation was at first said by the priests during mass, on the fourth Sunday after Advent. With the extended worship of the Virgin since the 11th c., the A. M. appears as a lay-prayer of nearly equal use with the Pater Noster, and was sanctioned as such at the end of the 12th c. Accordingly, not only did Urban IV. (1261) add the concluding words, *Jesus Christus, Amen*, but since the first half of the 16th c., the prayer began to receive, more and more commonly, as an addition to the old formula, what constitutes the conclusion of the modern form: 'Holy Mary, mother of God, pray for us sinners, now and at the hour of our death, Amen.' An edict of John XXII. (1326) ordains that every Catholic shall, morning, noon, and evening, at the warning of the bells, repeat three aves. This ringing of bells as a summons to morning, mid-day, and evening prayers, is retained in some Protestant countries, and is still called the Ave Maria, or Angelus Domini. The aves are reckoned by the small beads of the rosary, which are hence called Ave Marias, while the large beads are devoted to the Pater Noster. 150 Ave Marias form—after the 150 Psalms—a *Psalterium Mariæ*, and are thought to possess high propitiatory power.

AVE'NA. See OAT.

AVENGER OF BLOOD. See BLOOD, AVENGER OF.

A'VENS. See GEUM.

AVENTI'NUS, JOHANNUS THURMAYR, a scholar and historian, born at Abensberg, Bavaria, where his father was a publican, in 1476. Having studied at Inglostadt, he went to Paris, where he took the degree of M. A. He afterwards taught Greek and mathematics at Cracow, and poetry and eloquence at Vienna. In 1512, the Duke of Bavaria called him to Munich, and intrusted him with the education of his sons. Here A. wrote his esteemed *History of Bavaria* (Annales Boiorum), a work which occupied him sixteen years. This work was not published until twenty years after his death, which took place in 1534, and then only with large portions, more true than pleasant, about the Romish Church, excised. These, however, were all restored in Cisner's edition of 1580. A. wrote several other learned works.

A'VERAGE. If any number of unequal quantities are given, another quantity may be found of a mean or intermediate magnitude, some of the given quantities being greater, and others less, than the one found which is called the average. The exact relation is this: that the sum of the excesses of the greater above the A. is equal to the sum of the defects of the less below it. If there are, say, 7 vessels unequally filled with sand, and if we take handfuls from the greater, and add these to the less, until the sand is equally distributed, then any one of the unequalized measures of sand is the A. of the 7 unequal measures. If the quantities of sand in the several vessels are stated in numbers, as 5, 10, 12, 8, 11, 14, 3 ounces, the A. is found by adding together the numbers, and dividing by how many there are of them—viz., 7. The sum being 63, this, divided by 7, gives 9 ounces as the average. The system of averaging is a very important and time-saving one. By averages, the farmer calculates the value of his crops; the grazier the value of his cattle; and the forester, the value of his trees. Reflection, however, requires to be exercised in striking averages; otherwise, serious errors may be committed. If a farmer, for instance, has three lots of cattle, the first of which he averages at £25 a head, the second at £15, and the third at £9, it might be thought that the A. of the whole stock made up of the three lots would be got by taking the mean of £25, £15, and £9—viz., $\frac{25+15+9}{3}$ = £16⅓. But this would be correct only if there were an equal number of cattle in each of the lots. To get the real A. in case of the lots being unequal, he must multiply the A. of each lot by the number of cattle in it, add the three products together, and divide by the whole number of cattle in all three lots taken

together. If we suppose 9 head in the first lot, 20 in the second, and 15 in the third, the A. is $\frac{25\times 9+15\times 20+9\times 15}{9+20+15} = £15$.

A'VERAGE (in Marit. Law). A rule was established by the Rhodian law (q. v.), and has prevailed in every maritime nation, that where a loss has been sustained, or expense incurred, for the general safety of the ship and cargo, a contribution should be made, in proportion to their respective interests, by the owners of the ship, freight, and goods on board; or, in modern times, by the insurers of these. To this contribution the name of *General A.* is given. The apparel, jewels, and other personal property of the passengers, not carried for purposes of traffic, and the seamen's wages and provisions, are not liable for any share in this contribution. Goods thrown overboard are now estimated at the price they would have yielded at the port of delivery at the time, freight, duties, &c., being deducted. See JETTISON. *Particular A.*, again, is the loss of an anchor, the starting of a plank, the leaking of a cask, the loss of goods washed from the deck, or the like, where the common safety was not in question, and where there is, consequently, no contribution. To losses of this description, the term A., though generally, is incorrectly applied. *Petty Averages* are the duties of anchorage, pilotage, &c. If these occur in the ordinary course of the voyage, they are not loss, but simply part of the expense necessarily incurred. But if they have been incurred in extraordinary circumstances, and for the purpose of avoiding impending danger, they are a loss which is included in the general A., and covered by the contribution. *A. Bond* is a deed which parties liable to a general A. are in the habit of executing, by which they empower an arbiter to value the property lost, and fix the proportion which shall be borne by each proprietor.

AVERDUPOI'S. See AVOIRDUPOIS.

AVE'RNUS, in Gr. *Aornos*, or 'without birds,' called now Lago d'Averno, is a small, nearly circular lake in Campania, Italy, situated between Cumæ, Puteoli, and Baiæ. It is about a mile and a half in circumference, and occupies the crater of an extinct volcano. It is in some places as deep as 180 feet, and is almost completely shut in by steep and wooded heights. The sulphureous and mephitic vapors arising from the lake were believed in ancient times to kill the birds that flew over it; hence, according to some, its Greek appellation. Owing to its gloomy and awful aspect, it became the center of almost all the fables of the ancients respecting the world of shades. Here was located Homer's Nekyia, or entrance to the under world; here the Cimmerians are said to have dwelt—a people who lived in deep caverns, without ever coming into the light of day, explored metals, and imparted Stygian oracles; here also were placed the grove of Hecate and the grotto of the Cumean Sibyl. Agrippa caused the dense woods to be thinned, by which the place lost much of its wildness; and by his orders Cocceius constructed the famous tunnel through the mountain to Cumæ, a work of comparative ease, considering that the hills round about are composed of volcanic tufa. The lake was also connected in ancient times with the Gulf of Baiæ.

AVERRHO'A. See CARAMBOLA.

AVERRHO'ES, properly, Ibn Roshd, or more fully, Abul-Walid Mohammed-Ibn, Ahmed-Ibn, Mohammed-Ibn-Roshd, the most famous of the Arabian philosophers, was born at Cordova, in Spain, in 1149. His father, who was chief judge and mufti, instructed him in Mohammedan jurisprudence. In theology and philosophy, he had Thophail for his teacher; and in medicine, Ibn Zohr, the elder. His talents and acquirements made him be appointed successor to his father, and afterwards chief judge in the province of Mauritania. Being accused, out of envy, of a departure from the orthodox doctrines of Mohamedanism, he was dismissed from his office, and condemned by the ecclesiastical tribunal of Marocco to recant his heretical opinions, and do penance. After this, he returned to his native place, and lived in great poverty, until the Calif Almansor reinstated him in his offices, on which he went back to Marocco, where he died in 1198 or 1206. A. regarded Aristotle as the greatest of all philosophers. He translated and illustrated Aristotle's writings with great penetration; but the influence of the Alexandrine view laid down in the commentaries of Ammonius, Themistius, and others, is easily seen in his works, as in those of most of the Arabian philosophers. In opposition to the Arabian orthodox school, especially against Algazali, A. stood forth on the side of reason as the defender of philosophy. The Arabians called him, by way of eminence, the Expositor (of Aristotle). Most of his writings are known to us only through Latin translations (Ven. 1489). The Arabic text of A.'s philosophical works was published at Munich in 1859 by M. J. Müller, whose German translation of the same appeared in 1875. His Commentaries on Aristotle appeared in an edition of that philosopher's works (11 vols. Ven. 1560). He also wrote a sort of medical system, which, under the name of *Colliget*, was translated into Latin and repeatedly printed. The philosophy of A. attained to importance in the Christian Church as early as the 13th c., although his pantheistic doctrine of the unity of the active principle in the universe was often repudiated as an error, and astrology was characterized as Averrhoism. See Renan's *Averroës et l'Averroïsme*.

AVE'RSA, a town of Southern Italy, in the province of Caserta, is situated between Naples and Capua, 9½ miles S. of the latter, in a beautiful district rich in oranges and wine. It is well built with 20,000 inhabitants; has a cathedral, and a number of monasteries, in one of which, Andrew of Hungary, the Darnley of Neapolitan history, was murdered with the connivance of his wife, the beautiful but guilty Joanna, queen of Naples; an excellent asylum for the insane, established by Murat; and a foundling hospital. A. was built in 1029 by the Normans on a territory ceded to them by Duke Sergius of Naples, to be held in fief. About two miles from A. are still to be seen a few ruins of the Oscan city of Atella, famous as the birthplace of the satirical farces so popular on the Roman stage.

A'VÉS. See BIRDS.

AVEYRON, a river and department in the south of France. The river rises near Severac-le-Château; flows, for the most part, in a westerly direction through the department of the same name; and, after a course of 90 miles, falls into the Tarn—a feeder of the Garonne—below Montauban. It touches in its course the towns of Rhodez, Villefranche, and Negrepelisse.—The department of A. has an area of 3370 square miles, and is one of the most mountainous parts of France. Situated between the highlands of Auvergne and the Cevennes, it slopes like a terrace southwest to the Garonne, to the basin of which the department belongs. The principal rivers flow through the department from east to west; and between these, several ramified offsets from the chain of the Cevennes traverse the country. The climate is healthy, but cold and raw, especially in the north and east. North of the Lot, only rye and oats are grown; in the rest of the valleys, other kinds of grain also thrive, as well as fruit, chestnuts, potatoes, and truffles. A third part of the land is unfit for cultivation, but affords excellent pasture for the numerous herds of cattle, goats, and sheep, which, along with the breeding of swine, form the principal resources of the mountaineers. 18,000 cwt. of cheese is sold yearly, under the name of Roquefort cheese. The mineral wealth of the department is considerable. Coal, iron, lead, zinc, copper, vitriol, alum, and antimony are found in abundance, the mining, preparing, and sale of which form a principal means of support to the (1876) 413,826 inhabitants. Besides these, the principal employments are paper-making, cotton-spinning, tanning, the manufacture of woollen cloth and carpets, &c. The seat of the departmental courts is Rhodez, which is also a bishop's see.

AVEZZA'NO, a town of South Italy, in the province of Aquila, 22 miles south from Aquila. The town belongs to the Barberini family. Pop. 5200.

A'VIARY, a place for keeping birds. The arrangements of an A. depend upon the habits of its inmates, the climate suited to them, and other circumstances. A bird-cage is a domestic aviary. Aviaries on the largest scale are to be seen in zoological gardens.

AVICE'NNA, properly, Ibn Sina, or more fully, Abu Ali Al-Hossein Ibn Abdallah Ibn Sina, a famous Arabian philosopher and physician, whose authority for many centuries passed for indisputable, was born 980, at Charmatain, a village near Bokhara, where he received a very learned education. He studied with special fondness mathematics, astronomy, philosophy, and medicine. He was physician to several of the Samanide and Dilemite sovereigns, and also for some time vizir in Harmadan, but afterwards retired to Ispahan, and died during a journey of the Emir Ala-ed-Daula to Hamadan, in 1037. He left a multitude of writings, among which his system of medicine, *Kanun fi 'l-Tibb*, acquired the greatest reputation. It is distinguished less by originality than by an intelligible arrangement and judicious selection from the writings of the Greek physicians, at a time when the knowledge of Greek was not widely spread. A. himself knew the Greek writers only through Arabic translations. The Arabic text of the *Kanun*, and of several of his philosophical writings, among which those on metaphysics especially attracted the attention of the schoolmen, appeared at Rome, 1593, in 2 vols. The *Kanun* was translated into Latin by Gerardus Cremonensis, and repeatedly printed (Ven. 1595, 2 vols.). His philosophical writings have also appeared several times in Latin translations (Ven. 1490, 1523, 1564).

AVICE'NNIA, a genius of plants of the natural order *Avicenneæ* or *Myoporaceæ*, an order very nearly allied to *Verbenaceæ* (q. v.), and almost exclusively confined to the southern hemisphere. The genus *A.* consists of trees like shrubs resembling mangroves, and, like them, growing in salt-swamps. Their creeping roots, often curving for the space of six feet above the mud before they stick into it, and the naked asparagus-like suckers which they throw up, have a singular appearance. *A. tomentosa*, the White Mangrove of Brazil, has cordate ovate leaves, downy beneath. Its bark is

much used for tanning. A green resinous substance exuding from *A. resinifera* is eaten by the New Zealanders.—The genus is named in honor of the Arabian physician Avicenna.

AVI'CULA. See PEARL OYSTER.

AVIGLIA'NO, a town of South Italy, in the province of Potenza, ten miles northwest of Potenza Pop. 12,000.

AVIGNON (*Avenio Cavarum*), a city of Provence, in the south of France, capital of the department of Vaucluse, is situated on the left bank of the Rhone, which is here crossed by a long bridge. The population is (1881) 38,469; the streets are narrow and crooked. There is a multitude of churches and religious establishments, among which the cathedral on the Rocher des Dons and the church of the Franciscans, as well as the old papal palace and the tower Glacière, are distinguished. The Dominican convent now serves as a cannon-foundry. The city is the see of an archbishop, has a museum and picture-gallery, and several other valuable institutions. The university, founded in 1303, was abolished in 1794. A. has manufactures of silk, silk-dyeing, tanning, iron-founding, &c., and is famous for its garden produce, its fruit, wine, honey, &c. The country about A. is delightful, and extremely fruitful in corn, wine, olives, oranges, and lemons.—In A., Petrarch spent several years; it was here he saw Laura, whose monument is to be found in the Franciscan church. Vaucluse, which he has immortalized, lies about three leagues from Avignon. A. was the capital of the ancient Cavares, and presents many remains of the times of the Romans. In the middle ages, it formed, with the surrounding district, a county, which the popes, who had already received the county of Venaissin as a gift from King Philip III., bought in 1348 from Joanna, queen of Naples and Countess of Provence. The pope governed both counties through a vice-legate, and continued in the possession of them till 1790, when, after several stormy and bloody scenes, the city with its district was united with France. At the peace of Tolentino (1797), the pope formerly resigned A. and Venaissin. A. is celebrated in ecclesiastical history as being, for a time, the residence of the popes. By order of Philip IV. of France, Pope Clement V. and six of his successors from 1309 to 1377, were obliged to reside there. It was afterwards the residence of more than one anti-pope. Two ecclesiastical councils were also held at A. (1326 and 1337): the first took into consideration the relation of the clergy to the laity; the other, the bad training of the clergy.

A'VILA, a town of Spain, capital of the province of A., in Old Castile, 53 miles north-west of Madrid; pop. 9000. The Spaniards declare that its original name was Abula, and please themselves and amuse strangers with the belief that it was built by Hercules 1660 B.C. It is the birthplace of two highly remarkable persons—the first was the learned Alfonso Tostado de Madrigal, who died in 1455, and whose doctrines (according to his biographer) were so enlightened that they caused the blind to see, though, in the opinion of Don Quixote, he was more voluminous than luminous; the second is 'Our Seraphic Mother, the Holy Teresa, Spouse of Jesus,' born March 28, 1515; she was made the lady-patroness of Spain by Philip III., and shares the honors of worship with St. James. A. is the see of a bishop, with a beautiful cathedral, and was at one time one of the richest and most flourishing cities of Spain. The university, which had been founded in 1482, and enlarged in 1638, was abolished in 1807. It was at A. that the nobles of Old Castile assembled in 1465 to depose King Henry IV., and raise his brother Alfonso to the throne of Leon and Castile. At A., also, was held the meeting of the so-called Third Estate, or of the Holy League, in 1520, under the leadership of Juan Padilla, to which nearly all the cities of Castile sent representatives.

AVILA Y ZUNIGA, DON LUIZ DE, a Spanish general, diplomatist, and historian, born at Placencia, in Estremadura, enjoyed the favor and confidence of Charles V., who intrusted him with embassies to the popes Paul IV. and Pius IV., and made him grand master of the order of Alcantara. He accompanied the emperor on his expeditions to Africa and against the princes of the league of Schmalkald, and wrote an account of the war which goes under that name, partial, indeed, but able and spirited. The *Commentarios de la Guerra de Alemanna hecha por Carlos V. en* 1546 *y* 1547, have been published repeatedly (first, Ven. 1548), and translated into several languages.—AVILA, GIL GONZALEZ DE, born at Avila, in Old Castile, in 1559, and died in 1658, was a Jesuit and canon of Salamanca; also royal historiographer for Castile and the Indies. He composed a great number of historical works, of which the following may be mentioned as containing many valuable facts: *Historia de la Vida y Hechos del Rey Don Henrique III. de Castilla* (Madr. 1638); *Historia de la Vida y Hechos del Monarca D. Filipe III.* (in Mendoza's *Monarquia de Espaüa*, 3 vols. Madr. 1770); *Historia de Salamanca* (Salam. 1606); and the *Teatro Ecclesiastico de la primitiva Iglesia de las Indias Occidentales* (2 vols. Madr. 1649—1656).

AVILE'S (anc. *Flaviynavia*), a town of Asturias, Spain, in the province of Oviedo, and 19 miles from Oviedo. There are coal and copper mines in the vicinity. Manufactures of earthenware, glass, linen, &c., are also carried on. Pop. 8400.

AVI'Z, an order of knighthood in Portugal, instituted by Sancho, the first king of Portugal, in imitation of the order of Calatrava, and having, like it, for its object the subjection of the Moors. By the present usage, the king of Portugal, who is grand-master of all of them, wears decorations of the three first orders of Portugal—those of Christ, St. James, and Aviz united in one medal, divided into three equal spaces.

Badge of Order of Aviz.

AVO'CA or OVO'CA (Celt. meeting of the waters,), a small river in the south-east of Wicklow county, formed by the union of two streams, rising in the hills in the centre of the county. The A. runs through a very picturesque vale only a quarter of a mile broad, with wooded banks 300 to 500 feet high, and after a course of nine miles, reaches the sea at Arklow. A. Vale is celebrated in Moore's *Irish Melodies*.

AVOCA'DO PEAR, or ALLIGA'TOR PEAR (*Perse'a gratissima*), a fruit-tree of the natural order *Lauraceæ* (q. v.), a native of the warm regions of America. It attains the height of 30—70 feet, and is a slender tree with a dome-like top. The leaves resemble those of the laurel. The flowers small, and are produced towards the extremities of the branches. The fruit is a drupe, but in size and shape resembles a large pear; is usually of a brown color, and has a soft green or yellowish pulp, not very sweet, but of a delicate flavor, which dissolves like butter on the tongue, and is believed to consist principally of a fixed oil. It is called *vegetable butter* in some of the French colonies. It is much esteemed in the West Indies, and often eaten with sugar and lime-juice or wine, or with spices.

AVOCE'T, or AVOSE'T (*Recurvirostra*), a genus of birds, which, although having the feet webbed nearly to the end of the toes, is usually ranked among the *Grallæ* or *Grallatores*, upon account of the length of the legs, the half-naked thighs, the long, slender, elastic bill, and the general agreement in habits with snipes. They are distinguished from all other birds, except a few species of humming bird, by the strong upward curvature of the bill, which is much like a thin piece of elastic whalebone, and most probably a delicate organ of touch, adapted for seeking food in mud, as their webbed feet are for walking upon it, and their long legs for wading in the fens and marshes which they frequent. They are birds of powerful wing. They are not much addicted to swimming. They scoop through the mud with the bill, first to one side, and then to the other, in quest of worms and other small animals; although Audubon has also observed the American A. taking insects which were swimming on the surface of the water, and expertly catching them in the air, running after them with partially expanded wings.—The Common A. (*R. avocetta*), the body of which is about as large as that of a lapwing, is sometimes, though very rarely, found in the fenny districts of England; it is a native also of the continents of Europe, Asia, and Africa, occurring even at the Cape of Good Hope.—Other species are natives of North America, India, and New Holland.—The American A. (*R. Americana*) has the bill less recurved than the Common A.

Avocet (*Recurvirostra avocetta.*)

AVOGADRO'S LAW. See ATOMIC THEORY.

AVOI'DANCE, in English ecclesiastical law, the term by which the vacancy of the benefice, or the fact of its being *void* of an incumbent, is signified. A. is opposed to *plenarty*, or fulness. See BENEFICE.

AVOIRDUPOI'S, or AVERDUPOI'S, is the name given to the system of weights and measures applied in Great Britain and Ireland to all goods except the precious metals and precious stones. The word is generally said to be derived from the French *avoir du pois*, to have weight; but the middle-age Latin word *averia* or *avera*, used for goods in general, or the middle-age Latin *averare*, and French *avérer*, meaning to *verify*, seem to offer more probable etymologies.

The grain is the foundation of the Avoirdupois system, as well as of the Troy. A cubic inch of water weighs 252·458 grains. Of the grains so determined, 7000 make a pound A. and 5760 a pound

Troy. See WEIGHTS AND MEASURES.—The A. pound is divided into 16 ounces, and the ounce into 16 drams. A dram, therefore, contains 27$\frac{11}{32}$ grains, and an ounce 437$\frac{1}{2}$ grains.

TABLE OF AVOIRDUPOIS WEIGHT.

27$\frac{11}{32}$ grains	are 1 dram,	1 dr.
16 drams or drachms	" 1 ounce,	1 oz.
16 ounces	" 1 pound,	1 lb.
28 pounds	" 1 quarter,	1 qr.
4 quarters	" 1 hundredweight,	1 cwt.
20 hundredweight	" 1 ton,	1 ton.

A cubic foot of water weighs 997·14 ounces A., or nearly 1000 ounces, which gives an easy rule for determining the weight of a cubic foot of any substance from its specific gravity. A. is the weight used in the United States of North America, where, however, in many places, the cwt. contains only 100 lb., and the ton, 2000 lb.

A'VON, a word of British or Celtic origin, meaning 'river' or 'stream,' which seems allied to Aa (q. v.), the name of so many continental rivers. It is the name of several of the smaller British rivers. Of these may be noticed: 1. The Upper or Warwickshire A., which rises in north-west Northamptonshire, runs south-west through Warwickshire and Worcestershire, passing Rugby, Warwick, Stratford, and Evesham, and joining the Severn at Tewkesbury. It has a course of 100 miles, and receives several tributaries. 2. The Lower, or Bristol, or West A., which rises in north-west Wiltshire, and runs 70 or 80 miles, first south in Wiltshire, and then west and north-west between Gloucestershire and Somersetshire. It traverses an oolitic basin, passing Bradford, Bath, and Bristol, and empties itself into the Bristol Channel. It is navigable for large vessels up to Bristol. It runs generally between deep banks in a rich valley. A canal through the middle of Wiltshire connects it with the Thames. 3. The Wiltshire and Hampshire, or East A., which rises in the middle of Wiltshire, and runs south 70 miles through Wiltshire and Hampshire, passing Amesbury, Salisbury, and Ringwood, and entering the English Channel at Christchurch. It is navigable up to Salisbury. It abounds in the small delicate loach. In Wales two rivers named A.—one rising in Monmouthshire, the other in Glamorganshire—fall into Swansea Bay. In Scotland there are several of the same name, affluents of the Spey, Annan, Clyde, and Forth.

AVRANCHES (anc. *Abrancæ*), a city of the dep. of Manche, France, near the left bank of the Seez, 33 miles south-south-west from St. Lo. It stands on the sides and summit of a high hill. It has manufactures of lace, tiles, and bricks, and a little trade in grain, butter, cattle, &c. Pop. 7800.

AWE, LOCH, a lake in the center of Argyleshire, extending in a direction north-east and south-west about 24 miles, with an average breadth of from half a mile to 2$\frac{1}{2}$ miles. It rarely freezes, and its surface is 108 feet above the sea. The country around consists of mica slate. The scenery is most striking at the north-east end of the lake, where the water is studded with numerous wooded islets, overshadowed by towering and rugged mountains, prominent among which rises the dark and rocky ridge of Ben Cruachan, 3669 feet high, and 14 miles in circuit. Of the islands, the most noted is Fraocheilean, containing the remains of a castle granted to Gilbert M'Naughton in 1267 by Alexander III. On a peninsula, in the north end of the lake, stands Kilchurn Castle (Caesteal Chaoil-chuirn), once a fortress of great stength, built about 1440 by Sir Colin Campbell of Glenorchy, and garrisoned, as late as 1745, by the king's troops. The waters of the lake are carried off at its north-west end by the river Awe, which after a course of 7 miles, enters the sea at Bunawe on Loch Etive. The magnificent 'Pass of Awe,' through which the road runs beneath the shoulder of Ben Cruachan, was the scene of a conflict, in 1308, between Robert the Bruce and the M'Dougalls of Lorn, in which that clan was all but exterminated. At the north-east end of the loch, it receives the waters of the Orchy and Strae. Loch A. contains fine fish, especially trout, *salmo ferox*, and salmon; and the small villages of Claddich and Port Sonachan are the general resort of anglers. The north end of the loch is now skirted by the railway from Callander to Oban.

A-WEA'THER is a term denoting the position of the helm when jammed close to the weather-side of a ship; it is the reverse of *a-lee*.

A-WEI'GH, as applied to the position of an anchor, when just loosened from the ground, and hanging vertically in the water, is nearly equivalent to *a-trip*.

AWN (*Arista*), in the flowers of Grasses, a solitary pointed bristle, growing either from a glume or a palea. The flowers of some grasses are entirely *awnless;* in many, the glumes alone are *awned* (or *aristate*), or only one of them; in others, the glumes are awnless, and the paleæ, or one palea, awned. The awn is often terminal, and appears as a prolongation of the midrib of the glume or palea; from which, however, it sometimes separates below the point, and is then said to be on the back of it, or *dorsal;* sometimes it is jointed at the base, and finally separates at the joint; sometimes it is knee-bent or geniculate; sometimes it is twisted, and liable to twist and untwist hygrometrically; sometimes it is rough, or even serrate, at the edges, as in barley; sometimes it is feathery, as in feather-grass (*Stipa*), which is also remarkable for the great length of its awn. The characters of genera and species are often derived from it, but it is not always invariable, even in the same species, and the cultivated varieties of wheat and oats differ much in being more or less *bearded*. There appears to be a tendency to the diminution or disappearance of the awn through cultivation.

AXE, the name of two small rivers in the south-west of England. One rises in the Mendip Hills, north of Somerset, runs first south-west, and then north-east, through a carboniferous limestone, trias, and delnvial basin, past Wells and Axbridge, into the Bristol Channel. The other rises in west Dorset, and flows 21 miles south and south-west, through east Devonshire, in an oolitic and trias basin past Axminster into the English Channel. A. is only another form of Exe. See AA.

A'XEL, or A'BSALON, Archbishop of Lund, in Denmark, and also minister and general of King Waldemar I., was born in 1128, and died 1201. He was descended of a distinguished family, and, in his youth, studied at Paris. A. distinguished himself as well by wisdom and uprightness in peace, as by valor and address in war. The Wendish pirates were not only driven from the coasts of Denmark, but attacked in their own settlements, and subdued. He defeated the Pomeranian prince, Bogislav, and made him dependent on Denmark. In the wise legislation of Waldemar and of his son, he took a great part. He favored and promoted learning and art, and to his encouragement we owe the first connected history of Denmark by Saxo Grammaticus. By building a fortified castle for defence against the pirates, he laid the foundation of the future great city of Copenhagen, which was then an insignificant village, inabited only by fishermen. Owing to this origin, Copenhagen has sometimes got the name of Axelstadt. A. lies buried in the church of Soroe, where he had founded a monastery. The relics found when his grave was opened in 1827, the chief of which was a bishop's staff and ring, are described in the complete biography of A. by Estrup, translated into German by Molmike in Illgen's *Zeitschrift für Historische Theologie* (2 vols. Leip. 1832).

A'XESTONE, a mineral generally regarded as a variety of Nephrite (q. v.). It is of a greenish color, is more or less translucent, hard, tough, and not easily broken. It occurs in primitive rocks, always massive, and is found in Saxony, in Greenland, and in New Zealand and other islands of the Southern Pacific. It derives its name from the use to which it is put by the natives of these islands for making their hatchets. They also make ear-drops of it.

A'XHOLME ISLE (A. Sax. *holme*, a river isle), a low level tract in the north of Nottinghamshire, surrounded by rivers—the Trent on the east; Don, north and west; Torne and Idle, on the west; and Vicardyke, between the Trent and Idle on the south. This district, 18 miles from north to south, and 5 on an average east and west, was anciently a forest, but afterwards became a marsh. The marsh was drained into the Trent in 1634 by Vermuyden, a Dutchman, after 5 years' labor, and at the cost of £56,000. The reclaimed land became very fertile under Dutch and French Protestant settlers, and after much litigation, it was, in 1691, divided, the original inhabitants receiving 10,532 acres, and the settlers 2868. On the land are raised abundant crops of wheat, oats, rye, pease, beans, clover, flax, rape, hemp, potatoes, and onions. Peat and turf fuel abound, and valuable gypsum beds occur. The water is brackish, too hard for washing, and curdles milk when boiled with it. A. I. includes seven parishes. There are two small towns, Crowle and Epworth.

A'XIL (*axilla*), in Botany, the angle between the upper side of a leaf and the stem or branch from which it grows. Buds usually grow in the axils of leaves, although they are not always actually developed; but a bud may be made to appear in such a situation, and to form a new shoot or branch, by artificial means, which direct the strength of the plant more particularly to that quarter, as cutting over the main stem, wounding it above the place where the new branch is desired, &c. Flowers or flower-stalks (*peduncles*) growing from the axils of leaves are called *axillary*.

AXIM, an important station and port on the Gold Coast, a little to the east of the mouth of the Ancobrah River. Inland from Axim, in the basin of that river, and in the district between it and the Prah, gold-mining operations have recently been carried on on a large scale. See Burton and Cameron, *To the Gold Coast for Gold* (1882).

AXINOMANCY (Gr. *axine*, an axe, and *manteia*, divination), a mode of divination much practised by the ancient Greeks, particularly with the view of discovering the perpetrators of great crimes.

An axe was poised upon a stake, and was supposed to move so as to indicate the guilty person; or the names of suspected persons being pronounced, the motion of the axe at a particular name was accepted as a sign of guilt. Another method of A. was by watching the movements of an agate placed upon a red-hot axe. This is only one of a multitude of analogous modes of divination practised in all ages and among all nations. See DIVINATION, and DIVINING-ROD.

A'XIOM, a Greek word meaning a *demand* or *assumption*, is commonly used to signify a general proposition, which the understanding recognizes as true, as soon as the import of the words conveying it is apprehended. Such a proposition is therefore known directly, and does not need to be deduced from any other. Of this kind, for example, are all propositions whose predicate is a property essential to our notion of the subject. Every rational science requires such fundamental propositions, from which all the truths composing it are derived; the whole of geometry, for instance, rests on, comparatively, a very few axioms. Whether there is, for the whole of human knowledge, any single, absolutely first A., from which all else that is known may be deduced, is a question that has given rise to much disputation; but the fact, that human knowledge may have various starting-points, answers it in the negative. Mathematicians use the word A. to denote those propositions which they must assume as known from some other source than deductive reasoning, and employ in proving all the other truths of the science. The rigor of method requires that no more be assumed than are absolutely necessary. Every self-evident proposition, therefore, is not an A. in this sense, though, of course, it is desirable that every A. be self-evident; thus, Euclid rests the whole of geometry on fifteen assumptions, but he proves propositions that are at least as self-evident as some that he takes for granted. That 'any two sides of a triangle are greater than the third,' is as self-evident as that 'all right angles are equal to one another,' and much more so than his assumption about parallels, which, it has been remarked, is neither self-evident nor even easily made evident. See PARALLELS. Euclid's assumptions are divided into three 'postulates' or demands, and twelve 'common notions'—the term A. is of later introduction The distinction between axioms and postulates is usually stated in this way: an A. is 'a theorem granted without demonstration;' a postulate is 'a problem granted without construction'—as, To draw a straight line between two given points.

A'XIS, in Geometry.—The A. of a curved line is formed by a right line dividing the curve into two symmetrical parts, so that the part on one side exactly corresponds with that on the other; as in the parabola, the ellipse, and the hyperbola. The A. of any geometrical solid is the right line which passes through the center of all the corresponding parallel sections of it: in this sense, we speak of the A. of a cylinder, a globe, or a spheroid. By the A. of rotation, we understand the right line around which a body revolves.—In physical science, the A. of a *lens* is the right line passing through it in such a manner as to be perpendicular to both sides of it; and the A. of a telescope is a right line which passes through the centers of all the glasses in the tube. The A. of the *eye* is the right line passing through the centers of the pupil and the crystalline lens.

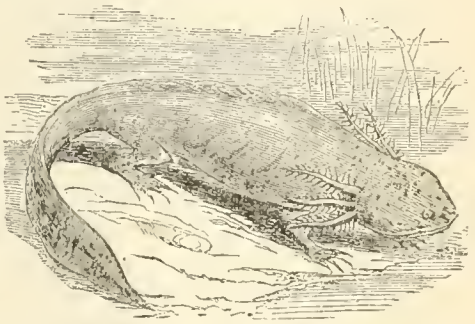
A'XIS, in Botany, a term applied to the central part both above and below ground, around which the whole plant is regarded as arranged. The stem is called the *ascending A.;* the root, the *descending axis*. The opposite tendencies of growth appear as soon as a seed begins to germinate, in the radicle and plumule; the former of which is the descending A., and the latter the ascending A.; the former descending deeper into the soil, the latter ascending towards the air and light. That part of the stem around which the flowers are arranged is called the *floral A.*, and, in describing some kinds of inflorescence, the terms, *primary floral A.*, *secondary floral A.*, &c., are occasionally employed.

A'XIS (*Cervus Axis*), a species of deer, abundant on the banks of the Ganges, but found throughout India and in many islands of the Eastern Archipelago. It was known to the ancients by the name Axis. One of its Indian names is Chittra, and by British sportsmen in India it is generally called the Spotted Hog-deer. By some naturalists, it has been made the type of a genus of *Cervidæ*, called *Axis*. The A. has a great resemblance in size and coloring to the European fallow-deer; it is generally of a rich fawn color, beautifully spotted with white, nearly black along the back, the under parts snow-white. The horns, however, differ very much from those of the fallow-deer, being slender, sharp-pointed, little branched, and not at all palmated. The female has no horns. The A. frequents thick jungles in the vicinity of water, and feeds during the night. It is commonly found in herds of 15 or 20, of which 3 or 4 are males. Its sense of smell is remarkably acute, and it is generally very shy and timid, so that sportsmen find it difficult to get within shot. The males, however, sometimes exhibit great courage in defence of the young. It is very easily domesticated, is very gentle in its manners, has been frequently imported into Europe, and breeds freely in the parks in which it is kept at a few noblemen's and gentlemen's seats in Britain and France.

A'XMINSTER, a small town in east Devonshire, on the side of a little hill on the left bank of the Axe. Pop. in 1871, 2861. A. was once famous for the manufacture of Turkey and Persian carpets, which were little inferior to those imported. Two celebrated geologists have been connected with A.: Dr. Buckland was born here, and Dr. Conybeare was lord of the manor, and vicar.

A'XMOUTH, a village at the mouth of the Axe, east Devonshire. A mile east of A. occurred, in 1839, a landslip; an area 200 feet wide, for three-quarters of a mile parallel to the shore, having sunk 250 feet below the sea, with a great noise. The chasm thus formed became a lagoon, while the neighboring sea-bed rose 40 feet. Rather more than a mile further east, occurred another but smaller landslip in 1840. The district around consists of green-sand strata.

AXOLOTL, pronounced *acho'latl* (*Gyrinus*, or *Axolotes edulis*), a remarkable animal, found in great abundance in some of the Mexican lakes, and particularly in the lake of Mexico itself. It is a Batrachian (q. v.) reptile of the family of the *Proteidæ* or *Perennibranchiate Batrachians*' in which the gills remain during life, and the lungs are never sufficiently developed to maintain respiration by themselves. It is in general form very



Axolotl.

like a fish; has a large and broad head; and tapers into a long compressed tail, which has a thin membranous fin both on its upper and its lower side. It has four legs, with toes not webbed; and on each side of the neck the gills form three long branched or feathered processes, which give it a very remarkable appearance. It is brown, and mottled with small black spots. When full grown, it averages 8 or 9 inches in length, though sometimes measuring 16 inches. It is esteemed a great delicacy in Mexico. These normally perennibranchiate creatures are capable, under certain circumstances, of becoming salamandrine, losing their gills, and so turning into *Amblystomas*.

AXUM, once capital of an Ethiopian kingdom, is now in the modern Abyssinian province of Tigré. It lies mainly in ruins. Pop. 2000. The former greatness of the city is testified by yet remaining structures cut in granite, some of which have inscriptions. From these it appears that the Axumite empire extended over Abyssinia, and even over Yemen and Saba in Arabia, and possessed the command of the Red Sea. It acquired political importance from the circumstance, that it formed on the south a boundary to the world-embracing power of Rome, as well as to that of Parthia, which then extended as far as Arabia. The Byzantine emperors even paid an annual tribute to the sovereigns of Axum. This country was also the furthest point southward that Grecian civilization reached; through the medium of Egypt, Greek philosophy spread into A., and the Greek language became the language of the court and of the priests. Under King Aizanes, who, in a still remaining inscription, appears as a heathen, Christianity was introduced into the country from Egypt by the two apostles Frumentius and Ædesius, who were followed by many priests from the same quarter. The new doctrine soon spread over the whole country; Frumentius was made the first bishop of A., and Fremona was built in honor of him. The stone churches, many of them very imposing, yet scattered over the whole of Abyssinia, owe their architecture to Egyptian priests, and arose at that period, as well as the most celebrated Abyssinian convents and hermitages. The Axumite empire carried on, through Adule, an active commerce with Arabia and India; it formed the outermost bulwark of Christianity; and, as such, particularly from about the 6th c., it interfered in behalf of the Christians in Arabia, and became the natural enemy of Mohammedanism. The contests in which it soon became involved with that power caused its fall, as the kings gradually lost their possessions in Arabia, and the whole coast on the Red Sea and Gulf of Aden. The outlets for commerce were

thus cut off, and the empire was at the same time so weakened by constant wars, that internal disorders brought on its complete dissolution.

AYACU'CHO, a town in a department of the same name in South Peru. Here, on the 9th December 1824, the combined forces of Peru and Colombia—the latter then comprising Ecuador, New Granada, and Venezuela—totally defeated the last Spanish army that was ever seen on the new continent.

AYA'LA, Pero Lopez De, called El Viejo, to distinguish him from his son of the same name, was born at Murcia in 1332, of one of the first families of the Castilian nobility. He stood high in the regard of several kings of Castile, and filled the first offices of the state, latterly, that of high-chancellor and high-chamberlain of Castile. At the battle of Najera, in 1367, he was taken prisoner by the English, then in league with Peter the Cruel, and confined for some time in an English dungeon; and again in 1385, by the Portuguese, at the battle of Aljubarota. He died at Calahorra in 1407. A. has acquired a name, not only as a statesman, but as a writer, especially as a historian and poet. His best known work is his *Crónicas de los Reyes de Castilla D. Pedro, D. Enrique II., D. Juan I., D. Enrique III.* (2 vols. Madr. 1779–80—the older editions of 1495 and 1591 are imperfect). He was the first among the Spaniards to give up the usual simple narrative of events in the order of time, and to seek to give a more rational representation of them according to the rules of historic art. It is only in recent times that the poetical works of A. have been discovered; the most remarkable of which is the *Libro o' Rimado de Palacio*. This 'Book in Rhyme on Court-life,' as its singular title may be translated, was begun during the poet's first captivity in England, and is composed in the old national form of rhyming Alexandrine stanzas of four lines; the contents are satirical and didactic. A. appears also in his poetical works as a representative of that transition epoch of Spanish national literature, when it was passing from a popular original literature to one of a more artificial imitative character.

AYAMO'NTE, a town of Andalusia, Spain, on the left bank of the Guadiana, and near its month. The principal occupation of the inhabitants is fishing. Pop. 6000.

AYE-AYE (*Cheiromys Madagascariensis*), a quadruped about the size of a hare, a native of Madagascar, which was at first placed by naturalists among Squirrels, and was ranked by Cuvier along with them in the order of Rodents (*Rodentia*), although Sonnerat, who discovered it, pointed out its affinity also to the Makis or Lemurs, to which family it is now pretty generally referred. The principal reason for placing the A. among the *Rodents* has been found in the conformation of its teeth; but the other characters of the animal agree generally with those of the Lemurs, and its habits resemble theirs. The A. has large broad ears, large round eyes, long brownish gray hair, and a large bushy tail, which it does not carry over its back as squirrels do. It is very active during the night, but sleeps during the day. In confinement, it will subsist on boiled rice and fruits, but its chief natural food is a white insect. The teeth scratch away the bark of trees for insects, and the long claws serve to draw them out. The native name *Hai Hai* is derived from the creature's cry, *hi, hi* (see *Nature*, xxvi.).

Aye-aye.

AYESHAH, the favorite wife of Mohammed, was born at Medina in 610 or 611 A.D. She was only nine years of age when she married the Prophet. Her father's name was Abdullah, but he was surnamed Abu-Bekr, 'father of the virgin,' in consequence, it is said, of his daughter being the only one of Mohammed's wives who was a virgin. Although A. bore no children to Mohammed, she was so tenderly beloved by him, that he was wont to say that she would be the first of his wives to whom the gates of Paradise would be opened. It is stated by Mohammedan historians, that to the charms of her beauty she added a knowledge of mathematics, rhetoric, and music. But this statement is improbable. She was accused of adultery, but Mohammed having produced a revelation from Heaven to the effect that she was innocent, punished her accusers, and made it an article of faith for all time, that whoever should not believe in her purity should endure the pains of hell for ever. In his last illness, Mohammed, by his request, was carried to her house, and expired in her arms.

After the Prophet's death, A. took an active part in the plot which deprived Kalif Othman of his power and life, and headed a force to resist the accession of Ali. After some partial success, however, the troops under her were effectually defeated by Ali, and she was taken prisoner. Ali spared her life, and allowed her to reside in any town in Arabia she chose, provided she did not interfere with state affairs. She died at Medina (677 A.D.). In spite of her political adversities, A. was highly venerated by all true Mussuimans, and named the *Prophetess*, and the *Mother of Believers*. She was consulted on divers points of the Koran, and her interpretations were held to be binding. They have been collected in the *Sunna* (q. v.).

AY'LESBURY, a town in the center of Buckinghamshire, on a rivulet which flows into the Thame, an east branch of the Thames. The population of the electoral district in 1881 was 28,899; that of the town proper, only 7795. A., with its hundreds, returns two members to parliament. It is chiefly an agricultural town. Many fat ducks are reared in the neighborhood to supply the London markets at an early period of the season, when they fetch very high prices. A. is a very ancient town, having been taken from the Britons by the Saxons in 571.

AY'LESFORD, a village near the center of Kent, on the right bank of the Medway, 3½ miles north-east of Maidstone. Remarkable ancient remains occur here. On a hill-slope a mile and a half to the northeast, there still stands a celebrated ancient dolmen, or burying-place, called Kits Coity House—a small truncated pyramidal chamber, open in front, and formed of four large rude Kentish rag blocks, three of which are uprights, with a slight slope inwards, and the fourth laid on them. Of the side-stones, one is 7 by 7½ feet, 2 feet thick, and 8½ tons in weight; the second is 8 by 8½ feet, weighing 8 tons; and the third is smaller and more irregular in form. The capstone is 12 by 9½ feet, 2½ feet thick, and weighs 10½ tons. This dolmen seems to have been the center of a group of ancient monuments connected by a long stone avenue with another group, 7 miles to the south-east. In this district also occur, on the brow of the chalk-hills on both sides of the Medway, large circular sepulchral pits, opening at bottom into one or more chambers. Some of these pits are covered with flat stones, and filled with flints. At A. the Britons defeated the Saxons in 455, and drove them from the island; but early in the 7th c. the Saxons were victorious here.

AY'LOFFE, Sir Joseph, an English antiquary of celebrity, born about 1708 in the parish of Framfield, Sussex. In 1731 he was elected a Fellow of the Royal Society, and in the following year, a Fellow of the Society of Antiquaries. He was one of the first council of this Society, after it received its charter of incorporation in 1751; and he was made vice-president some years after. When the new State-Paper Office was established in 1763, he was made one of the commissioners for the preservation of the state papers. In 1772, he published a valuable work on the national records. He also wrote several useful papers for the publications of the Society of Antiquaries; and projected, and was engaged in the execution of the work, afterwards continued by Gough, and known as Gough's *Sepulchral Monuments*, at the time of his death in 1781.

AYMAR, Jacques, a celebrated French professor of the art of divination. A. was the son of a peasant of Dauphiné, and was born at St. Veran in September, 1662. He was brought up as a mason, but he forsook that trade for the divining-rod, which he used at first to point out springs, hidden treasures, &c. In 1692, a murder and robbery was committed at Lyon, and A. and his rod were called into requisition to detect the criminals. In some way or other, he succeeded in discovering one of the guilty parties. A.'s fame having been spread by this incident, he was called to Paris to exhibit his art before the Prince de Condé; but, unfortunately for his reputation, his power of divination utterly failed him; and being forced to confess himself an impostor, he was sent back in disgrace to his original obscurity.

AYMON, the surname of four brothers, called respectively Alard, Richard, Guiscard, and Renaud, sons of Aymon or Haimon, Count of Dordogne, who figure among the most illustrious heroes of the chivalric poetry of the middle ages; but their historic existence must be considered problematical, as the deeds attributed to them possess in so large a measure a miraculous character. What basis of fact may underlie the fanciful accretions of mythology, it is now impossible to determine. Their career belongs to the cycle of marvels, of which Charlemagne is the central point, and their adventures furnished rich material to the romantic narratives of Italy in the 15th and 16th centuries, and, in fact, were the exclusive subject of some of these. A novel, entitled *Les Quatre Fils Aymon*, by Huon de Villeneuve, a French poet of the age of Philippe Auguste, details very minutely their exploits. Finally, Ariosto conferred a poetical immortality on the family by the publication of his *Roland*, in which Renaud, the bravest of the four brothers, plays continually the most distinguished part. The traditions concerning them are not uniform or consistent. Some

have a Provençal origin; but the author or authors of the popular German book which Tieck has edited and published, entitled *The Beautiful and Entertaining History of the Four Brothers Aymon, and of their Horse Bayard, with the Deeds and Heroic Feats that they accomplished against the Pagans, in the Time of Charlemagne*, seem to have drawn from a different source. The most probable hypothesis, therefore, is, that the varieties in these poetic legends are due to the fancy and national predilections of the particular authors, and that there originally existed a single tradition, out of which the whole sprang.

AYR, the county town of Ayrshire, is situated on the left bank of the river Ayr, about the middle of the coast of Ayrshire, 40 miles south-south-west of Glasgow by rail. It lies in a coal district. A. is a clean and handsome town, and its principal streets are well built. To the south, between the town and the race-course, numerous elegant villas have recently sprung up. The spire of the Assembly-rooms is 217 feet, and the Wallace Tower 113 feet high. Three bridges span the river and connect the town with Newton-upon-Ayr—the 'Auld Brig' and the 'New Brig' (taken down in 1877, and rebuilt) of Burns, together with a railway bridge. Part of the tower of the old church of St. John, built in the 12th c., and turned into a fort by Cromwell, is still standing. A. harbor is formed by the estuary of the river, and is protected by piers and a break-water. A large wet dock has recently been built. The coasting-trade is considerable. The chief export is coal, 180,000 to 200,000 tons yearly being exported from the Ayr collieries. A considerable quantity of grain and timber is imported, and two lace factories have been established. At an early date, A. was a commercial and military place of some importance. William the Lion made it a royal burgh about 1202. During the Scottish wars of independence, it formed a regular center of military operations, and, while in possession of an English garrison, it was the scene (according to *Blind Harry* of Wallace's first exploits. The principal objects of interest near A. are connected with the memory of Robert Burns. See ALLOWAY KIRK. Pop. in 1871, municipal burgh, 7987; of the parliamentary burgh, 17,954. Pop. in 1881, of parl. burgh, including Wallacetown and Newton, 20,821. A. unites with Campbelton, Irvine, Inveraray, and Oban, in sending a member to parliament. Parliamentary constituency (1881—1882), 2287.

AYRSHIRE, an extensive maritime county in the south-west of Scotland, bounded, N., by Renfrewshire; W., by the Firth of Clyde and the North Channel; S., by Wigton and Kirkcudbright; E. and N. E., by Dumfries and Lanark. Its greatest length is 78 miles; its greatest breadth, 26—average 14¼; area, 1149 square miles, or 735,262 statute acres. It is the seventh in size of the Scottish counties. The general aspect of the county is undulating and hilly, the land attaining no great elevation, except a small portion in the north, and some considerable tracts in the south and south-east, which are mountainous. None of the eminences exceed 2000 feet. A. contains a great number of lakes and small streams, the latter rising near the inland boundary of the county. The chief rivers—only 25 to 35 miles long—are the Ayr, with its tributary the Lugar, and the Doon, which flow across the center of the county; the Garnock and Irvine in the north; and the Girvan and Stinchar in the south. A. to the south of the Girvan consists of Lower Silurian rocks, and to the north of that river, of patches of Devonian, carboniferous, and trap rocks. It is rich in valuable minerals, especially coal, ironstone, limestone, and freestone.

The other minerals have been long wrought, but it is only of late years that the working of ironstone has been established—and is now carried on on a large scale in the north of the county. On the banks of the Ayr, is found an excellent species of whetstone, called Water-of-Ayr Stone. The climate of A. is mild and healthy, but moist. The soil along the coast is light and sandy, interspersed with deep loam; the most fertile districts are in the center of the county, where clay predominates. On the east side are extensive mosses or moorlands. The three ancient divisions of the county are—Carrick, south of the Doon, mostly wild and hilly; Kyle, between the Doon and the Irvine, containing much rich level land, but towards the coast the soil is light, and, though well cultivated, is less productive; and Cunningham, comprising all the country north of the Irvine, mostly fertile. The characteristics of these districts are rudely indicated in the old country rhyme:

> Kyle for a man;
> Carrick for a coo;
> Cunningham for butter and cheese;
> And Galloway for woo.

Agriculture in A., till about 1800, was very backward; but since then, especially of late, extraordinary progress has been made in furrow-draining, improved rotation, and road-making; while the condition of the peasants has been much improved. In 1881, 317,719 acres were under crops and grass, held by about 3500 persons, the farms being generally small. Dairy-husbandry is carried to high perfection in Ayrshire, the breed of milch cows, of which it rears a greater number than any other Scotch county, being noted as the finest in the kingdom for the quantity and quality of their milk. The Dunlop cheese, so called from the parish of that name, is almost as celebrated as Stilton, but is now almost superseded by that made on the Cheddar process. The breed of horses is also excellent. Manufactures, especially woollen and cotton, are carried on to an important extent. At Catrine there are extensive cotton-works; at Kilmarnock, dye-works, iron-foundries, &c.; and at Cumnock, a large pottery. Of the minor manufactures, the most characteristic is that of ornamental wood-work, often bearing tartan designs, which is extensively carried on at Manch-line. Great ironworks exist at Muirkirk, Hurlford, Kilwinning, Ardeer, Dalry, and Dalmellington. Maybole manufactures shoes and agricultural implements. There are valuable fisheries on some parts of the coast. Troon, Ardrossan, Ayr, and Irvine are thriving ports. Pop. (1871) 200,809; (1881) 217,504; number of children from 5 to 13, receiving education in 1881, 34,833. A. county returns two members to parliament. The chief towns, besides Ayr, are Kilmarnock, Girvan, Maybole, Dalry, Kilwinning, Beith, Irvine, Stewarton, Ardrossan, Saltcoats, Troon, Manchline, Galston, Newmilns, Kilbirnie, and Largs. Of antiquities, the most interesting are the ruins of Crossraguel Abbey, near Kirkoswald, and of the castles of Turnberry, the family seat of Robert the Bruce, Dunure, Loch Doon, Dean, Auchinleck, Dundonald, &c.; also the ruins of Alloway Kirk.

A. was inhabited, in the time of Agricola, by the Damnii, with whom were afterwards mixed the Scots from the opposite coast of Kintyre. In the 8th c., the Northumbrian Saxons seized the territory; and afterwards came the Normans, whose traces still exist in local names. During the religious persecutions of the Stuarts, A. was a stronghold of the Covenanters.

AY'RER, JACOB, next to Hans Sachs the most prolific and important German dramatic writer of the 16th c. His history was involved in obscurity; but it is known that he was a citizen of Nürnberg in 1594, and a procurator in the courts of law. It was not till after his death, in 1605, that a collection of his pieces was published, consisting of 66 tragedies, comedies, and carnival plays (Nürnb. 1618). A. has the same garrulous breadth of dialogue as Hans Sachs, but is inferior to him in wit and humor.

AY'TON, SIR ROBERT, a Scottish poet and favorite courtier in the reign of James VI. He was a younger son of Andrew Ayton of Kinaldie, Fifeshire, where he was born in 1570. He was enrolled as a student in St. Leonard's College, St. Andrews, in 1584, and took his degree of M.A. in 1588. For purposes of study he next visited France, from whence he addressed, in 1603, an elegant panegyric, in Latin verse, to King James, on his accession to the throne of England. This poem appears to have been the making of A.'s fortune, for we find him afterwards appointed, successively, one of the gentlemen of the bedchamber, private secretary to the queen, and master of requests. Subsequently, he held the appointment of secretary to the queen of Charles I. King James employed him to convey copies of one of his works, conjectured to be his *Apology for the Oath of Allegiance*, to the German courts. A. was on terms of familiarity with all the most eminent men of his time—poets, wits, and philosophers alike—among others, Hobbes and Ben Jonson. He was himself a poet of considerable merit; but, unfortunately, a large number of his effusions being complimentary verses to his friends, are characterized by conceit and extravagant flattery. He was one of the first Scotsmen who wrote in English with any degree of elegance and purity. His verses on general topics 'are conceived in a refined and tender strain of fancy, that reminds us more of the fairy strains of Herrick than anything else.' Burns had a great admiration of some of A.'s pieces, two or three of which he paraphrased. A. is also said to have written verses in Greek and French, as well as in English and Latin. Several of his Latin poems are preserved in the work called *Deliciæ Poëtarum Scotorum*, printed at Amsterdam in 1637. A. died in Whitehall Palace, March 1638.

AY'TOUN, WILLIAM EDMONDSTOUNE, was a native of Edinburgh, having been born there in 1813. He received his education at the metropolitan university, and was called to the Scottish bar in 1840. In 1845, he was appointed Regius Professor of Rhetoric and Belles-Lettres in the university of Edinburgh; and after the formation of the Derby administration, in 1852, he was promoted to the shrievalty of Orkney and Shetland. He married a daughter of Professor Wilson. During many years, Professor A. devoted himself to literary work. The earliest work of his with which we are acquainted is entitled *The Life and Times of Richard I.*, published in 1840—a subject well treated, and singularly in consonance with his chivalrous and romance-loving nature. Despite his minstrel tendencies, he is a master of caricature and parody; and many of the most successful of the *Bon Gaultier Ballads* are understood to be from his pen. In 1849, he published the *Lays of the Scottish Cavaliers and other Poems*, which established his reputation as a poet of the school of Sir Walter Scott, and which has

run through many editions. Among his subsequent writings are —*Firmilian, a Spasmodic Tragedy*, published in 1854; and *Bothwell*, a narrative poem of considerable length, in the measure and manner of Sir Walter Scott, which was, after its first publication in 1856, to a large extent recast and improved. His edition of the *Scottish Ballads*, in 2 vols., appeared in 1858. In the ensuing year, he issued, in conjunction with his friend, Mr. Theodore Martin, translations of various minor poems of Goethe, in one volume. He was for many years one of the most frequent and brilliant contributors to *Blackwood's Magazine*. Professor A. was successful in quite opposite departments of literature—he was distinguished at once as a poet and humorist. His poems exhibit a ballad-like simplicity, and a fiery flow of narration—the special merits of the poetical school in which he graduated; while his tales—the best known and appreciated of which are *The Glenmutchkin Railway*, and *How I became a Yeoman*—possess a certain robust humor and farcical abondonment, and are related to the writings of the great masters of humor much in the degree that the 'screaming farce' is related to genteel comedy. His poetical powers appear in their greatest perfection in the *Lays of the Scottish Cavaliers;* the special merits of his humor are best exhibited in *How I became a Yeoman*. As a critic, he took up the knout of the dreaded Christopher North of the 'Noctes,' which he wielded with considerable dexterity and force. Professor A. died at Edinburgh, Aug. 4, 1865. His life has been written by Theodore Martin (Lond. 1867).

AYUNTAMIE'NTO is the name given in Spain to the councils or governing bodies of towns. Sprung from the institutions of the Romans, and firmly established during the long struggle with the Moors, the ayuntamientos acquired great influence and political power, the more so that the nobility were not excluded from them. Although this importance was impaired through the insurrection of Juan de Padilla in 1521; and at a later period, under the Bourbons, the last shadow of municipal freedom was lost; the remembrance of it continued to be cherished by the people. Accordingly, the cortes of Cadiz, in 1812, took up the leading features of the former system, adapting them, by more democratic modifications, to the requirements of the time. On the return of Ferdinand VII., the ayuntamientos were abolished; they were again restored by the cortes, in 1823; and after the invasion by France, once more set aside. During the civil war, various proposals were made regarding the ayuntamientos; but at last the arrangements of 1812 were confirmed by the constitution of 1837. According to that statute, the A., with the alcalde as president, is appointed by the free choice of the people, and is entitled to exercise the highest functions within the circle of its jurisdiction. The government can provisionally annul its acts, but must afterwards procure the ratification of the cortes, by which alone an A. can be dissolved. The ayuntamientos are empowered to make up the lists of electors and jurors, to organize the national guards, to command the police within their own bounds, to direct the apportionment and raising of taxes, and to manage the funds of the commune. In 1840, a bill was brought into the cortes, formed on the model of the French law, proposing to deprive the ayuntamientos of all political power, and restrict their functions to purely municipal matters, and also to limit the franchise to the most highly taxed. But the insurrection which this step excited, and which ended in the expulsion of the queen, Maria Christina, prevented the project from being carried out. At last, in 1844, a law, similar to that proposed in 1840, was, through the intriguing of Christina, supported by French influence, adopted by the cortes, then composed of moderados; and this law, with little alteration, continues in force to the present day.

AZA'LEA, a genus of plants belonging to the natural order *Ericeæ*, and distinguished from Rhododendron (q. v.) chiefly by the flowers having five stamens instead of ten. Most of the species of A. also differ from the rhododendrons in having thin deciduous leaves. Some botanits unite the genus *A.* to *Rhododendron*. One of the species best deserving of notice is A. *Pontica*, a shrub from three to five feet high, a native of the countries around the Black Sea, with large obovate or oblongolanceolate shining leaves and umbellate yellow flowers, which are externally covered with glutinous hairy glands, and are very fragrant. It may be regarded as, like many of the other *Ericeæ* (heaths, &c.), a *social* plant; and its golden flowers give great brilliancy to the landscape in many parts of the Crimea, the south-east of Poland, the Caucasus, &c. It covers many mountain slopes, but does not ascend to great elevations, giving place to the more alpine *Rhododendron Ponticum*. It is common in gardens and shrubberies in Britain, and varies with orange, red, and almost white flowers. The whole plant is narcotic and poisonous, and the honey collected by bees from its flowers, which very much abound in honey, is said to cause stupefaction and delirium, as happened to Xenophon's soldiers in their famous retreat in Asia.—North America abounds in azaleas as well as in rhododendrons, and some of the species have been long cultivated in Britain, particularly *A. nudiflora* and *A. viscosa*, which, with *A. Pontica*, have become the parents of many hybrids. Both have nearly white flowers, very beautiful, and of delicious fragrance. *A. viscosa* has the flowers covered with glutinous hairs like *A. Pontica;* but the flowers of *A. nudiflora* are nearly destitute of them. Both species abound from Canada to the southern parts of the United States. They are taller shrubs than *A. Pontica*. Upon account of its sweet smell, *A. nudiflora* is called in America the Upright Honeysuckle. *A. calendulacea*, a native of the southern parts of the United States, is described as frequently clothing the mountains with a robe of living scarlet.—India and China produce several species of A., of which one of the finest is *A. Indica*, well known in Britain as a greenhouse shrub. Its flowers exhibit great brilliancy of colors. Many hybrids exist between the more hardy species and this. Another extremely beautiful species is *A. ledifolia*, an evergreen, which has been introduced into Britain from China.

Azalea Indica.

A diminutive procumbent, evergreen shrub, a native of alpine regions in Europe and North America, plentiful on high mountains in Scotland, was long known as *A. procumbens*, but is now called *Loiseleuria procumbens*. The flowers are small and rose-colored. The whole appearance of the plant widely differs from that of the genus Azalea.

AZE'GLIO, MA'SSIMO MARQUIS D', famous as an artist, a publicist, a romance-writer, and a statesman, was the deseendant of an ancient and noble family of Piedmont. He was born in 1798 at Turin, where his father held a high military position. In his fifteenth year, A. followed his father to Rome, where he had been appointed ambassador, and there contracted a love for the fine arts; but his study of music and painting was cut short by his father procuring him an appointment in a Piedmontese cavalry regiment. Here A. devoted his leisure with such intensity to scientific pursuits, that he brought on an illness which forced him to quit the service. A journey to Rome, from which he returned to Turin in 1820, restored his health, but deepened his passion for painting. After some difficulty, he got his father's permission to devote himself entirely to this art. A year had hardly elapsed ere A. had made himself a name in Rome as an artist. In landscape-painting he soon attained complete artistic skill. After a residence of eight years at Rome, during which he had pursued the study of history along with painting, he returned to Turin. On the death of his father in 1830, he went to Milan, where painting was then flourishing. In Milan he made the friendship of Alexander Manzoni, whose daughter he married. A. now began to make himself favorably known also in literature, his novels, *Ettore Fieramosco* (1833), and *Niccolo di Lapi* (1841), having done much to fan the national spirit of the Italians. The political affairs of Italy soon occupied him exclusively; he traversed the provinces, cities, and villages, seeking to stir up the spirit of patriotism, and to conciliate the unhappy party divisions, and was everywhere received with rejoicing and acclamation. A. never belonged to a secret political society, but opposed conspiracies as mischievous, and exhorted the impatient to moderation. While in Florence, he wrote his famous piece, *Degli ultimi Casi di Romagna*, in which he lashed the miserable papal government, denounced the vain attempts at insurrection, and proved to the Italian princes the necessity of a national policy. After the election of Pius IX. as pope, A. returned to Rome, and to his influence were ascribed the reforms with which Pius began his government. He was intensely active at this time, and wrote much on public questions. (An edition of his political writings, collected in one volume, appeared at Turin, 1851.) When Charles Albert, after the rising of Lombardy, crossed the Ticino, A. left Rome with the papal troops destined to support the Italian contest. In the battle of Vicenza, where he commanded a legion, he was severely wounded in the leg while fighting at the head of his troops. Scarcely was he recovered, when with his pen he courageously opposed the republican party, now intoxicated with victory.

On the opening of the Sardinian parliament, he was chosen a member of the Chamber of Deputies. After the unfortunate event of the battle of Novara, the young king, Victor Emanuel II., appointed him (1849) president of the cabinet, an office which he undertook solely out of love to his king and country. His influence in this high position was most beneficial. At the close of the war in 1859, A. was appointed *pro tempore* General and Commissioner Extraordinary, purely military, for the Roman States. On his retirement, he issued a proclamation to the people, which greatly tended to strengthen their resolution by its noble yet temperate advice. He died on the 15th of January, 1866. Since his death, *Political Correspondence*, and other writings from his pen, have been given to the world; and his *Autobiography* has been published by his daughter.

AZERBIJA'N, or ADERBAIJA'N, the ancient *Media Atropatene*, is the most northerly province of Persia. It is situated between lat 36° and 40° N., long. 44° and 48° 40′ E.; bounded on the S. by Persian Kurdistan and Irak, E. by Ghilan, N.E. and N. by the Russian territory, and W. by Turkish Kurdistan. It has an area of about 30,000 square miles, and a population of 2,000,000. The surface of A. is very mountainous, many of the ranges rising from 7,000 to 9,000 feet in height. The peak of Savalan (an extinct volcano) reaches an elevation of 13,000 feet. Mount Ararat rises on the north-west border. The chief rivers of A. are the Aras or *Araxes*, the Kara Su, and the Kizil-Uzen. The salt lake Urumiyah or Urumieyeh (q. v.), the largest in Persia, is situated on the western border of the province. The climate of A. is not unhealthy, but it is subject to the extremes of heat and cold. The transition from cold to heat is very rapid. In the mountainous districts, the hail-storms are occasionally so violent as to kill cattle. The principal products of A. are rice, barley, wheat, maize, flax, hemp, cotton, tobacco, honey, and saffron; camels, horses, cattle, and sheep, are also reared; velvet, silks, stuff, carpets, woollens, and leather are the most important articles of manufacture, and a little is done in hardware. Lead, iron, copper, sulphur, saltpetre, and salt are found in the province. The capital of A. is Tarbiz, with a population of about 120,000. It has suffered greatly from earthquakes. The other towns of note are Urumiyah, on the lake of that name; Maragha, famous as the place where Nasir Eddin, the astronomer, fixed his observatory; Miana, Khoi, Selmas, and Ardebil.

AZIMABA'D, or TIROWLI, a town of Sirhind, India, on the route from Kurnal to Lodiana, 9 miles north-west of Kurnal. Its site is slightly elevated above the neighboring plain, which is inundated in the rainy season.

AZIMGHU'R, or AZIM'S FORT, a name primarily applied to a town in India, and thence extended to its district, forming one of the N.W. provinces. 1. The town is in lat. 26° N., and long. 83° 14′ E. From Calcutta, it is 448 m. to the N.W.; from Benares, 81 to the N.; from Allahabad, 109 to the N.E.; and from Lucknow, 171 to the S.E. It is situated on the north-eastern Tons, a considerable offset of the Gogra, which is here crossed by a bridge of boats, and which is navigable downwards a distance of 40 miles, to its confluence with the Surjoo. The town contained in 1871, about 14,000 inhabitants, besides the troops in garrison. During the mutiny of 1857, A. was, so far, a creditable exception to the general rule of ruthless cruelty among the insurgents. The sepoys did indeed mutiny, actuated, apparently, by a wish to appropriate a passing treasure of 7 lacs of rupees, or £70,000 sterling. But, having formed a square round their officers, and sworn to protect them, they brought carriages for them and their families, and escorted the whole ten miles toward Ghazeepore.—2. The district stretches in N. lat. between 25° 36′ and 26° 24′, and in E. long. between 82° 45′ and 84° 12′. Its area is stated to be 2550 square miles; and its population (1871) to be 1,531,410. This gives the average of 600 persons to the square mile. This exceptionally high average is the more remarkable from the circumstance that there are few, if any, populous towns in the district besides the capital. The district is low and remarkably level. The soil is fertile, excepting that a few tracts are irreclaimably barren, from being impregnated with soda, nitre, and other saline substances. Magnificent crops of rice, sugar-cane, and indigo are produced. The principal manufactures are those of silk and cotton, the value of which amounts to more than £100,000 a year.

A'ZIMUTH. The A. of a heavenly body is the angle measured along the horizon between the north or south point, and the point where a circle, passing through the zenith and the body, cuts the horizon. The word comes from the Arabic, and is said to be derived from a word signifying a quarter of the heavens. It is usual to measure the A. westward from the point most remote from the elevated pole, beginning at 0°, and returning to it at 360°. Thus, in northern latitudes, where the north pole is elevated, the A. is measured from the south point, so that the east point, for instance, has an A. of 270°. See ARMILLARY SPHERE. A. circles are those which extend from zenith to nadir, cutting the horizon at right angles, or those in which all the points have the same azimuth.

A'ZINCOURT, or AGINCOURT, a village in the department of Pas-de-Calais, France, celebrated for a bloody battle between the English and French, October 25, 1415. The internal distractions of France under the imbecile Charles VI. (q. v.) had encouraged England to attempt to make good her ancient claims on France. Henry V. of England had landed at Harfleur, had taken that fortress, and wished to march through Picardie to Calais, in order to go into winter-quarters. The Dauphin advanced against him with a powerful force. A great number of the nobility accompanied him; and so great was their confidence, that the offered aid of the Duke of Burgundy and of the city of Paris was rejected. Henry hastened to the Somme, but was followed by the French, who opposed his passage; he at last managed to cross with his army at St. Quentin. Greatly weakened in numbers, and suffering extremely from want of provisions, Henry offered to purchase peace by reparation of injuries. But the French would not hear of a treaty, as they entertained the hope of completely annihilating the English army. They had, in fact, intercepted the English march to Calais, by getting possession of the high road behind the little river Ternoise, near the villages of A. and Frameecourt. The invading army, therefore, still (according to French accounts) 14,000 strong, of whom 2000 were men-at-arms—though no English writer makes it more than 10,000—prepared for an engagement by posting themselves between two woods, in a single line of battle, with the archers on the wings. The French, to the number of 50,000, under the command of the Constable, D'Albret, were drawn up in two lines, the men-at-arms, of whom only 2000 were mounted, being in the first. The English were the first to begin the onset. The French cavalry rushed forward to meet them, but were received with such a storm of arrows that they took to flight, threw themselves upon the first line, and put it into disorder. On this, the light-armed English archers took to their billhooks and hatchets, broke into the ranks of the men-at-arms that fought on foot, whose heavy armor and close array rendered them almost incapable of resistance, and made the greatest havoc among them. This being followed by a charge of the English horsemen, the first line took to flight, the second was unable to arrest the victors, and the whole French army was soon completely dispersed. The victory was decided. For a moment, Henry believed that the rallying masses were going to renew the fight; and hearing also that a troop of armed peasants were plundering his baggage, he gave orders to slay all the prisoners taken. The order was already executed when he discovered the groundlessness of his alarm. As many as 10,000 Frenchmen were slain, among whom were the Constable and six dukes and princes, the Duke of Brabant, the Count of Nevers, the Duke of Alençon, the Duke of Bar and his two brothers. Five princes, among them the Dukes of Orleans and Bourbon, were taken prisoners. The English lost 1600 killed, including the Duke of York, the king's great-uncle, whom the Duke of Alençon slew. Alençon had even struck the crown from King Henry's head, when he was surrounded by all present, and fell with many wounds. Henry, however, was too weak to pursue his advantage, and therefore continued his march to Calais, where he embarked for England.

AZO'RES, a cluster of islands in the Atlantic, 800 miles due west of the southern half of Portugal, ranging in N. lat. between 36° 55′ and 39° 44′, and in W. long. between 25° 10′ and 31° 16′. In the first half of the 15th c., the A. was discovered by the Portuguese, or rather, it has been said, appropriated by them, after having been revealed to them by a Flemish navigator, Joshua Vanderberg of Bruges. They were at that time uninhabited—a fact which, so far as it goes, seems adverse to any notion that Americe could have been colonized from Europe in this direction. That the A. were visited by the Carthaginians is proved by Phœnician coins found on Corvo. As early as 1436, they are marked on a map of the world by the Venetian Andrea Bianco. The Portuguese colonists called the whole group A., from *acor* or *azor*, a hawk; and they named two individual islands Corvo and St. Jorgo, from Corvos Marinos and St. Jorsi, which, according to the maps of the 14th c., had been previously seen in the western ocean. In 1466, Alfonzo V. made a life-grant of the island of Fayal to his aunt, the Duchess of Burgundy, and from this circumstance many settlers migrated thither from Flanders. Without reckoning mere rocks, the islands are nine in number. Taken from east to west, they are as follows: St. Mary, St. Michael, Terceira, Graciosa, St. Jorgo, Pico, Fayal, Flores, and Corvo. The area of the group is estimated at 920 sq. miles; while its population is (1878) 264,352; yielding an average of 287 to a square mile. In the order of population and importance, the islands stand thus: St. Michael, Terceira, Pico, Fayal, St. Jorgo, Flores, Graciosa, St. Mary, and Corvo. The A. form a province of Portugal. Their capital is Angra, in Terceira; but Ponta Delgado and Ribeira Grande, both in St. Michael, are larger towns.

As may be presumed from the density of the population, the

soil is fertile, and the climate healthy. The islands are also well watered. The exports are oranges, wine, brandy, grain, pulse, pork, beef, cheese, and coarse linens; and the imports are woollens, cottons, hardware, iron, glass, cordage, pitch, tar, staves, timber, oil, fish, rum, coffee, sugar, salt, and tea. Perhaps the greatest want of the group is a good harbor. The A. are of volcanic origin—a fact from which may probably be inferred their identity with the Isles of Brazil or of Fire in the maps above mentioned, of the 14th c. Though most of the volcanoes themselves appear to be extinct, yet the islands contain hot springs, and are subject to violent earthquakes. The coasts are generally steep and rugged, while the interior parts abound in ravines and mountains. The mountains range from 1869 feet to 7613—the latter being the height of the lava-covered *peak* which gives name to *Pico*.

AZO'TE (Gr. *a*, depriver of, and *zoe*, life) is the name given by French chemists to Nitrogen (q. v.).

A'ZOTISED BODIES are those substances which contain azote or nitrogen as one of their constituents, and which form part of the living structure of a plant or animal, or are produced during its natural decay. The principal members of the group are *albumen*, present in white of eggs, and the juices of plants and animals; *globuline*, or *crystalline*, a variety of albumen found in the lens of the eye; *vitelline*, another variety of albumen, composing the greater bulk of the yolk of the egg; *paralbumen*, a third variety of albumen found in the animal system during certain diseases; *fibrine*, which occurs largely in the seeds of cereals and in animal muscle; *caseine* (or cheese matter), present in all milk; *legumine*, a variety of caseine found in pease, beans, and leguminous seeds in general; *gelatine*, which is present in the skin, bones, and other parts of animals; *chondrine*, a variety of gelatine obtainable from the cornea of the eye and the permanent cartilages; *isinglass*, another variety of gelatine manufactured from the inner membrane of the floating bladder of sturgeons and other fishes; *glue* and *size*, which are secondary forms of gelatine; *urea*, *uric acid*, and *hippuric acid*, which are present in the urine of the higher animals; *kreatine* and *kreatinine*, occurring in the juice of flesh; several forms of *urinary calculi*, which are found as stones in the bladder; and the very large and important class of *alcoloids*, including strychnine, morphine, quinine, &c. The principal members of the series of A. B. will be considered under their special headings; and the use of several of them as articles of diet will come into notice under FOOD.

AZO'TUS, the *Ashdod* of the Old Testament (now Esdud), a village on the Mediterranean, 21 miles south of Jaffa. Lat. 31° 45′ N., long. 34° 37′ E. It was formerly one of the chief cities of the Philistines, strongly fortified, and the scene of numerous contests between that race and the Jews. Into this city the Ark of the Covenant was brought by the Philistines, and placed in the temple of their god Dagon, whose image fell in pieces before it. In the 8th c. B.C., the town fell into the hands of the Assyrians; and in the following century was captured by the Egyptians, after a 29 years' blockade and siege. In the wars between Alexander Balas and Demetrius, A. was destroyed by fire. It was afterwards rebuilt by the Romans, but never regained its early importance. It has now a population of about 300, and the sea is gradually receding from its harbor.

A'ZOV, or A'SOW, a fortress and port-town in the south of Russia, situated on the Don, about 30 miles from its mouth. The sand and mud deposited by the river have choked up the port, so that its trade and shipping have dwindled away, and the inhabitants now depend mostly on fishing. Pop. (1880) 16,791. A. was anciently a Greek colony, under the name of Tanaïs, and carried on extensive commerce with the northern peoples. In number of inhabitants and in wealth it often rivalled Panticapæum (now Kertch). In the 13th c. it was taken possession of by the Genoese, who called it Tana. They were driven out of it by Timur (Tamerlane) in 1392. In 1471, it was taken by the Turks, and since then has borne the name of A., the Turks calling the town and the neighborhood sea Asak. After an obstinate struggle, at which Peter the Great, then beginning his career, was present, it was captured by the Russians about the end of the 17th c. It more than once fell again under the dominion of the Turks, but at last, in 1774, remained in the undisturbed possession of Russia. It was bombarded and destroyed by an allied English and French squadron in 1855.

A'ZOV, SEA OF, named after the town, is a large gulf of the Black Sea, formed by the peninsula of Crimea, or rather an inland lake connected with the Black Sea by the long narrow strait of Kaffa. The Siwash or Putrid Sea is the western portion of the Sea of A. cut off by the long narrow slip of low sandy land called the Tongue of Arabat. The entrance to the Putrid Sea is by the narrow strait of Genitschi at the north of the Tongue. The Putrid Sea is little but a succession of swamps. The ancient name of the Sea of A. was Palus Mæotis. It gets the name of Balik-Denghis, or Fish-sea, from the Turks and Tatars, from its abundance of fish. The water is almost fresh. The whole sea is shallow, and occupies an area of about 14,000 square miles. During Crimean war, an expedition, having on board 16,500 English, French, and Turks, was sent to this sea in May 1855, which devastated the ports, and cut off supplies intended for Sebastopol.

AZ'TEC CHI'LDREN. In the year 1853, there were brought over to this country from America two diminutive children, a boy and a girl, said to be aged respectively 17 and 11, and who were represented as descendants of the ancient Aztecs. The height of each was under 3 feet. Their figure was slender and not ill-proportioned; that which was chiefly remarkable being their features. While the forehead and chin receded, the nose was so singularly prominent as to suggest the idea of the face of a bird. Yet, with dark lively eyes, an olive complexion, and glossy long black hair, and a great fund of good-nature, they were far from unpleasing. They spoke no intelligible language, but understood a few words of English, and seemed to have a taste for music. Shown to the public as curiosities, they were usually exhibited on a large table, on which they ran about amusing themselves. Their exhibitor told a very incredible story of how they had been obtained from the ancient city of Iximaga, where they were reverenced as gods. A certain Señor Velasquez, accompanied by a Canadian and an American, penetrated into this ancient city of Central America, where they made the acquaintance of one of the guardian priests of these undersized deities, who was so charmed with the accounts of the outer world, that he resolved to steal the gods of his people, and escape with the strangers. One after the other—the Canadian, the American, and the priest—were overtaken by disaster, and Velasquez alone was left to tell the wondrous tale, with no attestation but such as the children themselves furnished. Professor Owen considered them mere dwarfs, and other authorities held a similar opinion. Belonging probably to some Indian tribe, they were doubtless monstrosities; and this becoming apparent, interest in them ceased.

AZ'TECS. The name of the dominant tribe in Mexico at the time of the arrival of the Spaniards. See MEXICO, ANTIQUITIES OF.

AZU'A, a town of the island of San Domingo, not far from the south coast, on the Bia, and near its mouth, 60 miles west from San Domingo. Pop. 6000.

AZUA'GA, a town of Estremadura, Spain, in the province of Badajos, 20 miles east from Llerena. Pop. 8400.

AZU'NI, DOMENICO ALBERTO, a distinguished jurist, born at Sassari, in the island of Sardinia, August 3, 1749. He early applied himself to the study of law, devoting himself particularly to the maritime relationships of nations. He became judge of the Tribunal of Commerce at Nizza or Nice; and in 1795, after that city had been taken by the French, he published a work in which he endeavored to reduce maritime laws to fixed principles, and which, being recast, was published at Paris in 1805 under the title of *Droit Maritime de l'Europe*. The work was sufficiently anti-British in tone to secure its author the favorable consideration of Napoleon's ministry, by whom he was appointed one of the commissioners for compiling the new commercial code, the maritime portion being allotted to him. Genoa having been annexed to France, A., in 1807, was appointed president of the Court of Appeal there, where he remained until the fall of Napoleon. Among other things, A. published an *Essai sur l'Histoire Géographique Politique et Morale de la Sardaigne*, and a *Dictionary of Mercantile Jurisprudence*, and some controversial brochures. For some time after he had withdrawn from Genoa, he resided at Nice, and afterwards in his native island, where he was appointed, by King Charles Felix, judge of the consulate of Cagliari, and librarian to the university of that city. He died in January 1827.

A'ZURE, a French word technically used in Heraldry to signify blue. In engraving arms, it is always represented by horizontal lines.

A'ZURINE (*Leuciscus cæruleus*), a fish of the same genus with the roach, chub, &c., and most nearly resembling the Red-eye (q. v.) or Rudd (*L. erythrophthalmus*), from which, however, it is readily distinguished by the slate-blue color of the back, and the whiteness of the abdomen and fins. It is a fresh-water fish, and was first described by Yarrell from specimens received from Lancashire, where it is called the Blue Roach, but it is also an inhabitant of some of the Lakes of Switzerland.

A'ZURITE, a name which has been given to the mineral more commonly called Lazulite (q. v.), and to which, along with Lapis Lazuli (q. v.) or *Azure-stone*, mineral turquoise (see TURQUOISE), &c., the generic name, *Azure Spar*, is sometimes given.—The name A. is also given by mineralogists to an ore of copper, generally known as *Blue Copper* (see COPPER), nearly allied to Malachite (q. v.), and remarkable for its beautiful azure color.

B.

THE second letter in the Hebrew or Phœnician alphabet, and in all alphabets derived from it, belongs to the order of labials, and is of the kind called medial or flat. See LETTERS, ALPHABET. Its name in Hebrew is *beth*, signifying 'house,' probably because its original hieroglyphic or picture form was an outline of a house or tent. In the corresponding words of sister-languages, we find *b* very generally replaced by some one of the other labial letters [*p*, *f* (*ph*), *v*]; these substitutions, however, take place not by chance or caprice, but according to ascertained laws. See PHILOLOGY, COMPARATIVE, and GRIMM'S LAW. The following are some examples of the interchange of *b* with other letters: Corresponding to Eng. *bear* are Sansc. *bhri*, Lat. *ferre*, Gr. *pherein:* Eng. *be*, Sansc. *bhu*, Lat. *fio* and *fui*, Gr. *phuo:* Eng. *bore*, Lat. *forare:* Eng. *of* and *off*, Gr. *apo*, Lat. *ab:* Eng. *wife*, plural *wives*, Ger. *weib*, Old H. Ger. *wip:* Eng. *web*, *weave*, *weft:* Ger. *episcopos*, Eng. *bishop*, Fr. *cvêque*. In several Latin words, *b* arose out of *u* (pronounced like *v* or *w*). Thus, the original form of *bellum*, war, was *duellum* or *dvellum;* of *bonus*, *dvonus;* and the *d* being dropped (as we drop the sound of *k* in *knee*), the *v* became hardened into *b*. Similarly, *bis*, twice, is for *duis*. A remarkable interchange sometimes takes place between *b* and *m*, as in Sansc. *mri*, to die; Lat. *mort-*, death; and Gr. *brotos*, mortal.

The Greeks pronounced their *b* (*β*) like a *v*, for they spelled *Virgilius*, e. g., *Birgilios;* and this continues to be the case in modern Greek. In Latin, during the classical ages at least, the letter was pronounced as it is in English, French, &c. But in the time of the later emperors (beginning with the 3d c. of our era), *b* was softened down, in the popular language at least, to a slovenly sound like *v;* for in inscriptions of this period, such spellings as *verva* for *verba*, *mirivila* for *mirabili*, are quite common. The distinction between the two sounds being once lost sight of, the letter *b* was frequently substituted for *v*—as *berba* for *verba*, *bivus* for *vivus*. This softening of *b* into *v* in the middle-age Latin, has left traces in the modern Italian and French; as Lat. *habere*, Ital. *avere*, Fr. *avoir;* Lat. *tabula*, Ital. *tavola*. A Spaniard, on the contrary, has a tendency to use *b* instead of *v;* thus he pronounces *vivere* like *bibere*, and *Jovis* as if written *Jobis*.

B, in Music, is the seventh degree of the diatonic scale of C, and the twelfth degree of the diatonic-chromatic scale. In harmony, it is called the major seventh. According to the tempered system of tuning, the ratio of B, to the fundamental note C, is $\frac{8}{15}$. In the ancient diatonic scale, B was never used as a key-note, as its fifth, F, was imperfect. In the German notation, B is called H, while B flat is called simply B. B flat is half a tone lower than B, and in harmony is called the flat seventh. As a harmonic arising from C, B flat, as produced by nature, is considerably flatter than in the tempered system of tuning.

BA'AL, a Hebrew word signifying *lord*, *owner*, or, *master*, and applied as a general title of honor to many different gods. In Hosea ii. 16, it is mentioned as a name which had been given to Jehovah himself, but when used with the definite article it especially designated the principal male deity of the Phœnicians and Carthaginians, as Baaltis or Astarte was the principal female deity. In connection with Babylon and Assyria, the same deity is spoken of under the name of Bel or Belus. Originally, B. was the god of the sun, the ruler, and vivifier of nature, and Astarte the goddess of the moon. In the later star-worship of the western Asiatic nations, B. was the name of Jupiter, the planet of fate, or as some suppose, of Saturn. The proper Phœnician name of B., however, was Melkart, Melkrat, or Melchrat, which is usually supposed to mean 'king of the city'—i. e., Tyre; but others consider it a contraction of two words signifying 'king of the earth;' while the learned Selden is of opinion that it is equivalent to 'strong king.' B. was perhaps the same god as the Phœnician Moloch. The Greeks confounded B. or Melkart with their own Hercules; and, for the purpose of distinction, termed him the Tyrian Hercules. From the earliest foundation of Tyre, he seems to have been the tutelar god of that city, and his worship apparently extended thence until it was prevalent in all the towns of the Phœnician confederation, and was established in their remotest colonies, such as Malta, Carthage, and Cadiz. It also overspread the neighboring countries of Assyria and Egypt. Each country or locality had its B. or chief god. According to Scripture, the temples of this idol (at least in Phœnicia and Assyria) were built on the tops of hills, or still more frequently in solemn groves, and sometimes altars were erected to him on the roofs of houses. His priests were numerous. Incense was the most frequent offering presented to him, but we also read of sacrifices of bullocks, and even of children. In 1 Kings, chap. xviii., we read that the priests of B. danced about the altar during the sacrifice, and barbarously cut and mangled themselves, if their god did not speedily answer their prayers.

Fig. 1.—Baal, or Melkart.
From a copper coin of Cossyra in the British Museum. (Twice the size of the original.)

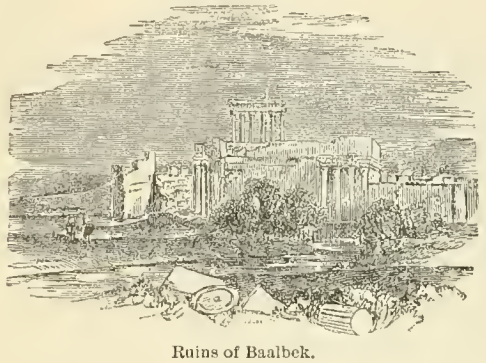
Fig. 2.—Baal:
In a warlike aspect, with four legs, representing the pervading energy and rapidity of the sun.

The word B. enters into the composition of many Hebrew Chaldee, Phœnician, and Carthaginian names, such as Jezebel Hasdrubal ('Help of Baal'), Hannibal ('Grace of Baal'), Ethbaal ('With Baal'), Baal-bee ('City of Baal'). The word is also frequently found in conjunction with some epithet, and in such cases appears to have denoted a different deity, though it is not impossible that it may have been the same person regarded in another aspect, and as exercising merely a different function. Thus, we have Baal-Berith, 'the Covenant Lord,' who was specially worshiped by the people of Shechem; Baal-Peor, the *Priapus* of the Moabites and Midianites; and Beelzebub, or Baalzebub (the Fly-god), the idol of the Philistines at Ekron, where he had a temple.—The Celtic deity Beal is usually identified with Baal. See BELTEIN.

BAA'LBEK, the name of a ruined city in the ancient Cœle-Syria, signifies the 'City of Baal,' the Sun-god, and was by the Greeks, during the Seleucide dynasty, converted into Heliopolis. Lat. 34° 1′ 30″ N., long. 36° 11′ E. It is situated in the plain of Bukâ'a, 'at the northern extremity of a low range of bleak hills, about one mile from the base of Antilebanon,' in a well-watered and delightful locality, rather more than 40 miles north-west of Damascus. It was once the most magnificent of Syrian cities, full of palaces, fountains, and beautiful monuments. It is now only famous for the splendor of its ruins, of which three deserve speical notice. The most imposing is that of the great Temple of the Sun, which was a rectangular building, 290 feet by 160, having its roof supported by a peristyle of 54 Corinthian columns, '19 at each side, and 10 at each end.' Of these, six are yet standing. The circumference of these columns is about 22 feet, and the length of the shaft 58; with pedestal, capital, and entablature, they measure about 89 feet in height. The approach to this temple was through two spacious courts, surrounded on all sides with porticos and other buildings. Except the columns mentioned, little of the great temple, or of the buildings in front of it, is left standing, but the ground is covered with their ruins. The vast size of the stones used in the substructions is remarkable, some of them being 60 feet long and 12 thick. South from the great temple is a smaller one, known as the Temple of Jupiter. It is similar in form, having its peristyle and the walls of its cella still mostly standing. Its dimensions are 227 feet in length, by 117 feet in breadth, being thus larger than the Parthenon at Athens. Both temples, as well as the surrounding structures, are built of limestone, in a richly decorated somewhat fantastic Corinthian style. Besides these, there stands at the distance of 300 yards from the others a circular building, supported on 6 granite columns; style, mixed Ionic and Corinthian. It was once used as a Christian church.

The early history of B. is involved in darkness; but it is certain that, from the most distant times, it had been a chief seat of sun-worship, as its name implies. Julius Cæsar made it a Roman colony, and under Augustus it was occupied by a Roman garrison. B. had an oracle held in such high esteem, that in the 2d c. A.D.,

it was consulted by the Emperor Trajan prior to his entrance on his second Parthian campaign. To test the prescience of the oracle, Trajan sent to it a blank piece of paper, which was returned to him blank. This gave him a high opinion of its powers, and he consulted it in all seriousness a second time. The response was some dead twigs from a vine, wrapped up in cloth. Trajan's decease some two years afterwards, and the transmission of his bones to Rome, was deemed a sufficient interpretation of the symbolical utterance, and confirmed the celebrity of the oracle. Antoninus Pius (138—161 A.D.) built the great temple, which the legend current among the modern inhabitants counts a work of Solomon. This temple is said to have contained a golden statue of Apollo, or of Zeus, which on certain annual festivals the chief



Ruins of Baalbek.

citizens of Heliopolis bore about on their shoulders. When Christianity, under Constantine, became the dominant religion, the temple became a Christian church. In the wars that followed the taking of the city by the Arabs, who sacked it in 748 A.D., the temple was turned into a fortress, the battlements of which are yet visible. The city was completely pillaged by Timur Bey, or Beg, in 1400 A.D. Both city and temple continued to fall more and more into decay under the misery and misrule to which Syria has been subject ever since. Many of the magnificent pillars were overturned by the pachas of Damascus merely for the sake of the iron with which the stones were bound together. What the Arabs, Tatars, and Turks had spared, was destroyed by a terrific earthquake in 1759. B. is now an insignificant village, with a population of some few hundreds. See Wood and Dawkin's *Ruins of Baalbec* (1757); Cassas, *Voyage Pittoresque de la Syrie*) 1799; Murray's *Handbook for Travelers in Syria and Palestine;* Baedeker's *Syria and Palestine* (1875).

BA'BA, a Turkish word signifying *father*, originating like our word *papa*, in the first efforts of children to speak. In Persia and Turkey, it is prefixed as a title of honor to the names of ecclesiastics of distinction, especially of such as devote themselves to an ascetic life; it is often affixed in courtesy, also, to the names of other persons, as Ali-Baba.

BA'BA, Cape, a bold rocky headland near the western extremity of Anatolia—the Lectum of the Greeks—in lat. 39° 29′ N., long. 26° 4′ E., about twelve miles from the northern extremity of Mitylene, the ancient Lesbos. On a shelving point of the cape stands the town of Baba, with a population of about 4000, who do some trade in cutlery of a superior quality. The once large and prosperous, but now utterly ruined city of Assos, mentioned by St. Paul, is in the vicinity.

BABATA'G, or BA'BA DAG, a city with 10,000 inhabitants, in the sandjak of Silistria, in the north-eastern part of European Turkey. It is situated in a marshy district; has a high school and five mosques, of which that built by Bajazet I. is the finest. It was Bajazet that founded the city, which he peopled with Tatars, and named after a saint, whose monument, on a hill near by, is resorted to as a place of pilgrimage. Through the port of Kara-Kerman, lying a short way to the south, the inhabitants of B. carry on a considerable commerce with the Black Sea.

BA'BBAGE, Charles, born in 1790, entered early at Trinity College, Cambridge, where he took his degree of B.A. in 1814. In 1828, he was elected Professor of Mathematics in his own university, an office which he filled for eleven years. B. united, in the most happy combination, powers of invention and observation with thorough scientific culture. Among his writings, we notice first his extremely correct and well-arranged *Tables of Logarithms* (Lond. 1834). He was the first to make the method of constructing such tables the object of earnest study. The difficulty of securing accuracy in getting up tables on a large scale, led him to the idea of committing the execution of the work to a machine. Being commissioned by the government to superintend the construction of such a machine, before beginning the work, he visited a great many manufactories and machine establishments, both in Britain and on the continent, in order to become acquainted with all the resources of the mechanical art, and thus be in a position to make a combined use of them in his great undertaking. This survey afforded him the necessary information for his able work, *On the Economy of Manufactures and Machinery* (Lond. 1832)—a book which has run through several editions, and been translated into several languages—in which all mechanical processes are classified from the most scientific point of view, and the most interesting examples of the more important kinds of manufacture are described. Besides his *Comparative View of the Different Life-assurance Societies*, his *Differential and Integral Calculus*, his *Decline of Science* (1830), *A Ninth Bridgewater Treatise*, and *The Exposition of* 1851 (1851), B. contributed a number of very interesting papers to the Transactions of the Royal Societies of London and Edinburgh.—With regard to B.'s calculating machine, which, from some cause not well explained, was never completed, see Calculating Machines. He died October 18,1871.

BA'BEL, Tower of. For an account of this building, and the confusion of tongues which it brought about, see the 11th chapter of Genesis. The distinction of being a remnant of the Tower of B. has been claimed for three different masses: 1st, for Nimrod's Tower at Akkerkuf; 2d, the Mujellibe, 950 yards east of the Euphrates, and five miles above the modern town of Hillah; 3d, the Birs Nimrud, to the west of that river, and about six miles to the south-west of Hillah—the whole situated in Babylonia (q. v.). The last of these has the majority of opinions in its favor. Every one, it is said, who has seen the Birs Nimrud, feels at once that, of the ruined mounds in this region, there is not one which so nearly corresponds with his previous notions of the Tower of Babel. According to Mr. Rich, it is of an oblong form, the total circumference being 762 yards. At the eastern side it is cloven by a deep furrow, and is not more than 50 or 60 feet high; but on the western side it rises in a conical figure to the elevation of 198 feet; and on its summit is a solid pile of brick 37 feet high by 28 in breadth, diminishing in thickness to the top, which is broken and irregular, and rent by a large fissure extending through a third of its height. It is perforated by small square holes, disposed in rhomboids. The fire-burnt bricks of which it is built have inscriptions on them; and so excellent is the cement, which appears to be lime-mortar, that it is nearly impossible to extract a brick whole. The other parts of the summit of this hill are occupied by immense fragments of brickwork, of no determinate figure, tumbled together, and converted into solid vitrified masses, as if they had undergone the action of the fiercest fire, or had been blown up with gunpowder, the layers of brick being perfectly discernible. These ruins stand on a prodigious mound, the whole of which is itself in ruins, channelled by the weather, and strewed with fragments of black stone, sandstone, and marble. Sir R. K. Porter has shown that the intense vitrifying heat to which the summit has been evidently subjected, must have been the result of fire operating from above, and was probably produced by lightning. This is a curious circumstance, taken in connection with the ancient tradition that the Tower of B. was rent and overthrown by fire from heaven. Porter thinks that the works of the Babylonish kings, especially the stupendous temple of Belus, which was erected on the site of the old Tower, concealed for a while the marks of the original devastation; and that now the destructions of time and of man have reduced it to nearly the same condition in which it appeared after the confusion. Mr. George Smith discovered the legend of the building of B. among the Assyrian tablets in the British Museum, and gave an account of it in his *Chaldean Account of Genesis* (1875).

BAB-EL-MA'NDEB (i. e. 'the Gate of Tears') is the name of the strait between Arabia and the continent of Africa, by which the Red Sea is connected with the Gulf of Aden and the Indian Ocean, so called from the danger arising to small vessels from strong currents. The Arabian peninsula here throws out a cape, bearing the same name as the strait, rising to the height of 865 feet. About 20 m. distant from this cape stands the wall-like coast of Africa, rising in Ras Sejan to the height of 380 feet. Within the straits, but nearer to Arabia, lies the bare rocky island of Perim (q. v.), now occupied by the English as a fort; the strait on the east side of this island is called the Little Strait, and that on the west the Great Strait. The depth of the former varies from 8 to 12 fathoms; that of the latter reaches 185 fathoms. The first is usually chosen by vessels on account of its affording good anchorage. Close to the African coast lie eight small islands, called the Eight Brothers.

BA'BER, or BA'BUR (Zohir-Eddin Mohammed), the first of the Great Moguls in India, a descendant of Timur, was born in 1483. He was barely 12 years of age when he succeeded his father, Omar Sheikh Mirza, in the sovereignty of the countries lying between Samarkand and the Indus. With a view to the conquest of India, although constantly contending with revolts in his own dominions, he made himself master, by fraud and force, of the provinces of Kashgar, Kundez, Kandahar, and Cabul. Having

thus opened the way to India, he made two or three rapid incursions into Hindustan; and finally taking advantage of the feeble government of Ibrahim Lodi, about the end of 1525, he crossed the Attock (the Cabul branch of the Indus), quickly defeated some bodies of troops that opposed him in the Punjab; and at last, in April 1526, on the plain of Panipat, not far from Delhi, encountered and fought a decisive battle with his enemy, whose army was far superior in numbers. The 100,000 men and 1000 elephants of Sultan Ibrahim were dispersed; Ibrahim himself fled; and B. made his entry into Delhi. In the following month, Agra, the second city of the empire, surrendered. B.'s enjoyment of empire in India was short; he died in 1530, having had to contend during the five years of his reign with numerous conspiracies and revolts. To the talents of a general and statesman, which he manifested in his conquests, his improvements of public roads, measuring of lands, adjustment of taxation, postal arrangements, &c., B. united a taste for science and art. He wrote, in the Tatar language, the history of his own life and conquests, which was translated into Persian by Abdul Rachim, and, more recently, from the Persian into English. B. was succeeded on the throne of Delhi by the eldest of his four sons, Humayun, and was the founder of the B. or Great Mogul dynasty.

BABEUF, FRANÇOIS NOEL, generally known by the name of 'Cains Gracchus,' which he affixed to his political articles, was born in 1764 at St. Quentin, in the department of Aisne, France. On the breaking out of the Revolution in 1789, he became a fanatical advocate of the popular demands. During the Reign of Terror he took up a position of hostility to Robespierre and the Terrorists. In his journal, established at Paris in July 1894, and termed *The Tribune of the People*, he preached the sovereignty of the masses, and defended the absurdest consequences flowing from that political doctrine. He was in favor of a new distribution of the land, of the abolition of every political order, and the equality of all individuals, wise and foolish. His violent language caused him to be imprisoned. On his release, he attached himself to the members of the extreme Jacobin party, which had just been overthrown. A secret conspiracy was formed, the aim of which was the destruction of the Directory, and the complete re-establishment of the democratic constitution of 1793, which had been suspended during the Reign of Terror. The plot was discovered through the treachery of one of the members. B. and other chiefs were seized, imprisoned, and ultimately brought to trial. B. defended himself with the courage of a fanatic, and overwhelmed his judges with abuse. He was of course condemned to death, and was guillotined on the following day, May 24, 1797. B. was a weak-headed enthusiast, without talent or culture; but abler men in the conspiracy made use of his furiously resolute character to secure the ends they had in view.

BA'BINGTON, ANTONY, an English gentleman of the county of Derby, head of a conspiracy in favor of Mary Stuart of Scotland. The rivalry between Queen Mary and Queen Elizabeth of England was at the same time a contest between Catholicism and Protestantism. Accordingly, the various plots for rescuing Mary from the power of her enemy wore the same character, and have been misrepresented and judged of according to the ecclesiastical prejudices of each historian. B., young, rich, a zealous Catholic, and on that account already an enthusiastic admirer of the unfortunate Mary, was induced, through the agents of a determined conspirator, Morgan, who had been arrested in France at the instance of the English court, to put himself at the head of a plot that had for its object the murder of Queen Elizabeth, and the rescue of Mary. The execution of the murder was undertaken by one Savage, in which he was to be assisted by a number of the Catholic nobility, as circumstances might require. The day of action was fixed for the 24th of August 1586. B. reserved the deliverance of Mary for his own share, entered into correspondence with her, and received letters purporting to be from her in return, approving of the assassination of Elizabeth. The secretary, Walsingham, not only had all the threads of the plot in his hand, but contributed, through his emissaries, to spur on the conspirators to the execution of their plans. When the right moment was come, B. and his accomplices were arrested, and condemned. B. made no denial, acknowledged the letters to Mary to be his, and, September 20, 1586, laid his head on the block. Savage, Barnwell, Bollard, Abington, Tichburne, and Tilnee, had a like fate. Mary Stuart herself had, four months later, to ascend the bloody scaffold; and her condemnation was justified chiefly on the ground of those letters received by Babington. Mary, however, denied to the last moment that the letters were written by her hand, or with her knowledge; and her friends constantly maintained that they were the work of Walsingham himself, in order that the unhappy queen might be got rid of with a show of justice. The rest of Walsingham's conduct in this affair, as well as the way in which he was in the habit of supporting Elizabeth's views in general, give at least a high degree of probability to the accusation.

BABOO'N (*Cynocephalus*), a genus of the Monkey family, or *Simiadæ* (see MONKEY), and distinguished from all the rest of that family by the very elongated muzzle, which terminates abruptly, and is pierced with nostrils at the end like that of a dog. The face has, indeed, a general resemblance to the face of a dog. The dentition agrees with that of the other apes or monkeys of the Old World, to which the baboons are entirely confined, being only distinguished by the remarkable strength of the canine teeth. Baboons, like almost all the monkey family in the Old World, have callocities upon the buttocks; and, like the greater part of them, they have cheek-pouches. The tail of some of the species is of considerable length, that of others is a mere tubercle, with an erect tuft of hairs. The physiognomy of all baboons is repulsive and indicates the fierceness which strongly characterizes them, and in which they differ from monkeys in general; some of the larger ones are dreaded by the inhabitants of the countries in which they are found; the danger to be apprehended by them being increased by the numbers in which they usually herd together. Their fore and hind legs are so proportioned, that they walk easily, and run swiftly on the ground; but, like all other quadrumanous animals, they climb rocks and trees with great agility. Their hair is long, forming a sort of mane on the upper parts. All of them are very susceptible of cold, and they seldom live long when removed from their native tropical countries. They feed chiefly on fruit and roots: some of them inhabit barren and stony places where scorpions abound, which they seize, adroitly deprive of the sting and devour. They are very cunning, mischievous, and revengeful; troops of them sometimes enter a plantation, not merely to plunder, but apparently to amuse themselves by destroying whatever they can find; they seem, however, always to have some appointed to keep watch, and they make off with great rapidity on the first signal of alarm. When plundering, they cram their cheek-pouches before they begin to eat. These cheek-pouches are very capacious: a B., kept in confinement, has been seen to put eight eggs into them at once, and then to take out the eggs one by one, to break them at the end, and deliberately to suck their contents. The larger baboons are sometimes hunted by dogs where they have not trees to take refuge in; but a single dog, however powerful, cannot safely attack them; a baboon will seize a dog by the hind legs, and whirl him round and round till he is stupid. Baboons are not so easily domesticated as many kinds of monkey; however, they are not quite incapable of it when taken young. 'Happy Jerry,' a mandrill or rib-nose B., which was long a great object of attraction at Exeter Change, used to sit with great gravity in an arm-chair, awaiting orders, which he obeyed with slowness and composure. He smoked tobacco, but did not seem much to relish it, and was rather induced to do it by a bribe of gin and water, for which his fondness was unquestionable.

As examples of baboons with tails of considerable length, may be mentioned the Chacma, or Pig-faced B., also called the Ursine B. (*C. porcarius*), a native of South Africa; and the Dog-faced B. (*C. Hamadryas*), a native of Arabia, Persia, and the mountains of

Mandrill or Rib-nose Baboon.

Abyssinia. The latter species, perhaps the only one known to the ancients, is often sculptured on the ancient monuments of Egypt, and it is supposed to have been the species of monkey to which divine honors were paid. Its body was frequently embalmed, and B. mummies are still found.—The Chacma is one of the largest of the baboons, about the size of an English mastiff, and very much stronger: it is common on the mountains of the Cape Colony, and in troops would be very formidable, but that they usually scamper out of the way, instead of attacking travelers, unless they are provoked. It is of a dark-brown color, with long shaggy hair. The tail is rather more than half the length of the body, and is terminated by a tuft of long black hair.

The short-tailed, or almost tail-less baboons, far exceed their long-tailed congeners in ugliness. Only two species are certainly known—the Mandrill or Rib-nose B. (*C. Mormon*), and the Drill (*C. leucophæus*), both natives of Guinea. The Mandrill is the

largest, fiercest, and most powerful of the whole genus. The colors of its fur are very fine, of a light olive brown above, and silvery gray beneath; but besides other things unpleasant to the sight, its face is peculiarly hideous; the cheek-bones in the adult males being enormously swollen, so that the cheeks are protuberant to the size of a man's fist upon each side, and ribbed with blue, scarlet, and purple. In their native forests, mandrills generally live in large troops, and are said to put to flight every other wild beast.

BA'BRIUS, a Greek fabulist, who lived about the close of the Alexandrian age, or the beginning of the succeeding Romano-sophistic period, made a considerable collection of Æsopian fables (see ÆSOP), which he turned into verse, in a natural and popular style. Several versions and transformations of these were made during the middle ages, and have come down to us under the name of *Æsop's Fables*. Bentley, who, in his *Dissertatio de Babrio*, was the first to recognize in these fables of Æsop the original work of B., endeavored to restore portions of the verses, and pointed out other fragments of the genuine B. in other quarters. A few fables were added from manuscript by Furia, Korais, and Schneider, and all that was known at the time was collected by Knoche (Halle, 1835). At last, in 1842, a Greek of the name of Minoides Minas, employed by the French government to explore the convents of the East, discovered a manuscript with 123 hitherto unknown fables of B., a copy of which he made and brought to Paris, where they were published in 1844. The best edition is that by Lachmann (Berl. 1845).

BA'BYLON, BABYLO'NIA. Babylonia was the name given in ancient times to the flat country about the lower course of the Euphrates, called in modern times Irak-Arabi. In the Old Testament, it is called Shinar, Babel, and also 'land of the Chaldees;' and by the later Greek and Roman writers, occasionally Chaldæa. Its proper boundaries were: on the N., towards Mesopotamia, the Euphrates and the Median Wall, which extended from the junction of the Chabur with the Euphrates to the Tigris; on the E., towards Assyria and Susiana, the Tigris; on the S., the Gulf of Persia; and on the W., the desert of Arabia. During the wider extension of the Babylonian dominion, the name comprehended also Assyria and Mesopotamia. The country forms a perfect plain, which is a continuation of that of Assyria. The two rivers, Euphrates and Tigris, here approach each other most nearly, until their blended waters fall into the Persian Gulf. The country was once protected from flooding by numerous canals and embankments, and several artificial lakes, which are now mostly in ruin. The most important canal was that now known as Nahr-el-Melik, which is undoubtedly the ancient royal canal that joined the two great rivers. It was kept in repair by the Roman emperors, and was serviceable as late as the 7th c. The soil, naturally fertile, was rendered more so by the garden-like way in which it was cultivated, and yielded abundant crops, especially of wheat, barley, and dates. The want of stone and wood was more severely felt than in Assyria. The only building material was brick, for which the soil afforded abundance of clay. The bricks were either dried in the sun or burnt, and were very durable, resisting, in the ruins, the effects of the weather to this day. Mineral bitumen, springing up everywhere in abundance, served as mortar. In this favored plain, the human race attained early a state of social and political organization, the oldest, indeed, that antiquity gives us any account of.

Until recently, the early history of Babylonia was doubtful and dark. The only sources were a few incidental notices in the Bible; some fragments derived at third hand from the perished writings of Berosus, a Babylonian priest, who had translated the annals of his country into Greek; and lastly, the notices of Greek writers, chiefly Herodotus. But the whole is confused and contradictory, and history and mythology were jumbled together.

But light is now breaking in upon the darkness. In recent years, multitudes of brick tablets, stamped with cuneiform (see CUNEIFORM) characters, have been dug up from the ruins of the great cities that once studded the banks of the Tigris and Euphrates; and in these we find ourselves in possession of contemporaneous records of events reaching back 30 centuries before the Christian era, and restoring a page of human history that was apparently lost.

At the earliest period to which the records carry us back, the population of the whole valley of the Tigris and Euphrates consisted mainly of tribes of Turanian origin, their language having remarkable affinities with those of the Ural-Altaic group of the Turanian nations, e. g., the Finns, the Magyars, and Turks. Closely allied tribes occupied the whole region south-west of the Caspian Sea—Media, Armenia, Elam, Susiana. In that region lies Ararat, the 'Mountain of the World,' and to that region the traditions of those Turanians pointed as the cradle of their race. But the earliest records reveal the existence of a Semitic element in the population of the Euphrates valley, coming in apparently from the south-west—Arabia and Egypt. The infiltration of this foreign element went on increasing for centuries, until at last it got the upper hand, and the Babylonians and Assyrians, when they became known to the historians of the West, were essentially Semitic peoples. Their civilization, however, was merely a development of what they took up from the original inhabitants.

The dominant people in Babylonia in the earliest times were the Accad, or Accadians. They had come originally from the mountains of Elam, to the east of the Tigris, and hence their name Accad, which means 'highlanders.' They brought with them the art of cuneiform writing, as well as other arts and sciences, especially astronomy. It is in the Turanian language of these Accadians that the cuneiform inscriptions of Babylon are written for many centuries. And when the Semitic tongue had become predominant, Accadian, now a dead language, was to the Assyrians what Latin has been to the nations of modern Europe: Assyrian scholars translated the Accadian literature into their own language, and their technical and sacred terms were borrowed from it. Every day is bringing to light new proofs of the influence of these Accadiens upon the civilization of the Semitic nations, and through them upon that of Europe.

Greece, it is well known, derived its system of weights and measures from the Babylonian standards; but these have been proved to be of Accadian origin. The Greek *mina* or *mna*, the fundamental unit of the Greek monetary system, is the *maneh* of Carchemish, and *maneh* is found to be not a Semitic but an Accadian word, showing the origin of the system. The sexagesimal division of the circle; the signs of the zodiac; a week of seven days, named as we now name them, and the seventh a day of rest, are all Accadian. Every large city had its public library. In the royal library of a Babylonian monarch, Sargon (about 2000 B.C.), every tablet was numbered, so that the reader had only to write down the number of the tablet he wanted, and it was handed to him by the librarian. Among the multifarious subjects of this extensive literature there are hymns to the gods strikingly like the Hebrew psalms; and in a long mythological poem there is an episode giving an account of the Deluge almost identical with that of Genesis, only more detailed. See ASSYRIA. The Accad religion was originally a Shamanism (q. v.), similar to what still prevails among the Turanian tribes of Siberia; but it gradually developed into a huge system of polytheism, which was adopted and modified by the Semitic inhabitants. The Accadians were great in magic, and the Greek *magos*, a magician, is derived from an Accadian word equivalent to 'reverend.'

The city of Babylon was not the first seat of power. The earliest records yet discovered are those of a monarch whose capital was Ur (now Mugheir). Art was already far advanced, and the extent of the monarch's resources is seen in the ruins of the temple of the sun-god built by him; it is calculated that 30,000,000 bricks must have been used in its construction. Centuries, apparently, after this, a fresh invasion from Elam is recorded, to which the exact date can be assigned of 2280 B.C. Another Elamite conqueror, named Cudur-mabug, extended his sovereignity over Palestine, and it is inferred that a sovereign of this dynasty is the Chedorlaomer of Genesis (the name in Accad would be *Kudurlagameri*, 'worshiper of the god Lagamaru'). Sometime after this, the seat of power was finally fixed at Babylon, and the Semitic tongue now began to supersede the Accadian.

The cities in the northern division of the country had been founded by the colonists from the south, and were long ruled as dependencies of Babylonia. At length they grew into the independent kingdom of Assyria; and in the 14th c. B.C. an Assyrian monarch captured Babylon. From that time the position of the southern state becomes more and more subordinate to the northern, and finally sinks into a province. Babylonia, however, was not always a submissive vassal. Under the leadership of Chaldæan chiefs, it made many struggles for independence. The Chaldæans are first heard of in the ninth century before Christ as a small Accadian tribe on the Persian Gulf; but they became so prominent in these struggles that they latterly gave their name to the whole province of Babylonia, which came to be styled Chaldæa. The name of one of those Chaldæan chiefs, Merodach-Baladan, occurs both in Scripture and in the inscriptions. From the former, we know that this king sent a message to Hezekiah, king of Judah, ostensibly to inquire about his recovery, probably with a view to an alliance against Assyria; and from the latter, that Merodach was expelled by Sargon, king of Assyria, that he made a fresh attempt to recover his throne, and was finally dethroned by Sennacherib. The complete subjection of B. to Assyria at this time (680 B.C.) is proved also from the Scripture account which states that Esarhaddon, son of Sennacherib, reigned in Babylon. About fifty years afterwards, Nabopolassar, governor of B. for the Assyrian king, proved faithless to his trust, and entered into an alliance with the Median king, Cyaxares, for the overthrow of the ruling state. See ASSYRIA. This undertaking was successful, and B. now (625 B.C.) became, though it was but for a short time, an independent and conquering power. The son of Nabopolassar, Nebuchadnezzar II., next defeated the Egyptian king, Necho, at Circesium (Karche-

mish), on the Euphrates (604 B.C.), and thus annihilated the Egyptian dominion in Asia. He then subdued Jehoiakim, king of Judah; and in consequence of repeated revolts, destroyed Jerusalem, and put an end to the kingdom of Judah under Zedekiah (588 B.C), carrying the inhabitants captive to Babylon. The Phœnicians submitted to him voluntarily, with the exception of Tyre, which underwent an obstinate siege without yielding. After a fortunate expedition against Egypt, Nebuchadnezzar turned his attention to the adornment of his capital; and the greater part at least of those buildings usually ascribed to a very early period, and especially to the mythical Semiramis, belong to him. After his death (562 B.C.), the Neo-Babylonian empire fell to pieces as suddenly as it had sprung up, and under Nabonedus (Nabunita, in the cuneiform inscriptions, and in Herodotus, Labynetos), who had entered into an alliance with Crœsus of Lydia, against Persia, it came under the dominion of Cyrus (539 B. C.). The Belshazzar of Scripture is thought to be the son of Labynetos, to whom was confided the defence of B., while the elder prince held Borsippa. From this time B. appears on the Persian monuments as a Persian satrapy, under the name of Babirus.

With the overthrow of the Persian monarchy, B. came under the short-lived dominion of Alexander the Great, who died in that city (323 B. C.). Seleucus I., to whom it had been promised at the conference of Triparadisus, contested and won the possession of it from Antigonus (312 B. C.). About 140 B. C., it was taken from the Syrian monarchs by the Parthians. It came into the hands of the Romans only temporarily, first under Trajan (114 A. D.), under Septimius Severus (199 A. D.), and again, under Julian (363 A. D.). When, in 650, the successors of Mohammed put an end to the new Persian monarchy of the Sassanides, the province of B., where Bagdad was built (762—766), became the seat of the califs till 1258. Since 1638, when the Turks, for the second time, took it from the Persians, it has been under the dominion of Turkey, divided into the pachalics of Bagdad and Basra.

The classic writers represent the civilization of the ancient Babylonians as of a high stamp. The government was despotic, of a kind to suit a crowded, luxurious, and effeminate population. Arts and commerce were highly flourishing—the last was carried on by caravans with Bactria, Persia, and Media, perhaps as far as India, and by shipping on the Persian Gulf with Arabia. B. was famous for its dyes, its cloths, and embroideries, especially for the manufacture of rich carpets with inwoven figures of strange animals and arabesques, such as we yet see on the Nineveh sculptures. The general prosperity was such, that B. and Assyria together were able to pay to Persia, in the time of Darius Hystaspes, a yearly tribute of 1000 talents (upwards of £280,000)—a sum greater than that contributed by any other province.

The Babylonians were notorious for their effeminacy, luxury, and licentiousness. Their religion was nearly allied to that of the Phœnicians. The essential part of it was the worship of the powers of nature, as they are manifested in the larger heavenly bodies and in the fertility of the earth. At the head of their system of belief stood Baal (see BAAL), reverenced through the whole of Mesopotamia and Canaan, who represented, in a general way, the power of nature, without having any moral significance, and was specially identified with the sun. Along with him stood, as feminine complement, the goddess Baaltis, the receptive Earth, with whose worship all manner of licentious rites were associated. She makes her appearance principally as Melyta or Mylitta—i. e., 'the causer of generation.' How nearly she is related to Ashtaroth (among the Greeks, Astarte), whose functions are so similar, it is not easy to determine. Education and religion were in the hands of the caste of the Chaldees, who occupied themselves at the same time with astronomy and astrology, and kept records, from the earliest times, of their astronomical observations, associating with them the chronicles of their kings. Their scientific acquirements must have been considerable. Engraved cylinders and gems, and the remains of their pottery, testify to their progress in these departments of art; and their architecture, according to the testimony of the ancients and the ruins still remaining, deserves to be ranked high.

Apart from canals, bridges, embankments, and sluices, the interest on the subject of Babylonian architecture is concentrated in the ruins of the capital, BABYLON. The accounts that we find in the ancients of the origin, the greatness, and the structure of the city, are exceedingly confused. The god Belus is named as its founder, and also Queen Semiramis; how we are to understand the two statements is not explained. Semiramis, according to the account of Diodorus, employed on it two millions of workmen, collected from all parts of her dominions. With the capital of the older kingdom, the accounts of the ancients known to us have, for the most part, nothing to do; they are all to be referred to the resuscitated and adorned residence of Nebuchadnezzar. Herodotus gives a description of the city, apparently from his own observation. It stood on both sides of the river, in the form of a square, the length of whose sides is variously given; by Herodotus it is stated at 120 stadia, making the whole circumference 60 miles. It must be remembered, however, that the walls, like those of most oriental towns, enclosed rather populous districts than cities, so that the whole mass of the population might easity find shelter within the space enclosed. It was surrounded by a wall 200 cubits high, and 50 cubits thick, and furnished with 100 brazen gates—the last number is raised by Diodorus to 250. The city was built with extreme regularity, with broad straight streets crossing one another at right angles; and the two parts were connected by a roofed bridge built of hewn stones, fastened together with iron clamps. Of this bridge, not a trace has yet been discovered. The western part of the city is undoubted the older, belonging to the early and properly Babylonish dynasty. Here stood, in the middle of the city, as it is described, the famous temple of Belus or Baal, called by the Arabs, Birs Nimrud. See BABEL, TOWER OF. The next important point on the west side is the mass of ruins called Mujellibe, which was probably the royal citadel of the old Babylonian monarchy. On the east side of the river stood the buildings of the Neo-Babylonian period, among which the 'Hanging Gardens' of Semiramis are to be singled out as one of the wonders of the world. Of these gardens, Diodorus has left us a detailed description. Their ruins may be recognized in the mound called El-Kasr. The city suffered greatly from the Persian conquest. When it revolted under Darius I., and, after a siege of two years, was recaptured through the ingenuity of Zopyrus, the outer walls were demolished. Xerxes plundered the temple of Belus, which had been hitherto spared, and Herodotus found it empty. Although the Persian kings made B. their residence, nothing was done for the restoration of the city; and Alexander the Great, who, on his entrance, in 331 B.C., had promised the inhabitants to rebuild the ruined temple, was unable even to clear the rubbish, although he employed 10,000 workmen for two months. After his death in the palace of Nebuchadnezzar, and the foundation of Seleucia on the Tigris by Seleucus Nicator, B. went rapidly to decay. This was partly owing to the new city's being built of the materials of the old, and partly to the want of durable materials for monumental buildings. Stones of any size had to be brought from the mountains of Armenia; their place was mostly supplied by burned brick.

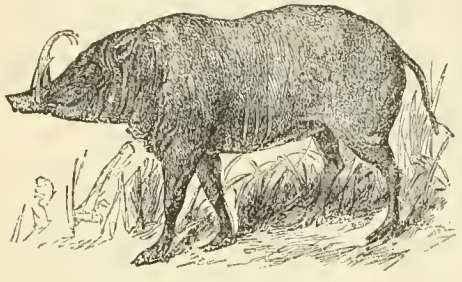
As early as the time of Pausanias, there was little to be seen but the ruins of the walls. The older Arabian geographers know, indeed, of a village, Bâbil, but speak more of the great masses of ruins. Since the time of Della Valle, who erroneously looked upon the ruin Mujellibe as the tower of Belus (in which he is followed by Rennel), the site of B. has been the object of many travels and researches. The greater number of the explorers, among whom Rich is the most distinguished, consider the town of Hillah, with 7000 inhabitants, as the representative of the ancient Babylon. The great masses of ruins, from which we must not, with Rennel, exclude the Birs Nimrud, embrace, indeed, an enormous extent, but agree perfectly with the accounts of the ancients in being arranged in the form of a square. Some time ago, Rawlinson transferred the site of B. to Niffer; but before anything can be determined, researches must be made on the spot, which could hardly fail to lead at the same time to valuable results, like those of Botta and Layard in Assyria, and increase the collection of cuneiform inscriptions, which are yet only fragmentary. See Rich's *Memoirs on the Ruins of Babylon*, and his *Personal Narrative of a Journey to England by Bussorah, Bagdad, the Ruins of Babylon;* Rawlinson's *Five Great Monarchies;* Layard's *Nineveh and Babylon;* Lenormant's *Langue Primitive de la Chaldée; Transactions of the Society of Biblical Archæology;* Smith's *Assyrian Discoveries;* Sayce's *Babylonia*, in the *Encyclopædia Britannica.*

BABYLO'NISH CAPTI'VITY. In the despotic policy of the East in ancient times, it was a rule to remove the rich and leading inhabitants of a conquered province to a distant part of the empire, where they were separated by nationality, language, customs, and religion from the great body of the population, and thus rendered politically harmless; while the people that remained behind were by this means deprived of influential leaders. The inhabitants of Judea underwent oftener than once a deportation of this kind, after they came into conflict with the powerful kingdom of Assyria. Thus, the kingdom of Israel was put an end to under King Hosea (722 B.C.), by the Assyrian monarch Salmanassar, who, after taking the capital, Samaria, carried the principal inhabitants into captivity in Assyria, and brought stranger tribes into the land of Israel in their stead; these, with the Israelites that remained, formed afterwards the mixed nation of the Samaritans. The most remarkable exile, however, befell the tribe of Judah under Nebuchadnezzar. Zedekiah, king of Judah, warned in vain by the prophet Jeremiah, allied himself with the king of Egypt against the sovereignty of Babylon. Nebuchadnezzar soon appeared with a powerful army before Jerusalem, which he took (588 B.C.). King Zedekiah had his eyes put out, and he and the principal part of the inhabitants were carried captive to Babylon. It is this Captivity, the duration of which is usually reckoned at 70 years, although, strictly speaking, it lasted only 56 years, that

is called, by way of distinction, 'the Babylonish Captivity.' The situation of the exiles was in other respects tolerable. Most of them settled down, and acquired property, and even riches; many were called to court, and even raised to high offices in the state. They were allowed to retain their organization by families, and lived by themselves essentially according to the Mosaic law.

They had also their own chief, and were allowed the free exercise of their religion. Nor did they want consolation and encouragement; for Ezekiel raised among them his powerful prophetic voice, and the idea of the Messiah became more clearly developed. When Cyrus overthrew the Babylonian empire (538 B.C), he allowed the Jews to return to their own country. Only the tribes of Judah, Benjamin, and Levi, availed themselves of this permission, the other ten tribes disappear from history after the Captivity. It is probable that they had become so mingled with the Babylonians, a people of kindred origin, that they had ceased to remember the country of their race. Vain attempts have, in recent times, been made to discover the ten lost tribes. Some learned men have sought for them in China and India, while others have declared the Afghans to be their descendants, and even the North American Indians. A more probable conjecture, perhaps, is, that they were the ancestors of the Nestorians in the mountains of Kurdistan.

BABYROU'SSA (*Sus Babyroussa*), a species of Hog (q. v.) inhabiting the forests of Java and the Molucca Islands, remarkable for the extraordinary tusks of the upper jaw, which rise like horns



Babyroussa (*Babirussa alfurus*).

through the bone and integuments, are long, somewhat slender, and curved backwards; their use being probably similar to that of horns. The animal is sometimes called the Horned Hog. Its limbs are much more slender than those of the common hog.

BACCHIGLIO'NÉ, a river of Northern Italy, having its source in the Alps, and its outlet in the Adriatic. It passes through the town of Vicenza, where it is crossed by a fine bridge of nine arches; flows through the plain of Padua, and enters the Adriatic about 3 miles south of Chioggia. Its whole course is about 90 miles, and it is navigable by large boats from Vicenza to the sea.

BA'CCHUS, the god of wine (called in Greek Bakchos, Dionysos, also, especially in the Mysteries, Iakchos), was the son of Zeus and Semele, the daughter of Cadmus. Before his birth, Semele, fell a victim to the insidious counsels of the jealous Here, who induced her to petition Zeus to visit her in his proper form and majesty—i. e., attended with thunder and lightning. The mother was of course consumed, but the six-months-old B. was saved by being enclosed for some time in the thigh of Zeus. He was first consigned to the care of Ino, the sister of Semele, and her husband Athamas; but when Ino and Athamas were driven mad by Here, Zeus caused him to be carried to Nysa, in Thrace, and given in charge to the nymphs. It was here that B. taught the cultivation of the vine, and prepared intoxicating drink from the grapes. In order to impart his discovery to mankind, or, as some say, because Here smote him with madness, he wandered through many countries attended by the Nymphs, who were crowned with ivy and vine-leaves, and bore in their hands the *thyrsus*, a pole bound round with leaves and fruit. This expedition, according to a later form of the myth, extended to Bactria and Media, to Egypt and India, where B. is said to have erected pillars as the eastern boundary of the world. Wherever he came in his wide progress, there is a Nysa to be found. The worship of the god, which came originally from the East, and was introduced into Greece by Melampus, was thus spread over nearly the whole of the then known earth, and at the same time the myth of B. was variously modified among the different peoples, so that it has become one of the most perplexed and difficult. B. was, besides, the protector of fruit-trees, and of fruits in general. His worship being thus extensively spread, and his festivals being held with music and song, he naturally received a great many surnames; for example he was called Lenæos, from the wine-vat (*lenos*); Bromius, from shouting (*bromos*); Euios (in Latin, Evius), from the exclamation *Euoi*, &c. The mythical march or expedition above spoken of, was suggested to the fancy by the Bacchanalian festivals, at which Bacchantes roved about in feigned madness, and made midnight processions to the mountains by torchlight.

Bacchus.

B. met with much opposition on his expeditions, many refusing to acknowledge his divinity. Thus, Lycurgus, king of the Edones, opposed him, and also Pentheus of Thebes, who was on that account torn to pieces by his own mother and her sisters. The daughters of Mynias (q. v.), who refused to celebrate his festivals, were punished by him with madness and metamorphosis. As he was crossing the Naxos, the Tyrrhenian sailors wished to carry him off to Italy, and, with this view, bound him; but the chains fell off, vines and ivy entwined the ship, and held it fast in the middle of the sea. B. changed himself into a lion, and the sailors from terror leaped into the sea, where they were transformed into dolphins. Those, on the contrary, who received him with hospitality and reverence, were rewarded; such as Midas (q. v.). In general, the character of B. is mild. In works of art, his type is that of a youth inclining to effeminacy. His peculiar ornament is the fillet. The long blond hair is bound up in a knot behind, and only a few locks fall down on both sides over the shoulders; the hair is surrounded by a twig of vine or of ivy. His figure is neither stout nor slim. He is usually represented quite naked; sometimes with a wide robe negligently thrown over, which either covers a part of the shoulders and thighs, or, though more rarely, enwraps the greater part of the body. Frequently, a deer-skin hangs across the breast; at times, he wears shoes, more rarely, buskins. From this, the properly Grecian B., the bearded or Indian B. is completely distinct. This last appears in a more dignified, lofty, regal form; he is clad in a tunic reaching to the feet, over which we wears a wide and splendid mantle. As a warrior, he wears a short tunic girded round the waist, with buskins on the feet; a panther's skin serves him for a shield. In addition, he is to be seen at times with horns. After the institution of the Eleusinian Mysteries, the service of B. was conjoined with these; accordingly, Pindar makes him the companion of Demeter. As the followers of Orpheus held him to be also Apollo, he is associated with the Delphic oracle.

The worship of B. consisted in noisy rites. Thebes, in Bœotia, held to be the birthplace of the god, was considered the chief seat of those rites in Greece. In Athens, the worship of the Lanæan B. was the most ancient, and may be traced back to ante-historic times. The chief offerings made to him were goats and oxen; the last, because he himself was conceived and represented under the form of an ox. The Bacchic festivals deserving special notice are —1. The Attic Dionysia, of which the minor, or country Dionysia, were celebrated in the country in the month Poseideon, at the time of the grape-gathering. Among the characteristic amusements of the occasion were the Askolia, which consisted in smearing full wine-skins (*askoi*) with oil, on which young peasants attempted to leap with one foot, and by their frequent falls produced merriment. There were also dramatic entertainments. This festival was probably held at the approach of the wine-harvest, and that of the Haloa at its close. These were followed, in the month Gamelion, by the festival of the Lenæa, which was peculiar to the city of Athens. The festivities on the occasion, besides theatrical representations, consisted in a great banquet, for which the state provided the meat, and in a procession through the city, attended with the jesting and raillery usual at Bacchic ceremonies.

After the Lenæa came the Anthesteria, on the 11th, 12th, and 13th of the month Anthesterion, when the new wine was first drunk. On the second day of this festival, the chief solemnity consisted in a great public dinner, at which the guests, crowned with flowers, and to the music of trumpets, entered into regular contests in drinking, and in a private sacrifice for the prosperity of the state offered by the 'king archon's' wife, who was at the same time symbollically married to the god. On the third day, a sacrifice was offered to the Chthonian Hermes and to the souls of the dead. Last came the great Dionysia, which were celebrated in the month Elaphebolion, and at which new comedies and tragedies were represented. 2. The Triateric Dionysia, which were celebrated every third year in the middle of winter. The performers were women and girls (called in Greek, *Mœnades;* in Latin, *Bacchæ* or *Bacchantes*), and the orgies were held at night, on the mountains, with blazing torches and the wildest enthusiasm. This mystic solemnity came from Thrace, and its institution is referred

to Orpheus. When it was adopted in Greece, cannot be exactly determined. It is earliest met with in Bœotia, particularly at Thebes, where the Cithæron was the scene of celebration. An important place in connection with it is also Parnassus, on the highest summit of which the women of Attica and Delphi celebrated nocturnal orgies in honor of B. and Apollo. The Mænades or Bacchantes were clad on the occasion in fawn-skins, swung about the 'thyrsus,' made a great noise with clapping of hands, and danced wildly with streaming hair. In this ecstatic solemnity, the god himself was represented by the victim sacred to him, the ox, which the Mænades in their fury tore in pieces. In the most ancient times, even human sacrifices were not uncommon. Descriptions of these wild and terrible rites are not unfrequent in the poets. 3. The Bacchanalia of later times, the foundation of which was laid in Athens, during the Peloponnesian war, by the introduction of foreign rites. From Greece they were carried to Italy. As early as 496 B.C., the Greek worship of B. was introduced at Rome along with that of Ceres; and Ceres, Liber, and Libera were worshiped in a common temple. In honor of these deities, the Liberalia were celebrated on the 17th of March, and were of a yet simpler and ruder kind than the great Dionysia of Athens. Afterwards, however, these rites degenerated, and came to be celebrated with a licentiousness that threatened the destruction of morality and of society itself. They were made the occasion of the most unnatural excesses. At first, only women took part in these mysterious Bacchic rites, but latterly men also were admitted. When the evil had reached its greatest height, the government (186 B.C.) instituted an inquiry into it, and rooted out the Bacchanalia with the greatest severity. This was the occasion of the well-known *Senatus Consultum de Bacchanalibus*. Mention of them, however, still occurs at a later period under the emperors.—Wild, excessive revels are still called Bacchanalia.

Bacchant.

BA'CCIO DELLA PORTA, better known by the name of Fra Bartolomeo di San Marco, one of the most distinguished masters of the Florentine school of painting, was born at Savignano, in Tuscany, in 1469. His first teacher was Cosimo Roselli; but he owed his higher cultivation to the study of the works of Leonardo da Vinci. His subjects are mostly religious, and by far the greater part of his pieces belong to the later years of his life. He was a warm adherent of that bold reformer of church and state, Savonarola (q. v.), after whose tragical end he, 1500, took the habit of the cloister, and for a considerable time renounced art. The visit of the young Raphael to Florence in 1504 seems to have been instrumental in stimulating him to return to it. He imparted to Raphael his knowledge of coloring, and acquired from him a more perfect knowledge of perspective. The two remained constant friends—B., on one occasion, finishing certain of Raphael's unfinished works, Raphael performing a like kindness for him another time. B. died at Florence, 1517. The greater number of his works are to be seen at Florence, in the gallery of the Pitti Palace.

BACH, Baron Alexander, an Austrian statesman, was born January 4, 1813, at Loosdorf, in Lower Austria, where his father held a judicial position. At the age of 24 he was promoted to the rank of Doctor of Laws, and then entered the imperial service, in which he remained about nine years. During this period also he traveled over the greater part of Europe and some of the countries of Asia. He was on terms of friendship with the members of the opposition of Lower Austria, and belonged to that circle of young men who well understood the failings of the old system, and the inevitability of a change in the organization of Austria. He took an active part in founding the Juridico-political Reading Club, and courageously defended it against the police. On the occurrence of the events of March 1848, B. took a distinguished place as mediator. He formed part of the Provisional Committee of the Commons, and was also chosen in April, by the states of Lower Austria, one of their representatives in the Central Commission of the Provincial States of Austria.

In this, the outset of his political career, B. already showed a leaning to those views which he afterwards manifested as minister. He advocated the centralization of the Austrian monarchy, and declared himself against the independence of Hungary, as well as against the entry of the German provinces of Austria into the German confederation. But he also desired an extension of the basis of the states, and of their parliamentary influence in the direction of public affairs. During the occurrences of the 15th of May 1848, B. kept away from Vienna.

When, after these occurrences, the old liberal opposition came to the helm, B., undertook the ministry of justice. He now entered with talent and energy into the remodelling of the whole system of Austrian law. On the other hand, the part he took in the assembly brought upon him the hatred of the 'left,' and of the democratic party generally. The opposition was particularly bitter on the question of removing the burdens from peasant proprietors, on which B. maintained the principle of compensation, and wished a part of that compensation to be made good by those who had hitherto borne the burdens in question. His policy, also, with regard to Hungarian affairs met with violent opposition from the 'left.' In the events of the 6th of October 1848, B. would have fallen a victim to popular fury, like the war-minister Latour, had he not found an opportunity of withdrawing from pursuit. On the formation of the Schwartzenberg-Stadion ministry, he again took the portfolio of justice, and participated in the measures regarding Hungary and all the important steps taken by that ministry. On the withdrawal of Stadion in May 1849, B. took his place at the head of the ministry of the interior, from which he was sent, in 1859 as plenipotentiary to Rome—a mission which terminated in 1865. Among his most important labors as minister of the interior are the constitutions for the different crown-lands, as well as the organization of their political administration.

BACH, Johann Sebastian, a celebrated musician, born at Eisenach, Upper Saxony, in March 1685. When he was ten years old, his father, who was a musician at Eisenach, died, and B. sought the protection of an elder brother, who, dying soon after, he was again left destitute, and, to earn a livlihood, entered the choir of St. Michael's, Lüneburg, as a soprano singer. In 1703 he became court-musician at Weimar, and, the following year, organist to a new church at Arnstadt. His reputation in this capacity soon spread, and in 1708 he was appointed court-organist at Weimar, by the reigning duke. While holding this office, he labored assiduously to make himself master of every branch of music. In 1717, he was made director of concerts, and six years afterwards, director of music, and cantor to St. Thomas's School, Leipsic, an appointment which he held to his death. About ten years later, the honorary distinctions of Kapellmeister to the Duke of Weissenfels, and court composer to the king of Poland, were conferred upon him. B., who had a son in the service of Frederick the Great, received a pressing request to visit Potsdam on the occasion of a concert there. He went, and acquitted himself greatly to the satisfaction of that monarch, some of whose music he played at first sight. B.'s close studies affected his eyes, and an operation designed to benefit them, left him totally blind, and hastened his death, which took place in July 1750. With the exception of Handel, B. had no rival as an organist; and his compositions for the organ have a deservedly high reputation. They are too elaborate, however, ever to become very popular, though his fame as a composer is sure to advance with the progress of scientific musical culture. The highly educated musician will best appreciate the grandeur of some of his works. In 1850, a Bach Society for the study and practice of his compositions was formed in London, and since that time they have often been publicly performed in this country. Three of his sons were also musicians of some note. One of them, Johann Christian, held the appointment of music-preceptor to Queen Charlotte. There are good lives by Hilgenfeld (1850), Bilter (1865), and Spitta (1873).

BA'CHARACH, a small town of Rhenish Prussia, on the left bank of the Rhine, 22½ miles above Coblenz. Pop. about 1900, with a good deal of commerce by river-craft. It is said to have derived its name from Bacchus (*Bacchi ara*), and the vine is still largely cultivated in the neighborhood—the wine produced being of a superior quality. B. is noteworthy also as the place where Blucher crossed the Rhine, on January 1, 1814.

BA'CHELOR (Fr. *bachelier*, Lat. *baccalaureus*, or, as it is variously written in old documents, *baccalarcus*, *bacularius*, and *bacillarius*). This word, which first makes its appearance in middle-age Latin, was long regarded as of very uncertain etymology. The old derivation, from *bacca laurea*, a laurel berry, certainly gives us little help; but the Spanish *bachillir*, which means at once *a babbler* and a master of arts, taken in conjunction with the Portuguese *bacharel* and *bacillo*, a shoot or twig of the vine (from the Latin *baculus* or *baculum*, a stick or shoot), were thought likely by some. Brachet, however, affirms that the word is derived from the Low Latin *baccalarius*, a farm-servant, originally a cow-herd; and this plainly comes from *bacca*, Low Latin for *vacca*, a cow. Odd though it seem, this will connect fairly with the special meanings of the word given by Ducange. 1. It was used, he says, to indicate a person who cultivated certain portions of church-lands called *baccalaria*—which he supposes to have been a corruption of *vasseleria*—a fen belonging to an inferior vassal, or to one who had not attained to a full feudal recognition. 2. It indicated ecclesiastics of a lower dignity than the other members of a religious brotherhood

—i. e., monks who were still in the first stages of monkhood. 3. It was used by later writers to indicate persons in the first or probationary stage of knighthood; i. e., not esquires simply, but knights who, from proverty and the insufficient number of their retainers—from their possessing, perhaps, only the *baccalaria* above referred to—or, from nonage, had not yet raised their banner in the field (*levé banniére*). 4. It was adopted to indicate the first grade or step in the career of university life. As an academical title, it was first introduced by Pope Gregory IX. in the 13th c., into the university of Paris, to denote a candidate who had undergone his first academical trials, and was authorized to give lectures, but was not yet admitted to the rank of an independent master or doctor. At a later period, it was introduced into the other faculties as the lowest academical honor, and adopted by the other universities of Europe. See DEGREES, UNIVERSITY. 5. It came to be used in its popular meaning of an unmatried man, who was thus regarded as a candidate or probationer for matrimony.

The legislation of almost every country, at some period of its history, has imposed penalities on male celibates or bachelors, on the principle that every citizen is bound to rear up legitimate children to the state. By the Jews, the command, 'Be fruitful and multiply,' was interpreted strictly, and every Hebrew regarded marriage as a duty. In Sparta, where the interests of the individual were entirely sunk in those of the state, criminal proceedings were authorized by the laws of Lycurgus not only against those who neglected to marry, but against those who, from marrying late in life, or any other cause, formed such alliances as rendered the procreation of healthy children unlikely. By the laws of Solon, celibacy was also treated as a crime, though the practice of interfering with the feelings of the individual in this respect early fell into desuetude at Athens. At Rome, penalties and disabilities were imposed on unmarried men from an early period, and latterly on unmarried women also. In the allotment of the Campanian lands, Julius Cæsar gave portions only to those who had three or more children; and in later times we have the *jus trium (quatuor et quinque) liberoram*. The most important provisions on this subject are contained in the law (or rather the laws, for it consisted of an act and an amended act) called Lex Julia et Papia Poppæa, the first portion of which belongs probably to 18 B.C., and the second portion to 9 A.D. In addition to various other provisions regarding marriage, this law imposed penalties on those who lived in a state of celibacy after a certain age. No unmarried person could take a legacy, whether of a portion or of the whole possessions of a deceased person, unless he complied with the law —i. e., got married within a hundred days from the testator's death. Widows were at first allowed a year from their husband's death, and divorced women six months from the time of the divorce, before they came within the penalities of the law; and these periods were afterwards extended to two years, and a year and six months, respectively. The original provisious of the law, did not apply to men beyond sixty, or women above fifty, but they were extended to them by subsequent enactments, and made perpetual even in case of their marrying. The *Senatûs consultum* passed in the time of Claudius, however, again exempted men above sixty who married wives under fifty, as from their unions it was supposed there was a fair prospect of issue. Childless married persons, moreover, from the ages of twenty-five to sixty in males, and twenty to fifty in females, were subject to the penalties of the *lex*, to the extent of losing one-half of any inheritance or legacy which might be bequeathed to them. The Lex Papia also contained a provision by which a candidate who had several children was preferred to one who had fewer; and various other premiums on fruitfulness were held out both at Rome and in the provinces.

In Britain, there are numerous instances of additional or higher taxes being imposed on bachelors and widowers, but apparently more with a view to the revenue than with any other object. Of this, 6 and 7 Will. III. c. 6, which was passed in 1695, and which granted to his majesty certain rates and duties upon marriages, births, and burials, and upon bachelors and widowers for five years, 'for carrying on the war against France with vigor,' is an instance; and another, probably, may be found in a higher charge for the servants of bachelors, first imposed by Mr. Pitt in 1785, and continued for a considerable time. By 52 Geo. III. c. 93, unmarried daughters of persons alive were exempted from the tax upon hair-powder; and in the income-tax of 1798, deductions were made on account of children, 5 per cent. being allowed to a person who had a family, and whose income was above £60, and under £400 a year, corresponding deductions being made in other cases. Much might be said in favor of such distinctions, on the ground of expediency, as they enable the government to impose a higher taxation, by lessening the burden on those members of the community who are most likely to complain; but their recognition in practice would, no doubt, be regarded as impossible by the financiers of our day, who have hitherto failed to distinguish between income derived from realized property and from personal labor.

BA'CHELOR, KNIGHT (qu. *bas chevalier*), the lowest grade of knighthood, now only conferred in the United Kingdom. Originally, like all knighthood, a military distinction, knighthood of this description came to be often bestowed on civilians, and in recent times it has frequently been conferred for no weightier service than carrying a congratulatory address to court. It is generally conferred by the sovereign by a verbal declaration accompanied with the imposition of the sword, and without any patent or instrument. The person who is to receive the honor kneels down before the sovereign, who touches him on the shoulder with a naked sword, saying, in French: '*Sois chevalier au nom de Dieu*' (Be a knight in God's name), and then adds: 'Rise Sir A. B.' In exceptional cases, persons have been made Knights Bachelor by patent. The lord-lieutenant of Ireland occasionally exercises a right of conferring knighthood. See KNIGHT.

BACIO'CCHI, MARIE-ANNE-ELISA BONAPARTE, the eldest sister of Napoleon Bonaparte, was born at Ajaccio, Corsica, in 1777. When that island was occupied by the English, she, with her family emigrated to Marseille. Here she married, at the age of 20, a countryman of her own, Captain Baciocchi. The elevation of Napoleon raised her also to rank and power; and in 1806, the principality of Massa and Carrara was intrusted to her administration, which was, on the whole, a beneficial one for the people. In 1809, she was made Grand Duchess of Tuscany, and appointed as adminstrator over that country in Napoleon's name. Here the arbitrary measures of her brother, which she had to carry out, and her own self-will and harshness, rendered her anything but popular. Her husband took no part in the government. When the allies entered Tuscany in 1814, she of course had to leave Florence. She died, at Bologna, of nervous fever, in 1820.

BACK, in maritime language, has many technical applications. To *back an anchor*, is to support the large anchor by a smaller one, in order to prevent it from loosening and coming home in bad ground. To *back and fill*, is a mode of tacking when the tide is with a vessel, but the wind against her. To *back the sails*, is so to arrange them as to make the ship move astern or backwards; it is done when the tide or current is with the ship, and light winds against her; and the manœuvre is useful to avoid collision in narrow channels, to bring the ship into a particular position during naval engagements, or to keep ships well asunder when crowded in convoy. To *back the maintop-sail*, and analogous operations to other sails, is so to arrange a sail that the speed of the ship's progress may be checked.

BACK, SIR GEORGE, a well-known traveler in the polar regions, was born at Stockport in 1796. He entered early on a naval career, and accompanied Franklin and Richardson in their expedition to the north coast of America. He volunteered to the government to go in search of Captain Ross, who was supposed to have been lost in his attempt to discover the North-west Passage; and his offer having been accepted, he left London, February 17, 1833, and on the 28th of June, started from Norwayhouse, a station of the Hudson Bay Company, on his journey to the north. After passing a terrible winter with his companions at Slave Lake, he discovered, in 1834, Artillery Lake, and the Great Fish River, or Back's River, which he followed to the Frozen Ocean. Being hindered by the ice from proceeding along the coast as far as Cape Turn-again, he returned by the river; but although he had received news of the return of Captain Ross, he continued his explorations in the North Sea, and did not return to England until 1835, when he was raised to the rank of post-captain for his services. In 1836 and 1837, he further explored the arctic shores in the interests of geography—the Geographical Society, in the latter year, bestowing its gold medal upon him. Two years afterwards he was knighted, and had a lucrative Treasury appointment bestowed upon him. He attained flag rank in 1857, and that of admiral in 1867. He died in June 1878.

BACKERGU'NGE, a town of Bengal, situated on Backergunge Creek, an offset from the Ganges, in lat. 22° 33′ N., and long. 90° 22′ E.—125 miles to the east of Calcutta. Till supplanted by Burrisol, which is 12 miles to the north, it was the capital of the district,of the same name.

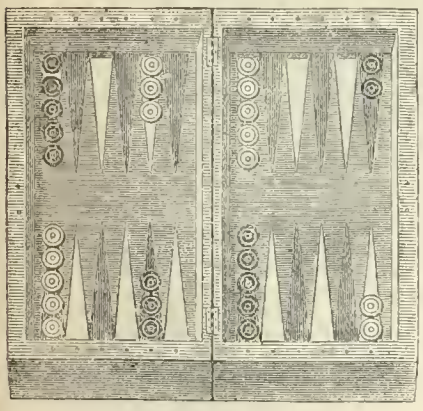
BACKERGU'NGE, the district named from the foregoing town. It extends in N. lat. from 22° 2′ to 23° 13′, and in E. long. from 89° 49′ to 91°, containing 4935 sq. m., and (1871) 2,377,433 inhabitants, or about 480 inhabitants to a square mile. Like the rest of the great delta of Bengal, B. is of alluvial formation and level surface, being watered at once by the lower streams of the Ganges and the Brahmaputra, and also by the various branches or offsets which interlace together those mighty rivers. In consequence of the great number of water-courses, which at once cool the atmosphere and drain the soil, the country is fertile, and the temperature is said never to rise above 88° in the shade. From the same cause, the district is independent of regular roads for intercourse and communication. In the season of high-water, as may be expected, inundations are common. To guard against them, the houses are

built on mounds; while the corresponding excavations, like the natural 'water-holes' of Australia, serve as tanks against the effects of the dry season. As is often the case in alluvial regions, land-slips are frequent, and also the opening of new channels for the streams. The productions are rice, sugar, cotton, pulse, mustard, cocoa-nut, betel-nut, mango, guava, plantains, limes, pine-apples, ginger, and turmeric. Buffaloes are said to be generally used instead of oxen, of which the domestic breed is small and poor.

BACKGA'MMON is the modern name of a game of considerable antiquity in England, where it was formerly known by the appellation of 'the tables.' The words *back-gammon* have been ascribed to the Welsh tongue, in which they are said to signify *little battle;* but Strutt, with greater plausibility, traces the term to the Saxon '*back* and *gamen*—that is, back-game—so denominated because the performance consists in the two players bringing their men back from their antagonist's tables into their own; or because the pieces sre sometimes taken up and obliged to go back—that is, re-enter at the table they came from.' Whatever be the etymology of the term, the game has been long established in the country; and as a fireside amusement of a decorous nature, is a favorite among clergymen, squires, farmers, and retired professional persons.

B. is played with an apparatus consisting of a board or tables, men or pieces, dice, and dice-boxes. The introduction of dice into the game, and their constant use in determining moves, makes B. essentially a game of chance, and therefore brings two players of unequal talents nearer a level than other diversions in which skill is the sole or predominant element. The B. board consists of two parts or tables, generally united by a hinge in the middle, by which they can be shut up as a box. Each table possesses twelve points, six at each end. The points are colored white and black alternately; but this variation of color has no reference to the game, and is only done to make the points more easily counted. The game is played by two parties, and with 30 pieces or men; each party has 15 men, one set of 15 being black and the other white. In beginning the game, the men are placed on certain points on the tables, as shown in the following figure. The game is played with two dice and two dice-boxes. The dice are common to both; but each party uses his own dice-box, and the throws are alternate. Each die is a perfect cube, marked on its sides with dots from 1 to 6. The 1 is called *ace;* the 2, *deuce;* the 3, *tre* or *trois;* the 4, *quatre;* the 5, *cinque;* and the 6, *size*. At every throw, the two dice are employed; consequently a person may throw from 2 up to 12—that is, two *aces* up to two *sizes*. If a player throws *doublets*, or both dice of one number, double the number of dots is reckoned; thus, by a throw of two aces, the player does not count 2, but 4. These numbers thrown or accidentally turned up by the dice, bear a reference to the points on the tables. In order to understand this connection between the dice and the men, the learner must observe how the men are placed on the points, and the rules by which their shifting from one to another is governed.

The tables are here spread out as if two partners were seated, and about to begin to play. The party owning the white men is seated at W, and the party owning the black men at B. We shall call one party White, and another Black. White counts round from the ace-point of Black, and Black counts round from the ace-point of White. These ace-points are respectively seen to have two men upon them in opposite corners of the same table. The grand object of the game is for each party to get all his men played round into the table containing the aces, removing them from point to point agreeable to the throws of the dice. In throwing, the number upon each die turned up may be reckoned by itself, or collectively, with the number on the other die. Thus, if quatre be thrown by one die, and size by the other, a man can be advanced 4 points, and another 6 points; or one man can be advanced 10 points, always providing that a point is open to suit this movement to it. No point can be moved to if covered by two men belonging to the adversary. If covered by only one man, which is called a *blot*, then that man can be hit, and be removed from the point, and placed on the bar between the tables, his place being taken by the man who has won it. The removal of a man to the bars throws a player considerably behind in the game, because the man must remain out of the play till the dice turn up a number corresponding to one open point on the adversary's table. Being fortunate to get an open point by this means, the man must be entered and wrought round from thence, as in the case of others in the set to which he belongs. The frequent occurrence of this hitting of a blot gives an adversary a great advantage, and allows him to win the gammon. There are two kinds of victory—winning the hit, and winning the gammon. The party who has played all his men round into his own table, and by fortunate throws of the dice has borne or played the men off the points first, wins the *hit*. The gammon may be explained as follows: When you have got all your men round to your own table, covering every point, and your adversary has a man out, then you are enabled to *bear* or lift your men away. If you can bear all away, so as to clear your table before the adversary gets his man placed by a throw on your table, you win the gammon. If the adversary has been able to bear one before you have borne all your men, it reduces the victory to a hit. Two hits are reckoned equal to one gammon in playing matches. To win two games out of three is called winning the *rub*, as at whist.



B
The Backgammon Table.

BA'CKHUYSEN, Ludolph, one of the most famous painters of the Dutch school, a master in marine painting, was born at Emden in 1631. His parents intended him for a commercial career; but he had not long been in a mercantile office in Amsterdam, to which he had been sent at the age of 18, before he resolved to devote himself to painting, and with that object received instruction from Evendingen, and attained, in a short time, extraordinary skill and readiness in execution. He was a close student of nature, so much so, that on the approach of a storm he often put to sea in a boat, in order to watch and sketch its effects, which he transferred to canvas immediately on his return home. His most famous picture is the sea-piece in the gallery at Paris, which he was commissioned to paint by the magistrates of Amsterdam, and which was, in 1665, sent as a present to Louis XIV. In all his pictures the utmost truthfulness prevails, at the same time that they embody all the poetry of the sea. His coloring is also excellent. After he was 71 years old, he began etching on copper. He also made attempts in poetry, and gave lessons in writing, an art which he did much to promote. He died, after long illness, in 1709.

BACK-STAYS are long ropes which extend from the topmast-heads down to the sides of a ship, where they are fastened in such a way as to assist the shrouds in supporting the masts. Different kinds are distinguished as *after-B., breast-B.*, and *traveling-stays*. One rope generally forms a pair of B.; being looped in the middle to pass over the mast-head.

BACOLOR, a town of the island of Luzon, Philippines, the capital of the province of Pampanga, 38 miles north-west from Manila. Pop. 8737. It stands in a plain, near the river Pampanga, with which it is connected by a canal.

BACON (from a root in the Teutonic languages which seems to be allied to the Lat. *vacca* in [mid. Lat. *baca*], a cow, and to have signified an animal in general; *bache*, in Ger., signifies among hunters a wild sow; *bake*, in Dutch a swine in general), is the cured side of a pig; while bacon-hams are the hind-legs cured. The mode of curing will be described under Hams; and their properties as articles of food, under Pork.

BACON BEETLE. See Dermestes.

BACON, Sir Nicholas, the father of Lord Bacon, was born in 1510, at Chiselhurst, in Kent. He received an excellent education; and being gifted by nature with sound and practical abilities, he quickly prospered in the legal profession, to which he attached himself. At the age of 27, he was appointed solicitor to the Court of Augmentations; two years later, on the dissolution of the monasteries by Henry VIII., he had the courage to present to that irascible monarch a reasonable project for applying the wealth which had been 'rescued' from the church. It was this: that Henry should employ a portion of it in founding a college for the study of politics and diplomacy. Unfortunately, the king had already squandered it away in presents, and was unable to comply with the wise suggestion of the young lawyer; but probably he remembered his good sense, for, in 1546, Henry advanced him to the office of Attorney of the Court of Wards, which he retained during the reign of Edward VI.; but his Protestantism necessarily caused him to be deprived of all public honors and emoluments after the subsequent Catholic succession. On the death of Mary, however, he was made a member of the Protestant part of the Privy Council, by Queen Elizabeth; and in 1558, received at her hands the Great Seal. In the beginning of 1559, he opened parliament with a judicious speech on the difficult subject of a national religion. He was also president of that assembly of ecclesiastical disputants which met in Westminster two months later, to discuss the points of controversy between Protestants and

Catholics. In 1564, he suffered a temporary eclipse of royal favor, on account of the too patriotic character of his religion; but through the persevering efforts of his old and constant friend, Sir William Cecil, he was at length restored to the sunshine in which he had been accustomed to bask. Elizabeth even went the length of paying him a visit in 1577, at his magnificent mansion of Gorhambury, in Hertfordshire. He died on the 20th of February 1579. Sir Nicholas was one of those solid and stately Englishmen to whose sagacity, high principle, and firm demeanor his country owed its safety in that critical period when Elizabeth mounted the throne.

BA'CON, Francis, Lord Verulam, Viscount St. Albans, born in London, January 22, 1561, was the son of Sir Nicholas Bacon (q. v.). His mother was the learned Anna Cooke. In early childhood, he manifested superior powers, and an ardent love of knowledge; his intelligence was so precocious, and his sedateness so remarkable, that the queen took pleasure in calling him her 'young Lord Keeper.' At the age of thirteen he was sent to the university of Cambridge, which he quitted after a residence of three years, with a low opinion of the course of study pursued there, and, as well, of the Aristotelian philosophy. On leaving the university, he went to Paris, in the suit of Sir Amias Paulet, the English Ambassador, and there occupied himself chiefly with statistics and diplomacy, the result of his studies and observation being a work, afterwards published, *Of the State of Europe*. The sudden death of his father, about the end of 1579, recalled him in 1580 to England, where, after failing to procure from the government a provision which would enable him to devote himself to science and literature, he betook himself for several years to the study of law. His professional progress was at first very slow, and, contrary to what might have been expected, it was long before he could obtain promotion in the public service. This want of success was chiefly owing to the hostility of his uncle, the queen's first minister, Lord Burleigh (see Cecil), who regarded him as a dangerous rival to his own son. To Lord Burleigh and his son, B., in the hope of advancement, had paid court till it was clear no favor was to be expected from them, when he betook himself to their rival, the Earl of Essex, whose friendship he speedily won. But the earl's influence could not counteract the continued opposition of the Cecils, through whom he was defeated, in 1594, in an attempt to obtain for B. the then vacant office of attorney-general. What he could do for his friend, however, he did, for shortly after this disappointment he presented him with an estate at Twickenham worth £2000 a year. It is painful to relate that B. repaid the generous friendship of his patron with flagrant ingratitude. When Essex was subsequently brought to trial for a conspiracy against the queen, B. came forward as his accuser with tongue and pen; he unnecessarily appeared as counsel against the friend who had so largely obliged and confided in him, and used all his great talents and ingenuity as a pleader to magnify his crimes and secure their punishment. B. was straitened at the time in his circumstances, through his extravagant mode of life, and, moreover, was anxious to conciliate the court, whose anger he had provoked by having espoused the popular cause on his first entering parliament as member for Middlesex in 1595. But whatever the temptation was, it cannot affect our opinion of conduct so mean and immoral. It remains to be stated that, after the earl's execution, he wrote, at the request of the queen, *A Declaration of the Practices and Treasons Attempted and Committed by Robert Earl of Essex*, which was printed by authority.

In 1590, B. obtained the post of Counsel Extraordinary to the Queen, and a few years afterwards, he entered parliament as a member for Middlesex. It was not, however, till the reign of James I. that he made rapid progress. He was knighted in 1603, and in the following year was appointed salaried counsel to the crown; by 1613, he had advanced to the office of Attorney-general, in which he unconditionally subserved the purposes of the court. His conduct as attorney, in attempting to extort by the rack a confession of treason from an old clergyman of the name of Peacham, has met with universal and deserved condemnation. He did not, however, cringe to the king and the royal favorite, Villiers, except to good purpose. In 1617, he was appointed Keeper of the Great Seal, and in 1619 attained the dignity of the Lord Chancellorship, with the title of Lord Verulam. In the year following, he was created Viscount St. Albans.

Having attained the highest honors of the state by truckling to the king and his favorite, B. proceeded to abuse his judicial functions to increase his revenues, which, great as they were, were unequal to his extravagance. Though his official income was great, and his means had been enlarged by a marriage with the daughter of a wealthy alderman, he could only support his style of life by contracting debt and accepting bribes from suitors. Nor was money his only motive to false judgments; he more than once polluted the stream of justice, to maintain the favor of Buckingham. By 1621, the state of the courts had become so scandalous as to call for a parliamentary inquiry, which resulted in his being convicted, on his own written confession, of twenty-three acts of corruption. In consequence, he was condemned to pay a fine of £110,000, and to be confined in the Tower during the king's pleasure; he was banished for life from the court, and declared unfit to hold any office of state, or to sit in parliament. The fine, however, was remitted; the imprisonment lasted only two days; he was allowed again to appear at court, and, indeed, was summoned to sit in the very next parliament. Age, however, failing health, and perhaps shame, prevented him from appearing. Banished from public life, he henceforth devoted himself to literature and science, enjoying from the government a pension of £1200, and an annual income, in all, of £2500. His mode of life still, however, continued to be so prodigal and ostentatious that, at his death, in 1626, his debts amounted to upwards of £22,000. The immediate occasion of his death (as related by Aubrey, who probably got it from Hobbes, who was B.'s intimate friend) was cold caught in making an experiment to test the power of snow to preserve flesh. He died in the house of the Earl of Arundel, to which he had been removed with the fatal chill upon him which he had caught in the course of his experiment.

While, on the whole, the public life of Lord B. is marked by meanness and dishonor, his literary and scientific works are everywhere irradiated by the powerful light of an intellect which towered over those of other men. The first edition of his *Essays* appeared in 1597; his two books of the *Advancement of Learning* in 1605; his *Wisdom of the Ancients*—in Latin—in 1610; a third edition of his *Essays*, greatly extended, in 1612; his two books of the *Novum Organum*, or second part of the *Instauratio Magna*, designed to consist of six parts—also in Latin—in 1620; his *History of the Reign of Henry VII.*, in 1622; his nine books, *De Augmentis Scientiarum*—a Latin translation and extension of his *Advancement of Learning*—in 1623. Besides these, he wrote several minor works, which need not here be specially mentioned. It is enough to say that his writings embrace almost all subjects, from jurisprudence—which he treated not as a mere lawyer, but as a legislator and philosopher—to morality and medicine. The *Sermones Fideles* is a treasury of the deepest knowledge of human relations, conveyed in a gorgeous and energetic style. Almost the only science with which he was unacquainted was that of mathematics. Thus singularly gifted and accomplished, he appeared at a time when science, from a variety of causes, started on that progress which has never since been arrested. If it is now a question how far he contributed by his genius to that progress at its commencement, it is a fact that he was long vulgarly regarded by his countrymen as the father of Inductive Philosophy—as having been the inventor and first teacher of the method of interrogating nature by observation and experiment and inductive reasoning. Nor are his writings wanting in materials qualified *ex facie* to support his title to that eminence. His claim to the distinction, however, has of late been the subject of much controversy, the result of which is that it has been generally disallowed. But if it be true that he had a somewhat vague and imperfect apprehension of the philosophy of induction, overestimated the province of observation, and undervalued the use of deduction and hypothesis, and that even his classification of the sciences in the *De Augmentis*, on which his reputation long turned, has been properly superseded by the superior and better-reasoned classification of M. Comte; still it must be borne in mind that he was one of the first that was aware of the true character of the positive philosophy, and who understood its conditions, and foresaw its final supremacy; and as for his classification, that it was a marvelous effort of reason at a time when the sciences were in their infancy, and many of them were yet unborn. Also, it must be said, that if B. cannot be claimed by the physicists as the father of their science, and they must look rather to Galileo, yet he may fairly be claimed in that character by the students of man and society; for he was the first to aim at the extension of the methods of positive philosophy to moral and social conceptions. If recent criticisms have dethroned him from the position which for centuries he occupied in relation to the physical sciences, by showing that neither his doctrines, experiments, nor writings have materially affected their course, it is only to leave him free to be placed in a position no less dignified in relation to human and social philosophy.

As a writer, B. presents us in combination an intellect at once one of the most capacious and profound that ever appeared among men—one of the most penetrating, one of the most far-reaching—and an imagination almost equally remarkable. In no other writer is so much profound thought to be found expressed in such splendid eloquence. 'If,' says Hallam (*Literature of Europe*, iii. 218), 'we compare what may be found in the sixth, seventh, and eighth books *De Augmentis*, in the *Essays*, the *History of Henry VII.*, and the various short treatises contained in his works on moral and political wisdom and on human nature, from experience of which all such wisdom is drawn, with the Rhetoric, Ethics, and Politics of Aristotle, or with the historians most celebrated

for their deep insight into civil society and human character—with Thucydides, Tacitus, Philip de Comines, Machiavel, Davila, Hume—we shall, I think, find that one man may almost be compared with all of these together.'

The collected works and life of Lord B. were published by Mallet in 5 vols. (Lond. 1765); a good edition is that of Montague (16 vols., Lond. 1825—1834); but the best, it is generally admitted, is the last (Works, 7 vols., edited by Spedding, Ellis, and Heath, 1858—1859; Letters and Life, 7 vols., by Spedding, 1862—1874). Spedding annihilates the authority of Macaulay's brilliant but one-sided and ill-informed review of B.'s character (the *Essays*). See also the *Personal History of B.*, by Hepworth Dixon; and Campbell's *Lives of the Chancellors;* Kuno Fisher's *Franz Bacon*, and Remusat's *Bacon*.

BA'CON, ROGER, an English monk, who, through the force of his intellect, raised himself far above his age, made wonderful discoveries in several sciences, and contributed much to extend the then scanty knowledge of nature. He was descended of a respectable family, and born at Ilchester, in the county of Somerset, 1214. He studied at Oxford, and then at Paris, where he received the degree of Doctor in theology; and soon after his return home, he entered the order of the Franciscans, and settled at Oxford. Physics seems to have been at that time the chief object of his labors; and liberal friends of science supplied him with the means of pursuing his researches. In exploring the secrets of nature, he made discoveries and invented applications which were looked upon by the ignorant as the work of hellish magic. This prejudice was encouraged by the jealousy and hate with which his brother monks regarded his superiority. Besides, he loudly denounced the ignorance and immorality of the clergy, especially of the monks, and even wrote a letter to the pope, in which he represented to him the necessity of clerical reform. Out of revenge, an accusation was brought against him at the papal court, and the pope interdicted him from teaching in the university. He was shortly after imprisoned, forbidden all human intercourse, and hardly allowed sufficient food. Among the few clear-sighted men, who admired Bacon's genius, and pitied his misfortunes, was the cardinal-bishop of Sabina, at that time papal legate in England. He desired to see Bacon's writings, but the interdiction of the Franciscans prevented a compliance with his wish.

On his ascent to the papal throne as Clement IV., B. wrote to him, expressing his readiness to furnish him with whatever he desired, and Clement in reply repeated his request to see B.'s works, in defiance of the Franciscan prohibition. B. accordingly drew up his *Opus Majus* (edited by Jebb, 1733), which he sent, along with two other works, to the pope, by his favorite pupil, John of London, and in which he represented the necessity of a reformation in the sciences through a diligent study of the languages and of nature. How Clement received them is not very well known; but they could only have reached him about the time he was seized with his last illness. For ten years after Clement's death, B. was free from open persecution at least. But in 1278, under Nicolas III., the general of the Franciscan order, Jerome of Esculo, declared himself against B., forbade the reading of his books, and issued an order for his imprisonment, which was sanctioned by the pope. This new imprisonment lasted ten years. When Jerome of Esculo became pope, under the name of Nicolas IV., B. sent him a *Treatise on the Means of warding off the Infirmities of Old Age* (Lat. Oxf. 1590; Eng., by Brown, 1683), with a view to convince him of the harmlessness and utility of his labors, but in vain. What the pope refused to the representation of the old philosopher, was yielded to the intercession of several influential English noblemen, and B. at last recovered his freedom. He returned to Oxford, wrote a compendium of theology, and shortly after died—according to some, 1292, to others, in 1294.

B., although an extraordinary genus, could not rid himself of all the prejudices of his times. He believed in the philosopher's stone and in astrology. His chief invention is the magnifying-glass. There are also in his writings other new and ingenious views on optics; for example, on refraction, on the apparent magnitude of objects, on the great increase in the size of the sun and moon in the horizon. On other subjects, again, he fell into the greatest errors. He made several chemical discoveries which were wonders at that time. He knew, for instance, that with sulphur, saltpetre, and charcoal, we may imitate lightning, and produce explosions. Mathematics, applied to observations, he considered to be the only means of arriving at a knowledge of nature. He studied several languages, and wrote Latin with great elegance and clearness. Deserving of honorable mention are his discoveries of the errors that prevailed in the calendar, and his proposals and data for remedying them, in which he came very near the truth. He prepared a rectified calendar, of which a copy is preserved in the Oxford library. On account of his extensive knowledge, he received the name of 'Doctor mirabilis.' Several of his works have never been printed, and are preserved among the Cottonian manuscripts in the British Museum; some are to be found in French libraries.

BA'CON, JOHN, a distinguished statuary, was born in London, 1740, and died there August 7, 1799. He was at first a painter on porcelain, and only began to work in marble at the age of 23; yet in 1769 he received the first prize from the Royal Academy, of which he was soon after made a member. His statue of Mars first established his fame. Among his principal works are, two busts of George III., one in Christ Church College at Oxford, the other in the university library at Göttingen; the monuments of Lord Chatham in Westminster Abbey and in Guildhall; the statues of Howard and of Samuel Johnson in St. Paul's and that of Blackstone at Oxford. B. was deficient in imagination, and had no refined perception of beauty.

BACSA'NYI, JANOS, a Hungarian writer, was born May 11, 1763, at Tapolcza. After completing his studies, he became a private tutor. In 1785 he published his first work on *The Valor of the Magyars*, and received an appointment in a public office. In 1793, in consequence of a liberal poem, he was deprived of his office, and in 1794 he was for conspiracy imprisoned at Spielberg. In 1796 he came to Vienna, where he held an office in the bank, and married (1805) the German poetess, Gabrielle Baumgarten—an unhappy match. In 1809, B. translated Napoleon's proclamation to the Hungarians and was afterwards obliged to take refuge in Paris. After the peace of Paris, he lived at Linz, and there he died, May 12, 1845. His collected poems appeared at Pesth in 1827.

BACTERIA are minute organisms with transparent oval bodies, slightly enlarged at each end, without observable structure. Weak wine, thin syrup of sugar, or an infusion of tea or meat, left exposed to the air, soon ferments, and is found to swarm with myriads of excessively small living and moving bodies. Most of these must be referred to the Protozoa, though germs of various kinds of fungus are present; and amongst the animal forms, B. and *Vibriones* (small rod-like organisms, generally of two joints) are almost universally observable. They are powerful organic ferments, and play an important part both in healthy and in morbid processes. It is in connection with the appearance of B. that the questions of spontaneous generation (see GENERATION, SPONTANEOUS) have of late been mainly discussed.

BA'CTRIA, the ancient name of the imperfectly known land lying between the western part of the Hindu Kush mountains, and the river Oxus (Amu, or Gihon), which separated it from Sogdiana on the north and north-east. Its boundaries in early times cannot be precisely ascertained, but it is generally considered to have been identical with the modern Balkh (q. v.). B. is supposed to have been the seat of the parent-people from which the Aryan (q. v.) or Indo-European family of nations branched off. The ancient Bactrians of historic times were akin to the Medes and Persians, and used the Zend language. B. was originally the center of a powerful kingdom, which extended itself over the east of Persia, but we have almost no record of its early greatness; we only know that Ninus, the Assyrian king, in spite of his vast army, found much difficulty in conquering it, and that when Arbaces besieged the last Assyrian king, Sardanapalus, in his metropolis, he was assisted by a large force of Bactrians. It is believed that the ancient Persian religion was first developed in Bactra or Zariaspa, the capital of B., which was the head-quarters of the Magi till the land was overrun by the Arabs, and a centerpoint of the inland trade of Asia. The modern town of Balkh (q. v.) is built upon its site. Alexander, on his return from Persia, left in B. a colony of 14,000 Greeks, who here extended civilization. After the death of Alexander, B. was annexed to the kingdom of Syria; but was raised to independence by its governor, Diodotus I., who founded the Greek kingdom of New B. about 256 B.C. The history of this kingdom was formerly little known, but has been recently elucidated by numerous Græco-Bactrian coins found in the *topes* or burial-places of Afghanistan. These coins give the names of a series of kings, and bear indications of the political circumstances of the Greek kingdom of B. On those of Eucratides, a monarch who flourished in the age of Mithridates, there are found, beside the Greek characters, others which have been proved to belong to a dialect of the Sanscrit, and have been very happily deciphered by Mr. Prinsep.

BA'CTRIS, a genus of Palms, of which nearly fifty species are known, all American. The leaves of some are pinnate, those of others entire. They are generally small palms, some of them very small, and with slender stems; that of *B. tenuis* is not thicker than a goose-quill. Some are spiny, and form thickets not easily traversed. *B. acanthocarpa* is called TUCUM, near Bahia, and from it an extremely tough thread is obtained, which is used for making nets. *B. Maraja*, the MARAJA' palm, produces large clusters of fruit, resembling small grapes, with a thin pulp of an agreeable subacid flavor.

BACTRI'TES, a genus of fossil *Ammonitidæ* with a straight shell, and indented but not ramified septa. Five species have been described, all from Devonian strata.

BA'CULITES, a genus of the family of *Ammonitidæ*, differing from the true *Ammonites* (q. v.) in the perfectly straight form of the shell, which tapers to a point, and is either round or compressed. The species, like the other Ammonitidæ, are all fossil. B. are characteristic of the upper chalk, and appear to have existed only towards the expiry of the period over which the existence of the Ammonitidæ extended.

Baculite.

BA'CUP, a rapidly increasing and very prosperous town of Lancashire, and station of the East Lancashire Railway, situated in a beautiful valley near the borders of Yorkshire, 15 miles N. from Manchester, and 12 miles E.-by-S. from Blackburn. Great improvements have been and are still being made in the condition and appearance of the town. There are many churches of all denominations, a mechanics' and a literary institute, reading rooms, &c., and in August 1867 was opened a beautiful market-house. Pop. (1861) 10,935; (1871) 17,-199; (1881) 25,033. B. has extensive cotton-factories, dye-works, brass and iron foundries. There are numerous coal-mines in the neighborhood; and within a mile from the town, large woollen manufactories.

BADA'GRY, a seaport town on the Gold Coast of Upper Guinea. Pop. 10,000. At one time it carried on a large trade in slaves with the Portuguese, who here established several factories. B. now belongs to Great Britain. It was from this place that Lander and Clapperton started on their expeditions to explore the African interior.

BADAJO'Z, called by the Romans Pax Augusta, and by the Moors Beledaix, i.e. 'Land of Health,' is the capital of the Spanish province of the same name. It is situated about five miles from the borders of Portugal, in a fruitful district on the left bank of the Guadiana, which is here crossed by a stone-bridge of 28 arches. It has 22,195 inhabitants, is a fortress of the first rank, the residence of a captain-general, and the see of a bishop, and has an old cathedral with a splendid organ, and paintings by Mateo Cerezo and Morales, who was born at B.; a brisk traffic, chiefly contraband, is carried on with Portugal. Its chief articles of manufacture are soap, coarse woollens, leather, and delft-ware. As one of the keys of Portugal, B. has often been a place of importance in war. It was besieged in vain by the Portuguese in 1660, and again by the allies, in the Spanish War of Succession, in 1705. During the French war, B. was besieged by the French in 1808 and 1809, and again in 1811, when it surrendered, March 11, to Soult. It was thrice besieged by the English under Wellington: first on April 17, 1811, after the conquest of Olivenza, on which occasion, the approach of Soult to its relief caused the siege to be raised on the 14th of May; the second time, after the battles of Fuentes d'Onor and Albuera, the city was invested from May 27 to June 10, 1811, but still in vain. The third investment, March 17, 1812, ended in the taking of the city by storm, on the night of April 6, after a murderous contest, and a loss during the twenty days' siege, of 72 officers and 963 men killed, and 306 officers and 3483 men wounded.—The province of B. has an area of 8687 square miles, and a population of (1870) 431,922. See ESTREMADURA.

BADAKHSHA'N, or BUDUKSHA'N, a territory of Central Asia, lying between 36° and 38° N. lat., and 69° and 73° E. long. B. lies between the chain of the Hindu Kush and the Oxus. It is drained by the Kokcha, a tributary of that river, and is famous throughout the East as a picturesque hill-country covered with woods, rich pasture, and fertile and well-cultivated valleys. Eastern travelers speak with rapture of its rich orchards, its fruits, flowers, and nightingales. In recent times no European traveler has visited it except Captain John Wood, who only saw it in the winter of 1838. The inhabitants are Tajiks, or an Aryan race speaking Persian and Turkee. They are Mohammedans—Sheas in the mountains, and Sunnas in the plains. Their number is estimated at 350,000. One of their chief occupations is man-stealing—their captives being chiefly Kafirs and Chitralis from the Indian side of the Hindu Kush. The people of B. seem to have been always under the immediate rule of their own chiefs, at the head of whom was 'the Mir.' They have generally, however, formed part of some great Asiatic empire. In the last century B. formed part of the empire of Nadir Shah, after whose death it became subject to the Afghans. In 1823, however, the Uzbecks, under Murad Beg, taking advantage of the disturbed state of Afghanistan, defeated the tribes of B. in a pitched battle; and two years after, subjection was completed. Their conquerors treated them most harshly, demolishing their towns, and either selling them as slaves, or carrying them off to people the unhealthy swamps of Kunduz. On the death of Murad in 1845, B. seems to have become for a time independent. The Afghans, however, soon reasserted their claims. In 1859, they conquered Kunduz, and were about to annex B., when the Mir agreed to pay an annual tribute. In 1863, Jehandar Shah, the Mir of B., was superseded by Mir Mamud Shah, another of the royal family of B., supported by the Afghans. This gave rise to a struggle which ended in the nephews of Jehandar acquiring dominion by means of Afghan help. In 1873 England and Russia discussed and agreed upon a frontier between B. and Afghanistan.—B. is sometimes made to include Wakan, on the Upper Oxus, between B. Proper and the Pamir Steppe (see BOLOR).—See Yule's *Marco Polo;* Vambóry's *Central Asia*, 1874; *Quarterly* and *Edinburgh Reviews*, 1873.

BADA'RKA, a town of Oude, India, in the district of Bainswarra, four miles east from the Ganges, and five miles east from Cawnpore. Pop. 8000.

BA'DDERLOCKS, or HEN'WARE (*Alaria esculenta*), a seaweed (see ALGÆ, where a figure of it is given), of the sub-order *Fucaceæ*, growing on rocks in deep water on the shores of Britain, Iceland, and the northern parts of Europe. It has a stem 4—8 inches long, pinnated with a few short leaflets, which contain the seeds, and a membranous olive-green frond of 2—12 feet long, with a stout mid-rib. The frond being stripped off, the mid-rib forms an article of food to the inhabitants of the sea-coasts of Iceland, Denmark, Scotland, Ireland, &c. The thinner part of the frond is also sometimes eaten.

BA'DEN, THE GRAND DUCHY OF, is situated at the south-western extremity of the German Empire. With an area of 5900 square miles, it runs in the direction of the valley of the Upper Rhine and of the Black Forest from the southern bend of the Main at Wertheim to the Bodensee or Lake of Constance, and is bounded on the N. by Bavaria and Hesse-Darmstadt; on the E. by Hohenzollern, Würtemberg, Bavaria; and on the W. and S. by the Rhine, which separates it from Rhenish Bavaria, Alsace, and Switzerland. It is divided politically into four circles—the circle of the 'Lake,' at the south, and the circles of the 'Upper Rhine,' of the 'Central Rhine,' and of the 'Lower Rhine;' these are again divided into 79 districts.

Surface and Hydrography.—Physically, B. falls into two divisions—the western plain, lying along the right bank of the Rhine, and the eastern highlands; the plain occupying about a fifth of the whole duchy, and the hilly part, four-fifths. Of the mountain ranges, the Schwarzwald, or Black Forest, is the most prominent. See BLACK FOREST. For a distance of 96 miles, it belongs almost exclusively to Baden. It terminates in abrupt declivities towards the west, and on the east descends by degrees into the plateau of the Neckar in Würtemberg. It decreases in height from south to north, its mean elevation being from about 4000 to 2700 feet, and is cut up into sections by numerous deep and wildly romantic valleys. The most remarkable summits are Feldberg and Belchen in the south. The less elevated part of the mountainous division of B., which lies to the north of the Murg, receives the general name of the Neckar highlands, as far as to its intersection by the Neckar valley, on the north side of which the Odenwald begins. Southward, in the circle of the 'Lake,' rise the extensive plateaus of the German Jura. This table-land is known by the local name of the Randen. In the plain of the 'Upper Rhine' between Altbreisach and Endingen, stands the small isolated basaltic group of the Kaiserstuhl, or Emperor's Seat, rising to the height of 1100 feet, and overlooking the Rhine.

Being drained by the Rhine and the Danube, B. belongs to the basins of two opposite seas; the sources of the Danube, however, drain only about 336 square miles in the northern part of the 'Circle of the Lake.' Beginning with the Bodensee, which projects three arms or bays on the northwest into B., the Rhine, in its tumultuous course, forms the south boundary, interrupted, however, by several encroachments of the Swiss territories upon its north bank. From Basel to below Manheim, the stream is the only and natural boundary. The chief tributaries of the Rhine, on the B. side, are the Neckar, the Kinzig, the Murg, the Elz, the Dreisam, and the Plinz. On the northeast the Baden territories are bounded by the Main, which there receives the Tauber. Except a part of the Bodensee, B. has no lake of importance. In the Schwarzwald, however, there are the following sheets of water which go by the name of lakes: Mummelsee, Wildsee, Feldsee, Titisee, and the Nonnenmattweiher, with a floating island.

Climate.—As the difference between the highest and lowest points of B.—Feldberg, which rises to a height of 4860 feet, and Manheim—amounts to something like 4500 feet, there is naturally a great variety of climate, especially in respect of temperature. The mean temperature of the plains may be stated at 50°, and that of the highlands at 44° Fahr., so that the Rhine valley of B. is one of the warmest and most fruitful districts, not only of Germany, but of Europe; the land yielding often, in the case of maize, a return of more than three hundredfold. Walnuts, cherries, apples, and pears grow in abundance, while the western terraces of the Schwarzwald are decked with vines. On these charming declivities, the walnut thrives at a height of 1340 feet; other kinds of fruit are cultivated in the higher regions to an elevation of more than 2000 feet. The wild cherry is found even as high

as 2600 feet; the cereals being profitably cultivated to at least an equal height. Oats rise as high even as 3600 feet, above which lie the exclusively pastoral districts.

About two-thirds of the population are engaged in the cultivation of the land, which, as may be inferred from the description, yields rich returns. An area of about 3200 square miles is occupied with fields and gardens, growing wheat, oats, rye, barley, maize, potatoes, pulse, and vegetables of all sorts. Tobacco, hemp, rape, opium, &c., yield a large revenue. Meadow land and pasturage occupy about a fifth of the surface. An important branch of cultivation is also the production of chestnuts, walnuts, almonds, &c. The quantity of wine produced yearly is, on an average, 14 million gallons. About 1790 square miles are under wood. The Schwarzwald is one of the most remarkable pine-forests of Germany. There whole tracts may be seen of pines of the height of from 160 to 180 feet, which are exported to the Netherlands for ship-building. The rearing of cattle is carried on to a large extent. The several kinds of stock may amount to the following numbers: horses, 73,200; asses, 700; cattle, 481,000; sheep, 189,000; goats, 22,100; swine, 480,000; making a total of 1,246,000 head of animals, and representing a large amount of wealth. Honey is also an important product, more than 74,000 bee-hives being kept in the duchy. Various societies exist for improving the breed of horses and perfecting agriculture.

Minerals.—The mineral wealth of the country does not seem to be valued yet as it deserves, if we may judge from the extent of mining operations carried on; but the activity of the Mining Society at Carlsruhe is yearly bringing this department of the national industry more and more into a fitting condition. Iron, lead, silver, copper, and salt are among the chief productions; gold is extracted from the sands of the Rhine, near Wittenweier, and cobalt, sulphur, marble, and several kinds of precious stones are found. B. is rich in mineral springs; as many as 60 are enumerated, some sulphureous, some chalybeate, and some acidulous. Hence there are a great number of much frequented watering-places, as Baden-Baden, Badenweiler, Griesbach, Petersthal, &c.

Manufactures, &c.—The increasing activity in the various branches of industrial art is testified by the existence of over 1200 manufactories, with about 70,000 hands, and a yearly produce of from 40 to 50 million marks. The industrial activity extends chiefly to the following articles: ribbons and cotton fabrics, mostly at St. Blasia; toys and trinkets, and tobacco, which occupies the first place; chicory, paper, cloth, leather, beer, wooden clocks, and articles of straw; the last two are characteristic of the Schwarzwald districts, and known all over the world. Of clocks alone over 600,000 are made annually. The chief articles of export are wine and timber, which last is sent almost exclusively to the Netherlands, and brings in a sum of at least 6 million marks (£300,000). The principal imports are colonial goods, fruits, drugs, horses, wool, cotton, silk goods, iron, steel, and articles of luxury. Money was formerly reckoned in guldens or florins of 24 to the mark of silver, a florin being equal to 20*d.* sterling; but now, under the new universal system of the German empire, in marks, approximately equal in value to shillings. Weights and measures are divided according to the decimal system.

Population, Religion, Education.—The population of B., in 1875, amounted to 1,506,531, and in 1881 it had increased to 1,570,196. With the exception of Jews, the inhabitants are exclusively German. The dominant church is the Roman Catholic, whose adherents in 1871 numbered 942,560, or about two-thirds of the whole population. Protestants numbered 491,008; Dissenters and Mennonites, 2265; and Jews, 12,475. The school-system of B. is excellent; it offers the means of instruction to every individual; and a multitude of libraries, museums, and collections of all sorts, are significant indications of the higher elements of culture.

Government.—The sovereignty of the grand duchy, which is strictly indivisible and inalienable, is hereditary in the eldest of the male line, and, failing that, of the female. The heir-apparent is styled Hereditary Grand Duke, and the other sons and daughters are called Margraves and Margravines. The sovereign is bound down by a parliamentary constitution. The parliament, which meets regularly every two years, consists of two chambers. The first chamber consists of the princes of the grand-ducal house, the heads of the seignorial families (seven princes and three counts), and of the nobility—on whom, when they possess hereditary property, under feudal tenure, to the value of 500,000 marks, the king confers the rank of the high nobility—the Catholic archbishop and the Protestant prelate, two representatives of the universities, and eight members chosen by the grand duke, without regard to rank or birth. The second chamber consists of 63 representatives chosen for eight years, 22 for the cities, and 41 for the country districts, giving one representative for about 21,540 inhabitants. As to the franchise, less regard has been paid in B. than elsewhere to the property qualification; every settled citizen and all state officials may take part in the nomination of electors, and may become electors; only representatives must either pay tax on a capital of 16,000 marks, or about £800, or be in possession of an ecclesiastical or secular office bringing in at least 2500 marks, or £125. The highest deliberative and executive body in the country is the council of state. The grand duke is its president, and it is divided, since 1870, into the ministries—(1) of the Grand-ducal House, of Justice, and of Foreign Affairs; (2) of the Interior; (3) of Commerce. The expenditure, according to the budget estimates for the year 1881, was £1,880,775; the estimated net receipts for the same year amounting to £1,514,168. A deficit is, however, unusual in B. There is a particular budget dealing with the finances of the railways, and the steamers on the Lake of Constance. 26½ millions of florins were added to the public debt of the country by the events of 1848 and 1849. The general debt of B. in 1880 amounted to £580,000; that on the railways to £16,207,000. The military affairs of B. are now exclusively regulated by the imperial power; the troops of B. form the major part of the fourteenth corps d'armée of the empire. The effective war-strength of the army in 1868 was 43,705; peace, 14,263. There exist three orders of knighthood, besides a medal for military service, and other decorations of merit. The capital and residence of the sovereign is Carlsruhe; the capitals of the four 'circles' are Constanz, Freiburg, Carlsruhe (formerly Rastadt), and Mannheim.

History.—The original inhabitants of B. were Alemanni. These fell under the dominion of the Franks, the conquerors of Gaul, and submitted at the same time to the Christian religion. Under their duke, Gottfried, they made repeated attempts to regain their independence, but in vain; and the dukedom of the Alemanni was abolished in 748 by Pepin the Little. In the 11th c., a Duke Berthold, said to have been a descendant of the Alemannian Gottfried, built the castle of Zähringen in Breisgau, and with him begins the unbroken line of the princes of the House of Zähringen. A descendant of his second son took the title of Margrave of B., and became the ancestor of the still flourishing House of Baden. He died in 1130. The history of this House presents, for long, little else but a succession of partitions of the territories among brothers, to be again and again reunited by one or other of the collateral branches becoming extinct. The prosperity of the country was thus greatly retarded. The present capital, Carlsruhe, was built in 1715 by the reigning count, Charles III. It is to his grandson, Charles Frederic, who succeeded in 1746, that B. owes consderable accessions of territory and political importance. By favoring the policy of Napoleon, and joining the Confederation of the Rhine, he doubled his possessions in extent and population, and acquired successively the dignity of elector and the title of grand duke. In 1811 he was succeeded by his grandson, Charles Ludwig Frederic, who, five years before, had married Stephanie Louise Adrienne Napoleone, an adopted daughter of Napoleon. After the battle of Leipsic, Charles Ludwig seceded from the Confederation of the Rhine, and (1815) joined the German Confederation, in which B. holds the seventh rank.

The original constitutions or 'states' of the separate territories composing the grand duchy having mostly become extinct, the Grand Duke Charles granted (1818) the charter which forms the basis of the present constitution. Charles was succeeded in the same year by his uncle Ludwig, who was inclined to absolutism, and had to contend at first with powerful opposition, which led him frequently to dissolve the Chambers. He succeeded, in 1825, in carrying through an alteration of the constitution, extending the duration of the parliaments; after which the government and the Chambers acted more harmoniously. Ludwig dying childless (1830) was succeeded by his brother Leopold. The known liberal tendencies of this prince promised at first a new life of constitutional government; but the tide of reaction, become strong since the fall of Warsaw, soon seized the government, and the act establishing the freedom of the press, which in 1831 had been hailed with delight by B. and the whole of Germany, was, in 1832, declared impracticable and abrogated. A fluctuating contest between a reactionary government and a growing opposition was carried on till 1846, when the constitutional Bekk was made minister of the interior, and liberalism thus placed at the helm. The first effect was to calm the public mind, and to cause a split between the liberals and the radicals. The ninth parliament met (December 1847) under the most friendly and promising auspices; when the French revolution (February 1848), the vibrations of which were first felt by B., suddenly called the radical party into the most violent activity. Not satisfied with a multitude of liberal measures passed by the legislature, the revolutionary leaders, Hecker and Struve, aimed at establishing a republic, and stirred up an insurrection. The troops having sided with the insurgents, the grand duke fled, and a Constituent Assembly was called (May 1849). The duke had recourse to Prussian aid, and after several battles, was reinstated on his throne (July 1849). The restoration was followed by some thirty executions, consisting chiefly of soldiers that had borne arms against the government, and of a few political leaders. Upon the whole, the reactionary tendency has been less marked in B. than in most other German states, and many valuable reforms effected in 1848 have been retained. See GERMANY.

BA'DEN, a town and fashionable watering-place in the canton of Aargau, Switzerland, is situated on the left bank of the Limmat. It has a pop. of (1870) 3412. It is of ancient date, being known to the Romans as *Thermæ Helveticæ*. The temperature of the baths is as high as 117° Fahrenheit. B., from the 15th to the beginning of the 18th c., was the seat of the Swiss diet.

BA'DEN-BADEN, a town in the grand duchy of Baden, situated in a pleasant valley at the base of the Black Forest. It contains (1880) 11,923 inhabitants; but its visitors during the season, which is at its height in July and August, are often double the number of the settled population. It is chiefly celebrated for its medicinal springs, which were known in the time of the Romans. B. having been a fashionable place of resort so early as the days of Antoninus and Aurelius, numerous Roman antiquities have been found in the neighborhood, and are preserved in a museum here. There are several springs of a saline character, varying in temperature from 117° to 154° F. These springs are impregnated with iron, magnesia, and lime, with sulphuric and carbonic acid, and are especially recommended in chronic cutaneous diseases, gout, rheumatism, &c.. The chief spring discharges in 24 hours about 4200 cubic feet of water. The gaming-tables of B., the most renowned in Europe, were closed with the rest of the licensed German gaming-houses in 1872.

BA'DEN BEI WIEN (i. e., 'Baden near Vienna'), a much-frequented watering-place of Lower Austria, about fifteen miles S.S.W. of Vienna. It was the *Aquæ Pannoniæ* or *Cethiæ* of the Romans, and is still famous for its warm mineral springs, which are frequented during the the season by from 12,000 to 15,000 persons chiefly from the Austrian capital. The temperature varies from 90° to about 99° F. The baths are frequented by persons of both sexes, who in the bath promenade arm in arm. Many of the Austrian nobility have palaces here. The favorite walk in the neighborhood is along the romantic valley, the Heleuenthal. Pop. (1880) 9645.

BA'DENOCH, a Highland district in the South-east part of Inverness-shire, 30 miles long by 15 broad, bounded by Lochaber, Athole, Braemar, and Murray, and traversed by the Spey. It is much covered with forest, and is chiefly composed of gneiss rock, with a little granite. It was a lordship, held during the 13th c. by the eldest branch of the great House of Cumyn, on whose forfeiture Bruce bestowed it on his nephew Randolph. In 1371, King Robert II. gave it to his son, 'the Wolf of Badenoch,' on the failure of whose descendants it reverted to the crown, which, about 1456, granted it to the Earl of Huntly.

BADGE, a term by which, in general, all honorary decorations and special cognizances are known. Badges are either conferred by the state or sovereign, or assumed by the individual for purposes of distinction, the former class having very frequently had their origin in the latter. Of badges conferred by public authority, for the purpose of inciting to exertion, and gratifying honorable ambition, numerous instances are to be met with in every part of the world. The garter of the English knight, the golden fleece of the Spanish grandee, and the button of the Chinese mandarin, will occur as familiar examples. To the same class belong not only the stars and crosses with which princes and other persons of rank are adorned in this country, and to a far greater extent on the continent, but the medal of the private soldier, and even those not less honorable decorations which are now frequently conferred by private societies for acts of voluntary daring, such as the medal given by the Humane Society for saving from drowning. Amongst the ancients, one of the most usual emblems of authority was a gold ring, which was worn generally on the fourth finger. A ring of this description was the mark of senatorial and magisterial dignity, and latterly of knighthood at Rome; iron rings, during the earlier period, at all events, having been used by private citizens. The right of wearing a gold ring (*jus annuli aurei*) was gradually extended, till at length Justinian conferred it on all the citizens of the empire. In the early times of the republic, when ambassadors were sent to foreign states, they were furnished with gold rings, which they wore during their mission as badges of authority. From an early period, every freeman in Greece appears to have used a ring, though the custom, not being mentioned by Homer, can scarcely have belonged to the earliest period of the history of that people, and is commonly supposed to have been of Asiatic origin. Rings are often mentioned in Scripture as badges of authority both among the Jews and other oriental nations. We read of Pharaoh taking off his ring and putting it on Joseph's hand, as a token of the power which he committed to him (Gen. xli. 42); and still earlier (Gen. xxxviii. 18), Judah left his signet with Tamar as a pledge. In the New Testament, rings are spoken of rather as marks of wealth and luxury than as badges of official rank; e. g., James ii. 2, and Luke xv. 22, where, on the return of the prodigal son, the father ordered that a ring should be put on his finger. As to the workmanship and materials of ancient rings, see RING, SIGNET, &c.

Of badges assumed for the purpose of distinction, none are more famous than the white and red roses of York and Lancaster. Henry VII. combined these two emblems, first carrying a rose per pale, white and red, and afterwards placing the white rose within the red one. One of Queen Elizabeth's badges was a golden falcon perched on the stump of a tree between two growing branches of white and red roses, a B., which is said to have been given to her mother, Anne Boleyn, by Henry VIII. The *bear and ragged staff*, which still exists as a sign in London, was the B. of the great Earl of Warwick. The *white hart* and *silver swan*, which are frequently met with as signs to inns, have a similar origin, the first having been the B. of Richard II., and the second having belonged to the House of Lancaster. The *garb and sickle*, the B. of the Hungerfords, is another very beautiful and less common example of the same class of badges. Different countries have also distinctive badges, generally connected with the history either of the actual ruling or some former dynasty. Of these the *fleur de lis* of France (represented in the accompanyng engraving of the seal of Louis VII.), and the other badges, for which it from time to time makes way—viz., the cap of liberty, and other emblems of republicanism, the eagles of the Empire, borrowed from Rome, and the bees and other insignia which the Bonaparte family have assumed may all be taken as examples.

Fleur de lis of Louis VII.

B. of England.—The present B. of England is a rose white and red, ensigned with the royal crown. The initials V. R., ensigned with a crown, which are used on military accoutrements, is also a species of national badge.

B. of Scotland is a thistle ensigned with a royal crown.

B. of Ireland. — Ireland has two national badges—the golden harp and the trefoil, both of which are carried ensigned with the royal crown.

The three badges of England, Scotland, and Ireland carried conjoined, may be seen under any representation of the royal arms.

B. of Wales is a dragon passant, wings elevated, gules, on a mount vert.

B. of Ulster is on a shield or canton, *or*, a sinister hand erect and apaumée, *gu.* This B., which is popularly known as 'the bloody hand,' is borne in the paternal coats of English baronets.

B. of Nova Scotia, which is borne by the Nova Scotia baronets, is, *or*, a saltire *azure*, thereon an escutcheon of the arms of Scotland, and ensigned with an imperial crown, the motto being, *Fax mentis honestæ gloria.*

Alfred's Jewel.

An ornament of gold, apparently intended to hang round the neck, found in Athelney, and now in the Ashmolean Museum, Oxford. The inscription on the side here represented, around the female figure holding flowers, is 'Aelfred me haet gewercan' (Alfred had me wrought). On the other side is a flower. The workmanship is in a good style.

One of the oldest and most celebrated badges in existence is the so-called jewel of King Alfred. For the badges of the different orders of knighthood, see their respective titles.

BA'DGER (*Meles*), a genus of quadrupeds of the Bear family or *Ursidæ* (see BEAR), and included by Linnæus in the genus *Ursus* or Bear, but forming a sort of connecting-link between this family and the *Mustelidæ* or Weasel and Otter family. To the Skunks (q. v.), which are ranked in that family, the badgers have a particularly strong resemblance, and their dentition and habits are almost the same. The dentition of badgers differs from that of bears chiefly in the large size of the tuberculous molar teeth at the bottom of each jaw, showing a still greater adaptation to vegetable food. Badgers, like the rest of the family to which they belong, are plantigrade, i. e., they walk on the whole sole of the foot, and not merely on the fore part of it. The body is thus brought nearer to the ground than it otherwise would be from their length of limb. The head is long, with a pointed muzzle, the tail short, the skin very thick and tough, the hair long. The gait is slow, the habits nocturnal and solitary. There are five toes on each, both of the fore and hind feet, and the feet are peculiarly adapted for digging and burrowing. A peculiar characteristic of the badgers,

not found in any other quadrupeds of the same family, is the possession of a bag, beneath the tail, for the secretion of a peculiar substance, of a disagreeable odor, which is supposed to be of use in directing the sexes to each other in their solitary wanderings.—The common B. (*M. Taxus* or *M. vulgaris*) is the only quadruped of the Bear family now found in the British islands. It is widely

Badger (*Meles vulgaris*).

diffused over Europe and the middle parts of Asia. It is grayish brown above, and black beneath; the head white, with a longitudinal black band on each side; the body long but robust, in size about equal to that of a small fox, the hair coarse and reaching to the ground as the animal walks. The average length is 2 feet 6 inches, and the height at the shoulder 11 inches. It haunts the gloomy recesses of woods, or thick coppices on the sides of hills, and digs for itself 'a deep and well formed domicile, consisting of more than one apartment, the single entrance to which is by a deep, oblique, and even tortuous excavation.'

In this, or similar excavation, the B. sleeps through the winter. The B. makes use of its nose in digging, scrapes with the forepaws, flinging the earth as far back by them as possible, and when the accumulation is considerable, pushes it away by means of the hind-feet. The B. is extremely cleanly in its habits. It is one of the most perfectly omnivorous of animals, in a wild state as well as in confinement; fruits, roots, beech-mast, eggs, young birds, small quadrupeds, frogs, snails, worms, and insects, equally constitute its natural food. It has been known to visit a garden for strawberries. It is also fond of honey, and of the larvæ of wasps and wild bees, for the sake of which it digs up their nests, its hide being impervious to their stings. It is often caught by placing a sack in the mouth of its hole, when it is out at night; dogs are then sent into the wood to alarm it, upon which it flees to its hole. Dogs sent into the hole are often foiled by earth which the B. throws back upon them, to block up their way, nor is it easy for a dog to contend with it, owing to its great strength, and particularly the strength of its jaws. A barbarous sport was formerly, and to some extent still is practised, called B.-baiting, or *drawing the badger*. A badger kept in a barrel was assailed by dogs, and at last, yielding to superior numbers, was dragged out, upon which it was released, and allowed to go back to its den, to recover itself, and be baited again, which happened several times daily, when the B. was kept as an attraction to a public-house of the lowest sort. The verb to *badger*, expressive of persevering annoyance by numerous assailants, was originally employed with reference to the practice of B.-baiting. The flesh of the B. is said to be very agreeable, particularly when cured in the form of hams. It is much used in China. The B. is easily domesticated when taken young, and becomes very familiar. In Scotland and the North of England, a B. is still called a *Brock*, its Anglo-Saxon name; and in some parts of England it is termed a *Grey*, from which some derive greyhound.—The Balysaur of India, also called the Sand Bear and Indian B. (*M. collaris*), very much resembles the common B., but is taller, and has a more hog-like muzzle, and a longer tail. Its habits and its food are similar to those of the common B., and when attacked, it defends itself with great vigor. It is chiefly found in hilly districts.—The American B. (*M. Labradorica*) was at first supposed to be a mere variety of the European B., but has proved to be very distinct, so that it has been regarded by some naturalists as worthy of a separate genus (*Taxidea*), and is sometimes called *Taxel*. Its teeth are more adapted than those of the B. for carnivorous subsistence, and it chiefly preys on small animals, such as marmots, which it pursues into their holes in the sandy plains near the Missouri and the Rocky Mountains. It is in that region that it abounds, over a considerable range of latitude, but it is not known to exist in Labrador, so that its specific name is perhaps the perpetuation of an error. In its pursuit of the smaller quadrupeds upon which it preys, it enlarges their burrows, and renders some parts of the plains dangerous to persons on horseback. Its prevailing color is hoary gray in winter, yellowish brown in summer, the under parts generally yellowish white; a white stripe runs from the nose over the forehead to the neck. The hair becomes not only very long but woolly in winter.—The burrowing powers of this animal are extraordinary. It sometimes makes burrows six or seven feet deep, running under ground to a length of 30 feet.

BADI'A-Y-LEBLICH, Domingo, known also by the name Ali-Bei-el-Abbassi, one of the most enterprising of modern travellers, was born at Barcelona, April 1, 1767. He studied the Arabic language, and also physical science and mathematics at Valentia. Possessed of a lively and restless spirit, he formed the project of visiting Africa and Asia, under the disguise of a Mussulman, both for the purpose of avoiding the suspicions of the natives when visiting those places forbidden to Christians, and also for giving greater *éclat* to his adventures. In pursuance of this scheme, therefore, he resigned an office under government in the year 1797, and went to Madrid, to make proposals of a scientific and mercantile tour of exploration in Africa. Having gained promises of support from Don Godoï, the Prince of Peace, he betook himself for a short time to London, to study commerce and politics. He also spared no labor to make himself familiar with the manners and customs of the people he was about to visit; and in his anxiety to escape detection, he even ventured to undergo the severe ordeal of circumcision. In 1803, he sailed for Africa, where he represented himself, under the name Ali-Bei, as a descendant from the Abbasides. His tact and talents gained for him such esteem that he was invited to the court of the Emperor of Fez and Morocco. After a two years' residence in Morocco, he set out on a pilgrimage to Mecca, in 1805, and after sojourning some time in Tripoli, Cyprus, and Egypt, arrived at the holy place in 1807, being the first Christian that had visited it since the institution of Islam. Subsequently, he visited Jerusalem and the chief places in Palestine and Syria, and in the autumn of 1807 arrived at Constantinople, whence he had soon to flee, the reality of his Mohammedanism being suspected. After his return to Spain, he was made Intendant of Segovia and Prefect of Cordova; but the easy way in which he shelved his patriotism, and submitted to the French conquerors, was fatal to his prospects, for, on the expulsion of the latter, he was compelled to leave the country. He went to Paris, where, in 1814, he published an account of his travels under the title *Voyages d'Ali-Bei en Afrique et en Asie pendant les Années* 1803 *à* 1807. His work was translated into most of the European languages. Four years after the publication, B. set off on another journey to the East, but died suddenly at Aleppo on 30th Aug. 1818. The Pacha of Damascus seized his papers, so that his second enterprise has been without results for Europe.

BADMINTON, a popular game closely resembling Lawn Tennis, is played with battledore and shuttlecock on a rectangular portion of a lawn. The ground is divided crosswise by a strip of net, not less than three inches wide, suspended from poles at a height of five feet. As in Lawn Tennis, the ground on either side of the net is divided lengthwise into right and left courts. The first player standing on a specified part of his right court, must strike the shuttlecock so as to fall across the net into the back section of the right court opposite. The opponent strikes it back, then it is returned by the first player, and so on till the first player misses the shuttlecock. After the first stroke it suffices that the shuttlecock be sent across the net, if it does not fly beyond the boundaries.

BAEL or BIEL. See Aegle.

BAË'NA, a town in the province of Cordova, Spain, of about 13,000 inhabitants. It is situated about 24 miles south-south-east from Cordova, on the river Marbella, and carries on a considerable export and inland trade, chiefly in grain and oil. B. was a Roman town; and a Roman sepulchre was discovered here in 1833.

BAER, Karl Ernst Von, a distinguished Russian naturalist, was born February 29, 1792, in Esthonia. During 1810—1814, he studied medicine at the university of Dorpat, but convinced that Russia as it then was presented very few advantages for the acquisition of scientific knowledge, he went to Germany in 1814, where he studied comparative anatomy under Döllinger in Würzburg. He also made the acquaintance of Professor Nees of Esenbeck, who exercised a considerable influence over him. In 1817, he went to Königsberg, where, two years after, he was appointed professor of zoology, and charged with the organization of the zoological museum. In 1834, he was called to St. Petersburg, and was soon known as one of the most active members of the Academy (of which he became an honorary member in 1862). As a naturalist, he has specially occupied himself with the difficult subject of embryology; and to his laborious investigations we owe several most valuable discoveries in regard to the development of organic bodies. Beginning with his *Epistola de Ovi Mammalium et Hominis Genesi* (Leip. 1827), he still further elucidated this subject in his *History of Animal Development* (Königsberg, 1828—1837) and *History of the Development of Fishes* (Leip. 1835). After his return to St. Petersburg, he made the polar regions the objects of his study. He examined carefully the northern shores of Russia,

and published a minute description of their fauna and flora. He suggested valuable improvements in the Russian fisheries. In 1864, the fiftieth year of his doctorate was celebrated by the Esthonian nobility, at whose expense a splendid volume was published, containing B.'s autobiography. He died Nov. 29, 1876. His *Reden* and *Kleine Aufsätze* appeared in 1864–75; the *Beiträge zur Kenntniss des Russischen Reichs* (26 vols.) in 1864–75.

BAE'ZA, a handsome old town of Spain, in the province of Jaen, from the capital city of which it is about 22 miles distant in a north-east direction. Pop. (1878) 14,377. It was here that the younger Scipio routed Asdrubal with immense loss, taking 10,000 Spaniards prisoners. It was a flourishing city under the Moors, several of whose caliphs and kings resided here, but it never fairly recovered its sack by St. Ferdinand in the 13th c. Gaspar Becerra, the celebrated sculptor, was born here in 1720; but B. is chiefly proud of being the birthplace of the 11,000 virgins, usually named of Cologne. Its principal buildings are the university, the old monastery of St. Philip de Neri, the cathedral, and the Jesuits' college. B. has manufactures of leather.

BA'FFA, the *Paphos* of ancient times, a seaport town on the south-west coast of the island of Cyprus. It has now fallen much into decay, and has but a small population, who trade in cotton, silk, and grain; but under the Venetian rule, it was a place of considerable importance. The present town occupies the site of New Paphos, which under the Romans, was a beautiful city, full of fine temples and other public buildings. The Old Paphos, famous as the place where Venus landed immediately after her birth from the foam, and as her favorite residence, stood a little to the south-east. A hundred altars were here erected to her name, to which numerous worshipers, male and female, from New Paphos, trooped annually to pay their devotions. An earthquake in the time of Augustus destroyed the Roman Paphos, but it was rebuilt soon afterwards. The Roman deputy-governor, Sergius Paulus, was here converted by St. Paul.

BA'FFIN'S BAY, a gulf, or rather sea, on the north-east coast of North America, extending between that continent and Greenland. Lat. 68° to 78° N., and long. 51° to 80° E. It is about 800 miles long, with an average breadth of 280. Its greatest depth is 6890 feet. The tides do not rise more than 10 feet. The currents are generally towards the south, though recent investigations would seem to show that on the east side of Davis' Strait and B. B. a current from Spitzbergen flows northwards round Cape Farewell. The shores are for the most part lofty and precipitous, backed by ranges of snow-clad mountains. The prevailing rocks are granite and gneiss; the principal animals inhabiting the coasts are, on land, bears, black foxes, and hares; in the sea, the black whale, walrus, and seal, gulls, ducks, and other sea-fowls.

The south shore of Whale Sound on the east coast in lat. 77° 20′ N. was found by Captain Inglefield in 1852 to be inhabited. There are Danish settlements on Disco and Whale Islands. B. B. communicates with the Atlantic Ocean by Davis' Strait; and with the Arctic Ocean by Smith Sound on the north, and Lancaster Sound on the west. Wellington Strait, which forms the north-west outlet of Lancaster Sound, was entered in 1852 by Sir E. Belcher. B. B. was first explored in 1616 by William Baffin, after whom it was called, and who was pilot of the expedition, which was commanded by Bylot. Baffin's title to this honor seems to have been most faithfully earned; and the accuracy of his observations and descriptions has been confirmed by subsequent navigators. Whale and seal fishing are prosecuted to a large extent in B. B., which, on account of ice, is only navigable for some two months in summer.

BAGA'RIA, or BAGHERIA, a town of Sicily, in the province of Palermo, nine miles east-by-south from Palermo, with which it is connected by railway. Pop. about 12,000. It is beautifully situated at the base of the isthmus which separates the Bay of Palermo from that of Termini, and is surrounded by groups of palatial villas of the Sicilian nobility, abandoned after the proprietors had ruined themselves by the festivals here celebrated in honor of Queen Caroline, at the commencement of the present century.

BAGASSE, CA'NE-STRAW, or CA'NE-TRASH, is the refuse matter obtained during the expression of the saccharine juice from the sugar-cane. In the manufacture of sugar (q. v.); the sugar-canes, in lengths of 3 to 4 feet, are passed between heavy rollers, which only partly squeeze out the juice, and yield the bruised canes, or B., still retaining a large percentage (usually about 18) of sugar.—The only use to which the B. is put is as fuel in the heating of the boilers and pans in the sugar-manufactory. The improved apparatus introduced of late years has done much to save the large amount of sugar wasted in the B. and in other parts of the process, which at one time amounted to not less than one-half of the entire quantity of sugar in the sugar-cane.

BAGATE'LLE (Fr. signifying primarily any trifle), the name of a game somewhat resembling billiards. A bagatelle-table is usually about 7 feet long and 21 inches broad; it is lined with cloth, and a game is performed on it with balls and a cue or mace. The balls are small ivory spheres, and the sport consists in striking one or more into holes at one end of the board. To perform this and other feats, some skill and experience are required, and the sport is far from unamusing in a cheerful parlor circle. Of late years, bagatelle-tables have become very common in the houses of the middle-classes of society; they possess the recommendation of being purchasable at a small expense.

BAGDA'D, the name of a town and pachalic in the south-east of Asiatic Turkey. The pachalic extends from lat. 30° to 38° N., and from long. 40° to 48° E.; and is bounded on the N. by the pachalics of Diarbekir and Van; on the W. and S., by Syria and Arabia; and on the E., by Persia; while at its south-east extremity lies the Persian Gulf. Extreme length, 550 miles; breadth, 350. Pop. 2,000,000. It is watered by the rivers Euphrates and Tigris, which unite their streams at the town of Korna, in lat. 31° N., and long. 47° E. The pachalic of B. is usually divided into three parts. 1. That east of the Tigris, comprehending the districts of *Khuzistan* (anciently, *Susiana*) and *Kurdistan* (part of ancient Assyria), the former of which is rich in grain and fruit. 2. That west of the Euphrates, a sterile waste, losing itself at last in the great Syro-Arabian desert. 3. That between the two rivers, the northern portion of which is known under the name of *Algesirah*, or 'the Island' (anciently, *Mesopotamia*), and the southern under that of *Irak-Arabi* (anciently, *Babylonia* and *Chaldæa*). The last of these divisions, though now a barren wilderness, was in ancient times luxuriantly fertile, the seat of mighty empires, and inhabited by industrious populations. The barbarous misgovernment and wretched incapacity of the Turks have reduced it to its present condition. The pachalic produces, in the better-cultivated districts, crops of rice, wheat, maize, barley, with some hemp, flax, tobacco, &c., while dates are brought to great perfection. The chief wild animals are lions—not numerous—hyænas, jackals, wolves, gazelles, ostriches; the chief domestic ones are horses, asses, mules, buffaloes, camels, and dromedaries. The inhabitants are composed of Turkomans, Armenians, Turks, Jews, Arabs, and Kurds; the last two of which races are notorious for their open and audacious depredations, their mutual wars, and their utter contempt for the authority attempted to be exercised over them. Principal cities—Bagdad, Bassora, and Mosul. For a description of the cities which in ancient times adorned this region, see ASSYRIA, BABYLON, NINEVEH, CTESIPHON, SELEUCIA, &c.

BAGDA'D, the capital of the pachalic of the same name, is situated on both banks of the Tigris, in lat. 33° 20′ N., and long. 44° 23′ E. Pop. estimated at 60,000. The city is surrounded by a brick wall, 5 miles in circumference; the two parts are connected by a bridge of boats, and the communication is guarded by a citadel. It has an extremely picturesque appearance from the outside, being encircled and interspersed with groves of date-trees, through which one may catch the gleam of domes and minarets; but it does not improve on closer inspection. The streets are narrow, crooked, unpaved, and dirty, full of ruts, and strewed with dead carcasses, which, however, are for the most part removed by dogs, the only public scavengers in the east. The exterior of the individual houses corresponds with the repulsive aspect of the streets. They have, in general, no windows towards the front, and are built of old brick; but their interior is often very gorgeously decorated. The vaulted ceilings, rich mouldings, inlaid mirrors, and massive gilding, bring back to the recollection of the traveler 'the golden time of good Harun Al-Rasehid.' B. contains upwards of 100 mosques. These, together with the khans, bazaars, and the palace of the governor, are the only noticeable buildings in the city. The domes and minarets are said to be finer than those of Constantinople, and are beautifully painted. The bazaars exhibit the produce of both Turkish and European markets; but commerce has greatly decreased since Persia began to trade with Europe by way of Trebizonde on the north, and by the Persian Gulf on the south. Nevertheless, though no longer the chief emporium of merchandize between East and West Asia, and though robber Kurds and Arabs lurk on all the roads that lead from the city, B. still carries on a considerable traffic with Aleppo and Damascus, and has manufactures of red and yellow leather, silks, and cotton stuffs. The value of goods that pass through the custom-house at B. in one year may be £500,000. Of the 60,000 inhabitants, the greater part are Turks and Arabs; the remainder are Jews, Armenians, Hindus, Afghans, and Persians. In summer, the heat is oppressive; rain does not fall on more than twenty or thirty days throughout the whole year; but when the snows melt on the Armenian hills, the Tigris becomes a majestic, and often a destructive river. In 1831, an inundation destroyed one half of the town, and several thousand lives. The plague visits it periodically—once every ten years. In 1831, 4000 people perished daily for several days from its ravages! B. is frequently chosen by Mohammedans of the Shiah

sect as a permanent place of residence. Several steamers now ply on the Tigris to and from B.; and here is one of the chief stations of the Anglo-Indian telegraph.

B. was founded by the Abbaside calif Almansur, 762—766 A.D. It was built out of the ruins of Ctesiphon and Seleucia. In the 9th c., it was greatly enlarged by Harun Al-Raschid, who erected numerous edifices on the east side of the Tigris, and connected its two banks by a bridge of boats. The palace, built for himself, and the tomb of his favorite wife, Zobeide, are said to have been of extraordinary splendor. A hundred years later, B. was ravaged by the Turks. In 1253, the grandson of Genghis Khan, Hulaku, put an end to the old califate; but the descendants of this Tatar conqueror were expelled by Timur, who took the city in 1393. After several vicissitudes, it remained in the possession of a Turkoman chief, whose dynasty governed until 1470. In the beginning of the 16th c., Shah Ismael, the founder of the Suffide dynasty in Persia, made himself master of it; since which period it has repeatedly been a bone of contention between Turks and Persians. After a memorably obstinate siege, it was conquered by the sultan, Murad IV., in 1638. Nadir Shah vainly essayed to retake it in the 18th c., and ever since it has been under the sway of the Porte.

BA'GGAGE, in the marching arrangements of the British army, is placed under strict rules, in order that the accumulation of weight may not impede the movement of the troops; and rules of an analogous kind are enforced in troop-ships, when soldiers are on a voyage. The term itself is made to apply chiefly to articles of clothing, and to small personal effects. A private soldier is allowed to carry nothing except that which his knapsack and other accoutrements can hold; but those who are married with their officers' consent—a small number in every regiment—are allowed one small chest each of definite size, which may be carried on a march, but at the men's own expense. Staff-sergeants and pay-sergeants have similar permission. The B.-wagons are not expected to receive packages weighing more than 400 lbs. each, or as much as four men can lift. Officers' B. is, of course, much more considerable in amount than that of the non-commissioned officers and privates. On board troop-ships, the weight to be carried for each person is strictly defined—from 18 cwt. for a field-officer, down to 1 cwt. for a married private soldier, with his wife and children. In encampments, whether permanent or temporary, and in armies on field-service, the utmost care is taken to preserve the B. from the enemy, by surrounding it as much as possible with defensive troops.

BA'GGESEN, Jens, a well-known Danish poet, but who also has a place in German literature, was born at Korsör, in the island of Zealand, February 15, 1764. He first obtained a reputation by his *Comic Tales* (1785), the opera *Holger Danske* (1790), as well as by his odes and songs. Through the kind assistance of the Prince of Augestenburg, he was enabled, in 1789, to make a tour through Germany, Switzerland, and France. In 1811 he was appointed professor of Danish language and literature at Kiel; in 1814, he removed to Copenhagen, where he became involved in an unseemly strife with Ohlenschläger, and in 1820 he left his native country altogether. Some years later, a home-sickness seized him, and he set out on his return, but died at Hamburg, October 3, 1826. B's nature was a curious compound of pride and humility, love and hate, sensitiveness and reflective power, free thinking and faith; and these conflicting qualites also appear in his poems, which possess an unfinished and inharmonious character. In 1803 appeared at Hamburg a collection of his German poems; in 1806 he published an idyllic epic, entitled *Parthenais oder Alpenreise*, in twelve cantos, and written in hexameters, which greatly increased his reputation. It contains single passages of great beauty. B. possessed no lyrical talent, in spite of his warm-hearted and enthusiastic character. Only a very few of his songs exhibit that simplicity and tenderness which are the essential requisites of song-writing; and, besides, they are almost all destitute of originality. Klopstock was the model whom he had in view in the composition of his odes; but he was far from reaching the level of his master. The sphere in which he shone most conspicuously was the serio-comic. His 'humorous epic' (as he called it) of *Adam and Eve*, published shortly after his death, is a singular mixture of humor, pathos, levity, and earnestness. He left in manuscript a poem of similar character on the subject of Faust. His *Poetical Works in the German Language* (Leip. 1836, 5 vols.) have been published by his son, who has prefixed to them an excellent biography.

BAGLI'VI, George, a celebratad Italian physician, born at Ragusa, in September, 1669. The incidents of his life are almost entirely confined to his professional career. Orignally descended from an Armenian family, he took the name of his adoptive father, who was a wealthy physician of Lucca, and who bestowed on him an excellent education. He studied at Salerno, Padua, and Bologna, and afterwards visited the principal hospitals of Italy. In 1692 he went to Rome where he enjoyed the anatomical prelections of his friend Malpighi. Shortly after, he was appointed professor of anatomy at the college of La Sapienza, Rome, where he died in 1706. His great discovery in medical science is the system of 'solidism,' as it is called. Previous to the time of B., physicians had held the doctrine of Hippocrates in reference to the primary seat of diseases—viz., that it is in the fluids. B. came to the conclusion that this was erroneous, and that the real seat of disease is in the solids. His reasons are, on the whole, sound, and the doctrine is now all but universally prevalent, though it is admitted that cases do occur in which the fluids appear to have been first affected. He published several treatises of great merit, in which his then novel views were explained. B. was very honest and independent in his judgment, and used to warn his profession against a blind adherence to mere dogmas on matters which were but imperfectly known.

BAGNA-CAVALLO, an inland town of Italy, formerly belonging to the Papal States, 11 miles west from Ravenna, in the province of that name. Pop. about 3900. B. was a Roman city, called Tiberiacum, in honor of Tiberius.

BAGNA'RA, a seaport town of South Italy, on the Gulf of Gioja, 16 miles N.E. of Reggio. Excellent wine is produced in the neighborhood. Pop. 6229.

BAGNÈRES, the name of two towns in the Pyrenees, France, both well known as watering-places.—B. de Bigorre on the Adour, in the department of the High Pyrenees, is situated at the base of Montalivet, and at the entrance to the romantic valley of Campan. Besides its extensive bathing-houses, it has a college, a theater, a Pyrenean museum, a trades-hall, and contains (1876) 7598 inhabitants. By the Romans it was known as *Vicus Aquensis* or *Aquæ Bigerronum*. It was destroyed by the Goths, but the fame of its waters survived, and is now so great that it is visited by about 20,000 strangers yearly. The tepid, warm, and hot saline springs are numerous, and are recommended for cutaneous and nervous diseases. Woollens, linens, and barèges are manufactured here.—B. de Luchon—the *Aquæ Convenarum* of the Romans—is situated in the department of Upper Garonne, and in a pleasant valley watered by the Pique. Its cold, tepid, and hot sulphurons waters are recommended in rheumatism, gout, cutaneous diseases, and paralysis. It has a pop. of (1876) 3982.

BAGNES, the convict-prisons of France. In ancient times the severest punishment, next to death, was that of the galleys (q. v.). In 1748, these were abolished, and the convicts were employed in hard labor in arsenals and other public works; and the prisons in which they were lodged were called *bagnes*, from the Italian *bagno*, literally a bath—a name supposed to have originated in the fact, that the slave-prisons at Constantinople contained baths, or because they stood near the baths of the seraglio. The Constituent Assembly of 1791 and 1792 mitigated the sufferings of convicts, and substituted for the detested name *galères*, that of *travaux publics*, to which succeeded the *travaux forcés* of the Code Napoleon. The practice of branding criminals with a hot iron was not abolished till 1832. The latest existing institutions of this class were at Toulon, Brest, and Rochefort, at which the number of convicts, in 1850, was respectively 3873, 2831, and 986. In these establishments, the labor of the convicts was turned to profitable account, and the various handicrafts were taught in the prison under the direction of overseers.

The industrious and clever were enabled to earn small wages, and good behavior was rewarded with a gradual relaxation of restraint. Formerly the punishment of the galleys was inflicted for comparatively slight offences, such as removing landmarks, begging, poaching, &c., but hard labor in the B. was reserved exclusively for such as commit crimes which seriously menace the public peace and personal safety. The number of these, however, is not less than 51. Of 7689 convicts (*forçats*) in 1850, 3070 were condemned to 5—10 years; 2239 to 11—20 years; 282 to 20—30; 41 to 30—40; 23 to 40—50; 9 to above 50; and 1965 for life. The principal crime was theft, for which 4750 had been condemned; for murder, 1027. The greater proportion of the criminals, viz. 4595, were from the rural districts; from towns, 2452; foreigners, 643; most of them were of the age between 20 and 40; and 3902 were unable to read or write. The most numerous class were husbandmen, threshers, gardeners, 1278; next, day-laborers, and *terrassiers* (navvies?) 1078. The number of pardons to convicts in 1848 was 90; in 1849, 52. In 1852 the imperial government decreed the suppression of the B., and substituted in their place deportation to Guiana. But in case any of the prisoners then in the B. might have considered deportation a greater punishment than what they were condemned to, it was resolved to give them the choice of remaining in prison or of being transported: 3000 chose transportation.

BAGNES-LE-CHABLE, a parish and village in the canton of Valais, Switzerland, on the left bank of the Dranse. The parish occupies the whole valley of the Bagne. Pop. (1870) 4254. The

valley was twice inundated during the 16th c.; again in 1818, when 400 cottages were swept away, and 34 lives lost.

BA'GNI DI LU'CCA (*Baths of Lucca*), a large inland village of Italy, in the province of Lucca, and 13 miles north from the city of Lucca. Pop. of commune about 8200. It is one of the most frequented bathing-places in Italy, and is situated in one of the finest valleys of Tuscany, the valley of the river Lima, a branch of the Serchio. There are hot springs of various temperature from 96° to 136° Fahr., scattered over a limited neighborhood.

BAGNO A RIPOLI, a famous Italian bathing-place, in the province and circle of Florence, five miles east-north-east from the city of Florence.

BAGNO IN ROMAGNO, a town of Italy, in the province of Florence, and 35 miles east-by-north from Florence city, on the right bank of the Savio, not far from its source. It is a much frequented bathing-place, having hot springs of temperature 108°—110° Fahr.

BAGNOLO, a town of Piedmont, in the province of Cuneo, 12 miles north-west from Saluzzo, on the left bank of the Grana, at the foot of the Alps.—Another small town near Brescia bears this name; also a town in the province of Reggio, in Emilia; and a town of the province of Lecce, in South Italy, as well as many villages in Italy.

BA'GPIPE, a wind instrument, which, up to the 18th c., was common in almost every country in Europe, and still continues in use among the country people in Poland, Italy, Sicily, the south of France, Scotland, &c.; but being far from a sweet-toned instrument, and limited in its range of notes, it has fallen into disuse wherever there is any pretension to musical refinement. It consists of a leathern bag, which the player inflates by blowing with his mouth through a tube. The music proceeds from three or four pipes, whose mouth-pieces are inserted into the bag; the wind being forced out by pressing the bag under the arm. One of the pipes, the *chanter*, is a kind of oboe with eight holes, and is similarly handled; the others, called *drones*, sound each only one continuous low note. It is certain that the bagpipe was in use among the Hebrews and Greeks, and there are plenty of proofs that in Germany and elsewhere in Europe it was among the most favorite instruments in the 15th c.

Though fallen generally into disuse, the B. is still a popular instrument in the Highlands of Scotland, and wherever there are gatherings of Highlanders, and even of Lowland Scotch, in England and other countries. Pipers in proper costume are also attached to the Highland regiments, and in some instances pipers are retained by Scottish noblemen to play on festive occasions. Skill in playing the B. is promoted by various Highland societies, which, at periodical competitions, gives prizes to the best players of pibrochs (q. v.), reels, and other airs.

BAGRATION, PETER, PRINCE, a distinguished Russian general, descended from the noble family of the Bagradites of Georgia and Armenia, was born in 1756. He entered the Russian service in 1783, and was trained under Suwarrow. In 1788 he was engaged at the storming of Oczakow; fought in 1792 and 1794 against the Poles; in 1799, in Italy and Switzerland; and distinguished himself in the Austro-Russian war of 1805 against the French, especially in the sanguinary engagement of November 16 of that year, when, with a small body of troops, he bravely stood during six hours opposed to the superior forces under Murat, and thus enabled the Russian general, Kutusow, to reach Znaym with the main army. Subsequently, Prince B. was engaged in the battles of Austerlitz, Eylau, and Friedland, and took part in the Russian campaign against the Turks, especially in the battle of Silistria, 1809. In the campaign of 1812, he commanded the second Russian army of the west, and had the misfortune to fail in his attack on Davoust near Mohilew; but succeeded in forming a junction with the west army at Smolensk. He was, however, mortally wounded in the battle of Mosaisk, and died October 7, 1812.

BA'GSHOT BEDS, the lowest series of strata in the Middle Eocene formation of Britain. The name is derived from Bagshot Heath in Surrey, where they were first examined; but, as they are more fully developed and better seen in the Isle of Wight, the rocks there are now considered the typical representatives of the series. The strata are arranged into four groups: 1. The *Upper B. B.*, composed of yellow and white sands with ferruginous stains, generally unfossiliferous, though a remarkable exception exists at Whitecliff Bay, Isle of Wight, where a bed contains a large number of very friable shells. 2. The *Barton beds*, consisting of colored clays interstratified with sand and loam. They are rich in fossils, chiefly the shells of mollusca, but contain also the remains of a fish and several reptiles. Here, too, the Nummulite (q. v.), so characteristic of the Tertiary formations, makes its first appearance in a descending order. This genus dies out with the *Nummulites variolaris*, the small species found in these beds. 3. The *Bracklesham beds*, so called from their extensive development at Bracklesham Bay, near Chichester in Sussex, are composed of marly clays and white sands, capped by a bed of flint-pebble conglomerate, and resting on dark carbonaceous clays. This is the most highly fossiliferous group in the series. Two species of plants have been noticed. The remains of 6 reptiles and 21 fishes have been described, besides a long list of mollusca, amongst which is the magnificent *Cerithium* (q.v.) *giganteum*, so conspicuous in the *Calcaire grossier* of Paris, where it is sometimes two feet in length. The prevalence of genera now only known as inhabitants of tropical or sub-tropical seas, such as volutes and cowries, together with their companion lunulites and corals, makes it highly probable that a warm climate prevailed during the deposition of these strata. 4. The *Lower B. B.*, consisting of alternations of variously colored sands with gray, chocolate-colored, or white pipe-clays. The white clays contain the only fossil organisms found in this group—beautifully preserved leaves spread out in the layers of the clay.

The series rests on the true London clay. Its maximum thickness is about 1200 feet.

BA'GUL, or BHA'GUL, a small state in North-west India, on the south or left bank of the Sutlej. B. is one of the native states in feudal subordination to the Punjab government. Pop. estimated (1872) at 22,000. Its lat. is about 31° N., and long. 77° E. The surface is generally mountainous, presenting two summits, Bahadurgarh and Bara Devi, respectively 6233 and 7003 feet above the sea. B. has a supposed gross revenue of £6000, pays 3600 rupees as tribute, and has 222 men under arms.

BAHA'MAS, or LUCAY'OS, a chain of islands stretching in a north-west direction from the neighborhood of the north coast of Hayti to that of the east coast of Florida. From Florida they are separated by the channel through which flows the Gulf Stream (q. v.); and from Cuba, by the Old Bahama Channel. These are the principal passages between the open ocean and the Gulf of Mexico. The chain extends in N. lat. from 20° 55′ to 27° 31′, and in W. long. from 72° 40′ to 79° 5′, having an entire length from north-west to south-east of about 550 miles; and it rests mainly on two shoals—the Great Bank to the south, and the Little Bank to the north. There are upwards of 3000 islands and rocks, but only about 30 of any size. The chief members of the group, if reckoned from the N.W., are these: Great Bahama; Abaco; Eleuthera; New Providence; Andros; Guanahani or Cat Island, or San Salvador; Watling's Island; Exuma; Long Island; Crooked Islands; Maricuana; Inagua; Little Inagua; Caicos; Turk's Island.

The area is 5390 square miles; and in 1881 the population was 43,521. The population of Turk's Island, officially separate from the B., is about 4800. The revenue of the B. in 1880 was £42,950; the expenditure, £43,650. The value of the total imports in 1880 was £180,800; of the exports, £121,430. The islands generally are of reef-like shape, long, narrow, and low. With very little appearance of soil, they derive considerable fertility from the tendency of the porous rock to retain moisture. Besides excellent pasturage, they yield guinea-corn, maize, cotton, pine-apples, lemons, oranges, pimento, and a species of cinnamon. In the larger islands, too, there is excellent timber. Cotton cultivation received a great impulse during the American civil war. During the summer, the temperature ranges from 73° to 93° F.; but in the winter the climate is so delightfully temperate as to be generally prescribed in the United States for pulmonary complaints. The annual fall of rain is from 43 to 45 inches, being heaviest in October, November, and December, but pretty equally distributed over the other months. On October 1, 1866, a furious and most destructive cyclone visited the Bahamas.

The B. were Columbus's earliest discovery. But the precise spot of his first landing has not been ascertained. Guanahani or Cat Island has generally been believed to be the San Salvador of Columbus; but recent investigations appear to have transferred the honor to Watling's Island, situated a little further to the east. The B. having been depopulated, but not again colonized, by the Spaniards, were occupied by the English in 1629—to whom, after various vicissitudes of fortune in the wars with Spain and France, they were ultimately secured by the treaty of 1783. Nassau, in New Providence, is the seat of government, and has recently been greatly improved both as town and port. During the American civil war, Nassau became the station for vessels about to run the blockade of the southern ports, and thence derived unexampled prosperity; and so far as agriculture is concerned, the impulse then received has been maintained by the Bahamas.

BAHA'R (also spelt *Behar* and *Bihar*), one of the old Mohammedan provinces of India, occupying part of the valley of the Ganges, and named after its chief town, a city which in 1872 had a pop. of 44,295. B. is now one of the provinces of Lower Bengal, and is divided into the two commissionerships of Patna and Bhagulpore, which are again subdivided into 12 adminstrative districts. The area of the province is 42,417 square miles, and the pop. (1872) 19,736,101, giving an average of 553 persons to the sq. m. The name B. was also given to one of the administrative districts, now officially called Gayah. Roads and bridges can

neither be well made nor thoroughly repaired, where, during nearly half the year, the surface of the country is inundated, and torn by innumerable torrents. In the dry season, the beds of the rivers present only detached pools. Among the minerals, the most important are coal and mica. The latter, nearly as pellucid as glass, is sometimes found in blocks, yielding plates of 36 inches by 18. Potatoes, cabbages, cauliflower, lettuces, turnips, &c., have been introduced from Europe, and succeed well. Of indigenous productions, the most considerable are rice, pulse, sugar, cotton, indigo, and tobacco. The district is largely engaged in the manufacturing of muslins, silks, carpets, blankets, tents, tapes, threads, ropes, paper, glass, cutlery, jewelry, leather, ink, soap, and pottery. Ardent, spirits, too, are extensively distilled from the flowers of the *Bassia latifolia* (q. v.) Before the days even of Moslem domination, B. appears to have been the center of a Hindu empire, which native accounts describe as of matchless splendor, and of fabulous duration.

BAHA'R, or BEHAR, a town of Bengal, 34 miles south-east-by-south from Patna, the chief town of a British district of the same name (see BAHAR,). According to the census returns of 1871, it contains a population of 44,295. The original city is nearly deserted, and the present town consists of houses scattered about its remains, and interspersed with fields, gardens, and groves. There are some remains of fine mosques. The ruin of this town began with its sack by the Mahrattas about 1742, and was completed by famine some years after. The present district of Bahar is but a small portion of the great province which was called by that name in the empire of Delhi.

BAHI'A, a capital of the Brazilian province of the same name. It is otherwise called San Salvador—the more usual term being taken from *Bahia de Todos-os-Santos*, or *Bay of All Saints*, on which it is situated, in lat. 13° 1′ S., and long. 38° 32′ W. B. contained, in 1874, 152,000 inhabitants, pretty equally divided between whites, blacks, and mulattoes. B. has an exchange, arsenal, and imperial dockyard, besides many ecclesiastical and public institutions; and is the point of departure for a railway line. It is connected by submarine telegraph with Pernambuco, Para, and Rio. The value of imports of foreign goods into B., in 1874, was £1,455,985; and the value of exports in the same year, £1,384,349. The chief exports of B. are sugar, cotton, coffee, tobacco, rice, rum, dye-stuffs, cocoa-nuts, fancy woods, horns, hides, diamonds, and bullion; and it imports manufactured goods, provisions, flour, salt, iron,glass, and wines. B. is the oldest city in Brazil, having been founded by the first captain-general of the country, and was long the capital of the colony. As a port, B. is unrivalled.

BAHI'A, a province of Brazil, about the middle of the coast, taking its name from its chief city. It extends in S. lat. from 10° to 16°, and in W. long. from 37° to 44°. Pop. in 1873 was 1,450,000. The wealth of B., consisting in valuable timber, in rich mines of gold, silver, copper, lead, iron, in deposits of potash, alum, &c., is in great measure lost for want of good roads. The interior contains lofty sierras; but the maritime districts are fertile, being well watered by the Itapicuru, Contas, and other rivers. Besides the streams that flow through B., the San Francisco, a vastly larger river, forms about half of the inland boundary, dividing this province from that of Pernambuco.

BAHI'A HO'NDA, a harbor on the north coast of Cuba, 60 miles west-south-west of Havana, potected by a fort, and formerly much resorted to by privateers and slavers.

BAHNA'SA, or BEHNE'SEH, a town of Central Egypt, on the Bahr Yousef (Joseph's Canal). It is noteworthy as the site of the ancient *Oxyrynchus*, celebrated for its numerous monasteries, the ruins of which are still to be seen.

BAHR, an Arabic word signifying a large body of water, is applied both to lakes and rivers.—BAHR-EL-ABIAD (the White River), and BAHR-EL-AZRAK (the Blue River), are the chief branches of the Nile (q. v.).—BAHR-ASSAL is Lake Assal (q. v.).—BAHR-BELA-MA (the Sea without Water), a long, deep valley in the desert, west from Cairo. It is completely barren, but has the appearance of having been once a water-course.

BAHR, JOH. CHRISTIAN FELIX, an eminent German philologer and critic, was born, 1798, at Darmstadt. He was educated at the Heidelberg gymnasium and university, where he gained the favor and friendship of Creuzer, whose symbolic system of interpretation in mythological matters he himself pursued at a later period. He was elected a professor in 1826. Previous to this, he had occupied himself chiefly with the elucidation and criticism of Plutarch, the result of which was an annotated edition of *Alcibiades* (Heid. 1822), and of *Philopoemen*, *Flaminius*, *Pyrrhus* (Leip. 1826). At the same time, he collected and published the fragments of Ctesias. But a greater interest was excited by his *History of Roman Literature* (1828), which is noted for its clearness and comprehensiveness. Three supplements to this work also appeared: *The Christian Poets and Historians of Rome* (1836), *The Christian-Roman Theology* (1837), and the *History of Roman Literature in the Carlovingian Period* (1840). One of his most important works is his version of Herodotus (1832—1835). In 1835, he published his *De Universitate Constantinopoli Quinto Sæculo Conditâ*. He likewise contributed numerous articles to Jahn's *Jahrbücher für Philologie*, and other works. He died 27th November, 1872.

BAHRDT, KARL FRIEDRICH, a German theologian of the extreme sceptical school, was born, 1741, at Bischofswerda, in Saxony, and studied at Leipsic, where he soon displayed extraordinary talents, and some restlessness of disposition. His early theological writings betrayed the sceptical tendencies which were afterwards more fully developed. On account of his immoral conduct, however, he was, in 1768, compelled to leave Leipsic, where he had been a popular preacher. In Erfurt, his next residence, he was appointed professor of Philosophy and Hebrew Antiquities, and wrote *Letters on a Systematic Theology*, and *Aspirations of a Mute Patriot*, two works whose heterodoxy involved him in controversies, and made his position untenable. In 1771, he went to Giessen, where he delivered theological lectures, and preached with approbation. His translation of the New Testament was regarded as so dangerous, that the author was deprived of the privilege of teaching. His creed, in fact, was simple Deism, and one of the chief points in his theology was his rejection of miracles. Even the immortality of the soul was not positively maintained in his works. Ultimately, after attempting to establish various institutions, he was reduced to the position of a tavern-keeper; and as he still persevered in his attacks on orthodoxy, he was imprisoned for one year at Magdeburg, where he wrote an autobiography. Among his other works are—*The Religious Edict* (a satire on the Prussian religious edict of 1788), and *The German Union*. He died at Halle, April 23, 1792.

BAHREI'N ISLANDS, or AVAL ISLANDS, a group of islands lying in the Persian Gulf. The most important of these is Bahrein, or Avâl, about 27 miles long, and 10 broad. It is hilly in the center, but the soil generally is fertile, and produces dates, figs, and other eastern fruit, besides wheat and barley. Bahrein is badly cultivated. Spring-water is plentiful in the interior, but on the coast it can only be procured from the bottom of the sea, where it springs up quite fresh, and is brought up by divers in skins. Manama, the capital, in lat. 26° 12′ N., and long. 50° 39′ E., has a good harbor on the north, but a safer though smaller one on the south. The B. I. are chiefly remarkable for their pearl-fisheries, which were known in ancient times, and which employ, during the season, from 2000 to 3000 boats, each manned with from 8 to 20 men. The annual value of the pearls is estimated at from £200,000 to £300,000. Tortoise-shell, shark-fins, and dates are also articles of export. The islands, which have been subject to a good many political changes, are now inhabited by Arabs. Pop. 68,000.

BAI'Æ, a small town of antiquity, on the coast of Campania, 10 miles west of Naples, where the present castle of Baja stands. When the Roman empire was in its greatest splendor, the beauty of its situation, the fineness of the surrounding scenery, and the excellence of its mineral springs, made B. such a favorite resort of the Roman nobles, that for want of space for their baths and villas they encroached on the sea. Julius Cæsar, Piso, Pompey, Marius, Julia Mammæa, and others, had country-houses at Baiæ. Horace preferred B. to all other places in the world. Seneca warned every one who desired to maintain dominion over his passions, to avoid this watering-place. Cicero thought it necessary to excuse himself for undertaking the defence of Marcus Cœlius, a man who had often visited B., for B. was considered by the stricter moralists of those times as the abode of voluptuousness and luxury, and a den of vice. The ruins, still standing on the desolate coast, or rising from the sea, are now the only evidence of the former magnificence of B., whose population, dwelling in mean hovels, only amounts to 800. The ruins of three supposed temples—one of Venus, one of Mercury, and one of Diana Lucifera—as well as the remains of a few *thermæ*, or warm baths, still attract the attention of archæologists. The harbor, one of the largest belonging to the Romans, is now much destroyed. The surrounding country is covered with the ruins of Roman villas, sepulchral monuments, and other buildings.

BAI'KAL (in Turkish, Bei-kul, i. e., Rich Lake), is, after the Caspian Sea and the Sea of Aral, the largest lake of Asia. It is a fresh-water lake, and is situated in the south of Siberia, in the gov. of Irkutsk, near the great military road between Moscow, Kiachta, and the mines of Nertschinsk. Lat. 51° 20′ to 55° 30′ N., long. 103° to 110° E. It somewhat resembles a sickle in shape, and varies considerably in breadth. Between the mouths of the Selenga and the Buguldeicha, it is only 19 miles across. Its length is 370 miles, and its breadth 20 to 70 miles; height above the sea, 1363 feet; depth in center very great. The Baikal Mountains, a spur of the Altaï, enclose the lake, which is fed by numerous streams, the chief of which are the Selenga and Bargusin. Its

outlet is by the Lower Angara, a chief tributary of the Yenisei; but the river is inconsiderable in size compared with those which flow into the lake. It has several islands, the largest of which, Olkon, has a length of 30 miles. B., which forms an important link in the chain of communication between Russia and China, has two commercial ports, and of recent years steam-boats have given a considerable impetus to its trade. Its sturgeon and seal-fisheries are valuable, and large quantities of a fish resembling a herring are also caught in it. A peculiar fish, called the golomynka (*Callionymus Baicalensis*), which is almost one mass of fat, yielding beautiful train-oil, was at one time caught in immense numbers, but it is now much scarcer. The surface of the lake is frozen from November to April, but the traffic is carried on over the ice. Besides the Russians settled on the banks of the Selenga and Angara, the shores of Lake B. are also inhabited by tribes of the Burates and Tunguses.

BAIL is a technical term in the practice of the law both in England and Scotland, with this difference, that, in England, it is used both in civil and criminal procedure, whereas in Scotland it is applied exclusively to the latter. By B. is understood the security given by sufficient sureties for the appearance in court on a day, and at a place certain, of a person arrested or imprisoned, and who, in consequence of such security or B., is in the meantime set at liberty. Such security, however, involves the assumption of the custody of the arrested or imprisoned party by his B., the meaning of the rule being that the party arrested or imprisoned is delivered into the hands of those who bind themselves for his forthcoming, in order that he may be protected from prison until he has to make his personal appearance; and, in this sense, it differed from the old term, *mainprize*, now obsolete, and which signified a mere security without any other or corresponding guarantee, as in the case of bail. A technical and necessary distinction is taken in law-books between what is called *common B.*, or *B. to render to prison*, and *special B.*, or *B. to the action;* but for general information, the following statement of the law may suffice.

In civil process, the sureties give their bail-bond to the sheriff himself for the appearance of the defendant, according to the exigency of the case, and for nothing else. It does not appear that any particular or limited number of sureties is to be taken; but it would seem that the sheriff may insist on more than two, provided they have only sufficient property within the county to answer the penalty; but if more than two be tendered, it is not necessary that each should be worth the full amount. On the other hand, the bail-bond will be good though there be only one surety; but in accepting such security it would seem that the sheriff does so at his own risk. If there is reasonable ground for believing the sureties to be sufficient, the sheriff has no discretion, but is bound to accept the B.; and if he refuses to do so he is liable to an action.

The necessity of B., however, may be avoided by the defendant availing himself of the provisions of statutes which are re-enactments of older laws, by which it is enacted that the arrested or imprisoned party may obtain his immediate discharge by depositing with the sheriff the sum demanded by the plaintiff, together with £10 towards the cost, the same to remain in court to abide the event of the suit. The enactment, however, contains a proviso that it shall be lawful for a defendant who has made such a deposit in payment, at any time in the progress of the cause, before issue joined, or final or interlocutory judgment, to receive out of court the sum so deposited and paid, upon putting in and perfecting special B., and paying such costs as the court shall direct; and, by another enactment of the same statute, provision is made for the case where a defendant who has put in B., afterwards elects to deposit the plaintiff's demand, and to pay the costs to abide the event of the action.

As to those who may or may not be B., it would appear, from the nature of the security undertaken, that persons priviliged from arrest cannot be B., because the engagement on the part of the B. being, in default of the principal party, to pay the debt or damages and costs, the plaintiff is entitled to require the security of persons who are amenable to the ordinary process of the courts. Therefore, peers, members of parliament, ambassadors, and other privileged persons, cannot become bail; nor, generally, can attorneys or those employed in executing the process. But persons who are not in such a position, but who are either housekeepers or freeholders, may be taken as bail. The possession of *leasehold* property is not enough, unless the party is also a housekeeper; but the real owner of a *freehold* estate, however small it may be, situated within the jurisdiction of the court, and provided he can otherwise make up the amount required, isqualified, though he be only a lodger, or merely an occupant by suffrance in the house of another. Again, to constitute a 'housekeeper,' within the meaning of the rule, the house must be within the jurisdiction of the court, and such a party must be the *bonâ-fide* tenant of the house in his own right, enjoying its benefits, and bearing its burdens. A person, therefore, inlodgings in England, but with a house in Scotland, is not admissible as B.; and such B. must strictly in this sense be a *housekeeper*. Bail has ceased to be usual since imprisonment for debt was abolished. Besides these arrangements of the common law with regard to B., we may mention two other forms of it—namely, B. *in Error*, and B. *in Attachment*. The former is regulated by the Common Law Procedure Act (1852), 15 and 16 Vict. c. 76, by section 151 of which it is provided that proceedings in error shall not stay or delay execution on a judgment, unless the person alleging or pleading such error shall be bound, along with two sufficient sureties, in double the sum recovered by the judgment in order to prosecute the proceedings in error with effect, and make payment of the costs, in the event of the judgment being affirmed, or the proceedings in error being discontinued. B. in attachment, again, signifies the sureties required for a party arrested upon a writ of attachment, and brought up before a judge in order to obtain his discharge from custody, the sureties undertaking that he shall appear and answer such interrogatories as may be required of him. This, however, only applies to attachment in the case of *contempt* of court; for it would appear that an attachment for the non-payment of money, or the non-performance of an award, is not bailable. In the Court of Chancery, also, there are rules for accepting B.; as, for instance, for a defendant against whom attachment has issued for his contempt in not making appearance to the plaintiff's suit; but an attachment for non-performance of a decree in Chancery is not a bailable process.

In criminal procedure, the subject of B. is at present regulated by the 11 and 12 Vict. c. 42, which provides that if the justice or justices, before whom a prisoner is brought, shall be of opinion that the evidence against the prisoner be sufficient, or even if it raise a strong or probable presumption of his guilt, they shall either commit him to prison, or admit him to B.—that is, allow him to be discharged on entering into recognizance—with some sufficient surety or sureties—to appear and surrender himself to custody, to take his trial on such indictment as may be found against him, in respect of the charge in question, at the next assizes or sessions of the peace. The crime of treason, however, is not a bailable offence, except by order of a Secretary of State, or by the Court of Queen's Bench, or by a Judge thereof in vacation. But Justices are bound to admit to B. in all cases of misdemeanor, excepting in the case of a misdemeanor in receiving property stolen or obtained by false pretences, &c., or the case of any misdemeanor for the prosecution of which the costs may be allowed out of the county rate, as to all which misdemeanors, as well as in all felonies—treason excepted—justices and magistrates have a discretionary power either to admit B. or to commit to prison. The Court of Queen's Bench exercises a paramount jurisdiction, and can bail in all cases whatsoever; but it is not usual for that court or for justices or magistrates to admit to B. in any case of felony, except under circumstances of a special and favorable kind.

In Scotland, the term B., as we have mentioned, is only used in the proceedings in the criminal courts; and there the general distinction is taken between offences that are capital and not capital, the former not being bailable except by order of the High Court of Justiciary, who exercises a power in this respect analogous to the jurisdiction of the Court of Queen's Bench; offences that are not capital being bailable by magistrates, sheriffs, or other competent judges. In the *civil* process of the Scotch courts, the term corresponding to B. is CAUTION (q. v.).

BAIL COURT is the name given to a new and supplementary tribunal at Westminster, called into existence by the 11 Geo. IV. and 1 Will. IV. c. 70, by which, after providing for the appointment of an additional puisne judge in each of the three courts of common law, it is made lawful for any one of the judges of either of these courts, when occasion shall so require, where the other judges of the same court are sitting in banc (see BANC), to sit apart from them for the business of adding and justifying special bail, discharging insolvent debtors, administering oaths, receiving declarations required by statute, hearing and deciding upon matters in motion, and making rules and orders in causes and business depending in court to which such judge shall belong, in the same manner and with the same force and validity as may be done by the court sitting in banc.

This statute has been hitherto acted on only by the Court of Queen's Bench, wherein one of the judges sits from time to time in the B. C. for the purposes above specified. It may be remarked that a rule of the B. C. cannot be reopened in the full court after the term in which it is made, even though the judge who pronounced it sanctions the application; and a judge sitting apart, under the authority of the statute, has equal authority with the full court to reverse the decision of a judge sitting at chambers. See Lush's *Practice* by Stephen.

BAILEE'. See BAILMENT.

BAI'LEY, derived through the French *baille*, from the middle age Latin BALLIUM, which is a corruption of the Lat. *vallum*, a rampart. The B. was the whole space enclosed within the external walls of a castle, with the exception of that covered by the keep. This space was variously disposed of, and, of course, dif-

fered greatly in extent. Sometimes it consisted of several courts, which were divided from each other by embattled walls, so as to form a series of fortifications. When these courts were two in number, they were known as the outer and inner bailey. The entrance to the B. was generally by a drawbridge over the ditch, and through a strong machicolated and embattled gate. The B. was often of great extent, containing the barracks for the soldiers; lodgings for workmen and artificers, magazines, wells, chapels, and sometimes even a monastery. In towns, the B. had even a wider signification, and was often retained after the castle or keep had long disappeared, as in the case of the Old B. in London, and the B. in Oxford.

BAI'LEY, PHILIP JAMES, a distinguished living poet, was born at Basford, in the county of Nottingham, in the year 1816. His early education was conducted in his native town, and afterwards he became a student at the university of Glasgow. He was called to the English bar in 1840, but never practised. The first edition of *Festus*, the poem by which he is best known, was published in 1839, and has in subsequent editions received a large amount of new matter. It attracted considerable notice in England, and was in America assailed by a perfect tornado of applause. While the enthusiasm lasted, Mr. B. was in certain quarters mentioned in the same breath with Shakspeare, Milton, and Goethe. This injudicious admiration was, however, certain to cool down, and to prove more prejudicial to the real interests of the author than unmerited censure itself; consequently, in literary journals, *Festus* is frequently mentioned with a contempt which is far from deserving. It is a wonderful work, when the age of the author at the period of its production is taken into account. It was commenced before the author had reached his 20th year, and completed in three years. *Festus* errs from excess of boldness. Mr. B. speaks of universes as other poets speak of butter-cups. He has the *entrée* to the highest heaven and to the regions of penal fire. He is on terms of perfect familiarity with Eternity. He lays his scenes in the 'Centre,' 'Elsewhere,' 'Everywhere,' 'Nowhere.' Despite its extravagance, *Festus* is full of poetical thought and felicitous expression, and has occasional dashes of grim humor in it, not unworthy of Goethe's mocking fiend himself. The faults of the poem are as great as the beauties; there is no congruity or proportion in it, and you lay it down with a sense of admiration qualified with disgust. In 1850, Mr. B. published the *Angel World*, which possesses all the faults and all the beauties of the former work on a reduced scale. If the reader's admiration is less, his disgust is less. The *Angel World* is now incorporated with the larger work. Mr. B.'s subsequent writings have been the *Mystic*, the *Age*, a colloquial satire, and the *Universal Hymn* (1867). The first production is in the writer's early style, with all the beauties deleted. But whatever measure of success may attend Mr. B. in 'Elsewhere' and 'Nowhere,' complete failure awaits him when he deals with mankind and the ordinary affairs of earth.

BAILEY, SAMUEL, a writer on politics, political economy, mental philosophy, and other subjects, was born in 1791 in Sheffield, where afterwards he became a banker. He died January 18, 1870, leaving £90,000 as a bequest to the town. His works are: *Essays on the Pursuit of Truth and on the Progress of Knowledge* (1821); *Questions for Discussion in Politics, Political Economy, and other Departments of Knowledge* (1823); *A Critical Dissertation on the Nature, Measures, and Causes of Value* (1825); *A Letter to a Political Economist, occasioned by an Article in the Westminster Review on the subject of Value* (1826); *Essays on the Formation and Publication of Opinions* (1829)—a sequel to his work on the *Pursuit of Truth; A Discussion of Parliamentary Reform* (1831); *The Rationale of Political Representation* (1835); *The Right of Primogeniture Examined* (1837); *Money and its Vicissitudes in Value* (1837); *A Defence of Joint-stock Banks and Country Issues* (1840;) *A Review of Berkeley's Theory of Vision* (1842); *A Letter to a Philosopher in Reply to some Recent Attempts to Vindicate Berkeley's Theory of Vision* (1843); *The Theory of Reasoning* (1851); *Discourses on Various Subjects, Literary and Philosophical* (1852); *Letters on the Philosophy of the Human Mind* (three series, 1855, 1858, 1863); *On the Received Text of Shakspeare's Dramatic Writings, and its Improvement* (2 vols. 1862, 1866).

Mr. B.'s works on the *Pursuit of Truth* and the *Publication of Opinions* gave a great impetus to liberal and advanced views. His writings generally are distinguished by independent thinking, logical precision, a careful English style, and warm aspirations for the improvement of mankind. His treatises on the mind, while abounding in original suggestions, expand and enforce the views of the school of Locke in metaphysics, and what is termed the doctrine of Utility in morals.

BAI'LIE, a Scotch term, with several legal applications. It chiefly, however, and popularly, signifies a superior officer or magistrate of a municipal corporation in Scotland, with judicial authority within the city or burgh. In royal burghs, the office is in some respects analogous to that of Alderman in England. The chief magistrate of a Scotch corporation, called the *Provost* (q. v.), and often one or more of the bailies, are, in virtue of their office, in the commission of the peace; and by the 6 Geo. IV. c. 22, bailies are exempted from serving on juries. There are also *Bailies of Regality* and *Barony*, who are appointed by the *Superior* or over-lord of the manor (q. v.), with limited powers fixed by the 20 Geo. II. c. 43. There is a B. for the Sanctuary or Abbey of Holyrood, appointed by the Duke of Hamilton as hereditary keeper, and having jurisdiction within the precincts. See ABBEY, SANCTUARY. The word B. was also formerly a term in the practice of Scotch conveyancing, and signified an officer who represented the seller, and who, as such, gave *seisin* or sasine (q. v.), or delivery of the lands sold to the buyer or his attorney; but by the changes and simplifications effected by recent legislation, the office of B. in this sense may be said to be virtually abolished; indeed, by the 21 and 22 Vict. c. 76, s. 1, called *The Titles to Land Act*, seisin itself, as a separate and independent documentary title, is declared to be unnecessary, and registration of the conveyance of the estate held to be sufficient.

BAI'LIFF in English, BAILIE in Scotch, BAILLI in French, and BALIO in Ital., are terms having a common origin—namely, the middle Latin *ballivus*, which is again connected with the older form, *bagalus*, or *bajulus*. Through all the changes of application they have undergone in the course of history, they have continued to agree in denoting an overseer of some kind—an officer exercising superintendence on behalf of some superior authority. At the Greek imperial court in Constantinople, the chief tutor of the imperial children was called Bajulos. The same title seems also to have been given in Constantinople to the superintendent of the foreign merchants, who was appointed by the Venetians, and it may possibly be for this reason that the title Balio came at length to be applied also to the Venetian ambassadors themselves. The title Ballivus was introduced by the Knights of St. John into the south and west of Europe, as the eight members of their chapter were called *Ballivi conventuales*, whence also the name Ballei, given to the circles into which the possessions of the order were divided. In France, the royal Baillis were at one time commanders of the troops, administrators of the royal domains, and judges each in his district. In later times, the royal Baillis were deprived of the two latter offices, and were consequently then called Baillis d'Epée only. Proprietors of estates, also, possessing supreme jurisdiction, appointed Baillis to superintend these courts of justice. As very little knowledge was required for these situations, and as they might be purchased, they were held in little estimation; and in later times, the Baillis became standing characters on the stage, held up to ridicule on account of their ignorance and their absurd pretensions, as well as for cheating and injustice. In England, the name B. was introduced in the reign of William I., to designate the superintendents of counties, which were called Ballivæ.

BAI'LIFF, in English law, is a legal officer, and may be described as a keeper, protector, or superintendent of some duty or charge legally imposed on him. As officers of the law, bailiffs put in force arresting process, and they perform other duties within the county or bailiwick required of them by the sheriff, who is their immediate official superior. In this sense bailiffs are either *bailiffs of hundreds*, or *bound bailiffs*. The duty of the former is to collect fines, summon juries, attend the judges and justices at the assizes and quarter-sessions, and execute writs and processes in the several hundreds. *Bound* bailiffs, again, are officers usually joined by the sheriffs with the bailiffs of hundreds, and employed on account of their adroitness and dexterity. They are called bound bailiffs, because the sheriff, being civilly responsible for their official misdemeanors, they are annually bound in an obligation, with sureties, for the due execution of their office. There are also *special bailiffs*, who are officers appointed by the sheriff on the application of the party suing out the process to be executed; and whenever a party thus chooses his own officers, he is considered to discharge the sheriff from all responsibility for what is done by him. There is, besides, another exceptional class of bailiffs, called bailiffs of *liberties*, honors, manors, and other lordships and franchises, whose appointments, duties, and responsibilities are regulated by the 7 Vict. c. 19. The county courts likewise have bailiffs for the execution of their process, as to whom see 9 and 10 Vict. c. 95, 12 and 13 Vict. c. 101, 13 and 14 Vict. c. 61, and 19 and 20 Vict. c. 108.

The sheriff himself is the *Queen's B.*, and, as such, it is his business to preserve the rights of the Crown within his bailiwick. He must seize to the sovereign's use all land devolved to the Crown by attainder or escheat; must levy all fines and forfeitures, and must seize and keep all Waifs (q. v.), wrecks, estrays, and the like, unless they be granted to some subject.

BAI'LIFF, HIGH. See HIGH BAILIFF.

BAI'LIWICK legally means the county or district within which the sheriff's bailiffs may execute their office. Blackstone says that this word was introduced by the princes of the Norman line

in imitation of the French, whose territory was divided into bailiwicks, as that of England into counties.

BAILLEUL, a town of France, department of the Nord, with manufactures of woollens, cottons, lace, hats, beet-root, sugar, &c.—the cheese of its neighborhood being also celebrated. Pop. in 1876, 8180.

BAI'LLIE, JOANNA, a modern poetess of distinguished merit, was born in 1762 at Bothwell, in Lanarkshire, Scotland. Her father was a Presbyterian clergyman. She received a superior education, and soon began to manifest those talents which subsequently excited the admiration of the public. Her career was a singularly happy one, but devoid of all striking incident. At an early period, she went to reside in London, where her brother, Matthew Baillie, had established himself as a physician. Here she remained till her death, which occurred on the 23d of February 1851, when she had attained the venerable age of eighty-nine. No authoress ever enjoyed a larger share of the esteem and affection of her literary contemporaries. All vied in showing her a courteous respect, and even America sent its votaries to her little shrine at Hampstead. Her greatest achievement is undoubtedly the *Plays on the Passions*, which, though erroneous in conception, are full of noble and impressive poetry, and often characterized by intense dramatic power. The principle upon which Miss B. proceeded in the construction of these works, was to take a single passion as the subject of a play, and to exhibit its influence on an individual supposed to be actuated by nothing else. In point of fact, such persons do not exist in society; men are swayed by a variety of conflicting emotions; and even when any one of these becomes dominant, it does not wholly destroy the rest, otherwise the victim of a ruling passion would lapse into a monomaniac. The leading personages of Miss B.'s plays are, therefore, rather impersonations of certain elements of human nature, than genuine human beings. They are vivid poetical studies in psychology; not mirrors held up to nature, like the brilliant and variegated creations of Shakspeare. Still, there are scenes, in her tragedies especially, where the interest of the reader is intensely excited by the great art shown in the minute delineation of a particular passion, and where he is forced to forget the artificial theory of the authoress. The first volume of the *Plays of the Passions* appeared in 1798, and met with remarkable success. Four years afterwards, she published a second volume; in 1804, *Miscellaneous Plays;* in 1812, the third volume of her *Plays of the Passions;* and in 1836, three volumes of dramatic poetry. The most popular as well as the most powerful of her works is the tragedy of *De Montfort*. It was brought upon the stage in London, Kemble acting for eleven nights the character of the hero. Many of Miss B.'s minor pieces are very sweet, simple, and beautiful; and are marked by a sprightly grace of versification, and a playful serenity of spirit, which pleasantly remind one of the personal character of the authoress herself.

BAI'LLIE, MATTHEW, M.D., a distinguished physician and anatomist, was born on the 27th October, 1761, in the Manse of Shotts, Lanarkshire, Scotland. His father was descended from the family of Baillie of Jerviswood, so noted in the history of Scotland during the reign of Charles II.; his mother was a sister of the two celebrated anatomists, William and John Hunter; and one of his sisters was Joanna Baillie, the poetess. Talent seems to have been both hereditary and abundant in the family. On account of his abilities, his father was appointed professor of divinity in the university of Glasgow, where young B. went through the usual curriculum, and afterwards proceeded to Balliol College, Oxford, as an exhibitioner on the Snell foundation. In 1780, he commenced his anatomical studies in London under the care of his uncle, and was frequently employed as demonstrator to the latter in his theater at Great Windmill Street. His success in this capacity was so great that on the death of Dr. Hunter, in 1783, he was found qualified to become his successor. In 1784; he began to lecture, and acquired a high reputation as a vigorous and lucid expositor of the science of anatomy. In 1795, he published a small work entitled, *The Morbid Anatomy of some of the most Important Parts of the Human Body*. It made an era in medical science. In addition to the information formerly scattered through the writings of Bonnetus, Lieutaud, Montagni, and others, it contained a multitude of ingenious observations made by his uncle and himself, and greatly enhanced our knowledge of the changes produced on the human frame by disease. It had a remarkable influence on the study of medicine, and excited in a greater measure, perhaps than any other book, a spirit of careful induction among professional men. In 1799, Dr. B. relinquished his anatomical lectureship, and in 1800, his appointment as physician to St. George's Hospital, which he had held for thirteen years. He now devoted himself exclusively to his duties as a medical practitioner, and by his honorable assiduity succeeded in realizing a large fortune. In one of his busiest years, when he had scarcely time to take a single meal, his professional income is said to have reached £10,000. In 1810, he was appointed physician to the king, and offered a baronetcy, which, however, he declined. At last, worn out with incessant labor, he died on the 23d September 1823.

BAI'LLIE, ROBERT, one of the most eminent, and perhaps the most moderate of all the Scottish Presbyterian clergy during the time of the civil war, was born at Glasgow in 1599, and educated at the university of that city. In 1622, he received episcopal ordination — episcopacy being then nominally the established religion of the country—from Archbishop Law, and was shortly after presented to the parish church of Kilwinning. At first a maintainer of the doctrine of passive obedience, he seems to have changed his opinions on this point some time during 1630—1636. In 1638, he sat in that famous General Assembly of the Kirk of Scotland which met in Glasgow to protest against episcopacy being thrust on an unwilling people, but conducted himself with greater prudence and temperance than was quite agreeable to his excited brethren. However, he soon threw himself eagerly into the national cause. In 1640, he was selected by the Scottish leaders, on account of his pamphlet against Laud's party, as a proper person to go to London, along with other commissioners, to prepare charges against Archbishop Laud, whose rash and tyrannical measures were alleged to have been the origin of the recent hostilities against the sovereign. On his return to Scotland in 1642, he was appointed joint-professor of divinity at Glasgow, along with Mr. David Dickson, an equally distinguished, but less moderate divine. In 1643, he was again sent to London as a delegate to the Westminster Assembly of Divines, where he conducted himself in an unobtrusive manner, but cordially concurred in the doctrines which were drawn up. It is curious to notice, in connection with this incident of his career, that though Mr. B. had himself experienced the injustice of intolerance, like almost every other theologian of his age, he vehemently discarded the principle of toleration, and asserted the divine right of presbytery with as much emphasis as Laud did the divine right of episcopacy. After the execution of Charles I., in 1649, B. was chosen by the church to proceed to Holland, and to invite Charles II. to accept the Covenant and crown of Scotland. Though it was not easy to deal with one of Charles's slippery character, B. is admitted to have borne himself in the matter with great prudence and dignity. After the Restoration, he was made Principal of Glasgow University. He died July 1662. His *Letters* are a valuable contribution to our knowledge of the times.

BAI'LLIE, ROBERT, of Jerviswood, happily described as the Scottish Sydney, was a native of Lanarkshire, and distinguished himself during the latter part of the reign of Charles II. by his bold opposition to the tyrannical misgovernment of the Duke of Lauderdale. Having on a certain occasion (June 1676) rescued a relative, the Rev. Mr. Kirkton, from the clutches of Archbishop Sharpe's principal informer, a wretched profligate of the name of Carstairs, who pretended that he had a warrant for the apprehension of the clergyman, but refused to show it, B. was actually prosecuted for interfering to prevent the illegal capture of his friend. For this purpose, an ante-dated warrant was furnished to Carstairs, signed by nine of the councillors. The Marquis of Athole afterwards admitted to Bishop Burnet that he was one of the nine who lent their names to this infamous document. The case was therefore made out to be a tumult against the government. B. was fined in 6000 merks (£318). He refused to pay, and was sent to prison; but so strong was the indignation of the Scottish gentry, that he was released at the end of four months, in consideration of payment of one-half of his fine to Carstairs. In 1683, B. took a prominent part in a scheme of emigration to South Carolina, as he saw no other refuge from the degrading tyranny of the government. About the same time, however, he entered into correspondence with the heads of the new Puritan party in London, whose leaders were Russell, Sydney, and the Duke of Monmouth, and subsequently repaired to that city to concert measures for a vigorous insurrection against the government, not, however, so far as he was concerned, with a view to revolution, but as the only means of securing adequate reforms. On the discovery of the Ryehouse Plot, B. was arrested, and sent down to Scotland. Accused of conspiring against the king's life, and of being hostile to monarchical government, B. was tried at Edinburgh, and condemned to death upon evidence at once insignificant and illegal. His bearing both on his trial and during his imprisonment was such, that his cousin, Bishop Burnet, declared 'it looked like a reviving of the spirit of the noblest of the old Greeks or Romans, or rather of the primitive Christians and first martyrs; and the celebrated Dr. Owen speaks of him as a 'great spirit,' 'a person of the greatest abilities I almost ever met with.' The sentence was carried into execution on the 24th December 1684. It is to be regretted that so few opportunities were afforded B. of achieving anything really great, for he seems from all accounts to have possessed a remarkable strength of character and noble fearlessness of spirit.

BAILLY, JEAN SYLVAIN, a distinguished French savant, President of th National Assembly of 1789, and Mayor of Paris, was born in that city, September 15, 1736. Originally intended by his father for an artist, he first turned aside into literature, until, becoming acquainted with Lacaille, he was fortunately induced to study astronomy, which proved to be the true sphere of his genius. In 1763, B. presented to the Académie des Sciences his *Lunar Observations;* in 1766, appeared his *Essay on the Satellites of Jupiter, with Tables of their Motions;* and in 1771, a treatise on the light of these satellites, remarkable for the profundity of its astronomical views, and which classed him at once among the greatest astronomers of his time. His historico-scientific works, especially his *History of Indian Astronomy*, are full of learning and ingenious disquisition, and written with great elegance. In 1777, he published his *Letters on the Origin of the Sciences;* and in 1799, his *Atlantis of Plato*. In 1784, he was elected a member of the Académie Française; and in the following year, of the Académie des Inscriptions. The *éloges* which he wrote about this period for the Académie des Sciences on Charles V., Molière, Corneille, Lacaille, Leibnitz, Cook, and Gresset, were very highly praised. Fontenelle was the only Frenchman before him who had enjoyed the honor of being a member of the three académies at once. The revolution interrupted his peaceful studies. During the earlier part of it, he occupied a very prominent position. Elected President of the National Assembly, June 17, 1789, and Mayor of Paris on the 15th of July, he conducted himself in these capacities with great integrity and purity of purpose; but at last lost his popularity by allowing the National Guard to fire on the masses who were assembled in the Champ de Mars, on the 17th of July 1791, to demand the dethronement of the king. He now threw up his mayoralty, considering it impossible to satisfy either party, withdrew altogether from public affairs, and went to live first at Nantes, and afterwards with his friend Laplace at Melun. Here he was seized by the Jacobin soldiery, and brought to Paris, where he was accused of being a royalist conspirator, condemned and executed with the usual Jacobin preliminary of savage insult, November 11, 1793. Among his papers were found, and afterwards published, an *Essay on the Origin of Fables and Ancient Religions* (1799), and *Memoirs of the Revolution by an Eye-witness* (1804). There cannot be two opinions regarding the merit of B.'s style, but his historico-astronomical speculations are now considered fantastic.

BAILMENT, an English law term, defined to be 'a delivery of goods for a particular purpose, upon a contract, express or implied, that the purpose shall be carried into effect, and that, when that is done, the goods shall be restored by the bailee, or person to whom they are delivered, to the owner or bailor, or according to its directions.'—*Tomlin's Dict*

BAI'LY, EDWARD HODGES, R. A., an eminent sculptor, was born at Bristol on the 10th March 1788. In 1807, he went to London, saw Flaxman, and entered his studio. In 1809, he gained the silver medal at the Society of Arts and Sciences, and the silver and gold medals at the Royal Academy. His works during this part of his career were chiefly, if not altogether, classical figures. They exhibit great care in execution, and are simple and pure in conception; but it was not till his twenty-sixth year that the full power and originality of his genius manifested itself in his celebrated 'Eve at the Fountain,' a figure of exquisite grace and loveliness. His next works were, 'Hercules casting Lycus into the Sea,' 'Apollo discharging his Arrows,' and 'Maternal Love.' George IV. also employed him, along with other artists to execute the sculpture in front of Buckingham Palace, the figures on the marble arch, and the 'Triumph of Britannia,' as also the *bassi-relievi* that surround the throne-room. Besides these, B. executed a great number of busts and statues of distinguished contemporaries, such as Telford the engineer, Earl Grey (14 feet high), and Sir Astley Cooper. The statue of Nelson, in Trafalgar Square is likewise the work of his hands. His 'Eve listening to the Voice,' the 'Sleeping Nymph,' 'Girl preparing for the Bath,' and 'The Graces seated,' are among the finest efforts of his genius. Died 22d May 1867.

BAI'LY, FRANCIS, an eminent English astronomer, was born at Newbury, Berks, in 1774, and died in London in 1844. In the midst of active business as a London stockbroker, he laid the foundation of his scientific fame, and during the years of life usually devoted to repose, underwent labors and rendered services to astronomy, which entitle him to be regarded as one of the most remarkable men of his time. Among the chief of these services were his share in the foundation of the Astronomical Society, and in the improvement of the *Nautical Almanac*, his laborious repetition of Cavendish's pendulum experiments, and the production of the Astronomical Society's Star-catalogue. The latter, says his biographer, Sir. J. Herschel, 'put the astronomical world in possession of a power, which may be said, without exaggeration, to have changed the face of sidereal astronomy.' In addition to several standard works on Life-annuities, &c. (1808—1813), and an immense mass of contributions to the *Memoirs of the Astronomical Society*, he wrote a valuable *Life of Flamsteed* (1835).

BAILY'S BEADS, the name given to a phenomenon in connection with the eclipses of the sun, first fully described by Francis Baily. Just before the beginning and after the end of the obscuration by the moon of the sun's disc, the thin crescent-shaped unobscured portion of the sun seems usually to become suddenly discontinuous, and looks like a belt of bright points, varying in size and separated by dark spaces. The resulting appearance has been compared to a string of beads. The phenomenon is most probably accounted for as an effect of irradiation. To irradiation it is also due that, by the default of the retina of the eye, bright objects seen on dark ground seem larger then they really are.

BAIN, ALEXANDER, writer on mental philosophy, was born at Aberdeen in 1818. He entered Marischal College and University in 1836, and graduated in 1840. From 1841 to 1844, he assisted the Professor of Moral Philosophy in Marischal College, and in 1844—1845, taught the class of Natural Philosophy. In the winter of 1845—1846, he lectured on Natural Philosophy in the Andersonian University, Glasgow. In 1847, he became Assistant-secretary to the Metropolitan Sanitary Committee, and was thence transferred to the same office in the General Board of Health, which office he resigned in 1850. From 1857 to 1862, and from 1864 to 1869, he was Examiner in Logic and Moral Philosophy in the university of London. For several years he acted as examiner in Mental Philosophy at the India Civil Service Examinations. In 1860, he became Professor of Logic in the university of Aberdeen.

Mr. B. began as a writer in 1840, by contributing to the *Westminster Review*. He also contributed a considerable number of treatises to the publications of W. and R. Chambers, especially in the educational department; among them was an edition of the *Moral Philosophy of Paley, with Dissertations and Notes* (1852). In 1855, he brought out *The Senses and the Intellect*, and in 1859, *The Emotions and the Will*, completing a system of the human mind. In 1861, appeared *The Study of Character, including an Examination of Phrenology*. In 1863, he published an *English Grammar*, and in 1866, a *Manual of English Composition and Rhetoric*. In 1868 appeared his *Mental and Moral Science, a Compendium of Psychology and Ethics;* in 1870, *Logic, Deductive and Inductive;* in 1872, *A Higher English Grammar (with a Companion*, 1874). In 1872, he acted with Prof. Robertson in editing Grote's treatise on *Aristotle;* and he edited Grote's minor works. In 1873, he published the *Relation of Mind and Body;* in 1879, *Education as a Science;* in 1881, *James Mill, a Biography*, and *John Stuart Mill, a Criticism*..

In 1881, he resigned his chair in Aberdeen, and the same year was elected Rector of the university. B. is remarkable for the subtlety and minuteness of his analysis, and the clearness of hi exposition. He belongs decidedly to the empirical or experimental school of philosophy, in opposition to the *a priori*, or transcendental. His chief work, *The Senses and the Intellect*, together wit *The Emotions and the Will*, is a very complete systematic exposition of the phenomena of the human mind. B.'s psychology is based on physiology, after the manner of Hartley's; but instead of considering the human organism as capable only of receiving impressions and of acting in response thereto, he finds in it a power of originating active impulses (see SPONTANEITY), and thus obviates many of the defects alleged by *a priori* philosophers to inhere in the system of sensationalism, as hitherto exhibited.

BAINI, GIUSEPPE, one of the most distinguished scientific musicians of modern times, was born in Rome on the 21st October 1775. In 1795, he became a singer in the Papal Chapel. Having been initiated by G. Zannaconi into the art of composition, he soon gained distinction by his compositions. The severe gravity and profound science of these contrasted strongly with the careless style and shallow dilettantism of the modern Italian masters. B. has secured for himself a prominent place in musical literature, less, however, by his compositions than by his historical researches. His principal work is his life, with criticism, of Palestrina (1828). B. was appointed director of the papal concerts in 1804, and general director of the choir in 1814. He died in 1844.

BAIRAKTA'R, or, more correctly, Bairak-dar, signifying Standard-bearer, is the title of the energetic Grand Vizier Mustapha. He was born in 1755, and was the son of poor parents. He entered the military service at an early age, and soon distinguished himself by his valor. When he was Pacha of Rustchuk in 1806, he fought not without success against the Russian army, which had advanced into Moldavia and Wallachia, and had taken Bucharest. After the revolt of the janizaries in 1807, by which Selim III. (q. v.) was deposed from the throne, in favor of Mustapha IV., B. at first concealed his attachment to the deposed monarch, and marched with his troops apparently against the revolted Servians; but as soon as he reached Adrianople, he compelled the grand vizier to return with him to Constantinople, in order to restore the throne to Sultan Selim. On their return, they found this prince murdered, and his dead body lying in the first court of the seraglio. Filled with rage at this sight, B. caused all those to

be executed who had had any share in the murder. He deposed Mustapha IV., and proclaimed the brother of this prince, Mahmoud II., sultan on the 28th July, 1808. B. was now appointed grand vizier. In the exercise of this office, he deposed the grand mufti, the leader of the janizaries, and all the ulemas who had taken any part in the last revolution; while at the same time he was careful to secure the tranquility of the capital, and strengthened the regular army. His chief object was the annihilation of the janizaries; but, like the unfortunate Selim, he also fell a victim to these fierce bands of soldiery, who resisted everything like military discipline. Favored by the fanatical people, the janizaries rebelled, and, with the support of the fleet, attacked the seraglio on the 15th November, 1808, and demanded the restoration of Mustapha IV. B. defended himself bravely; but when he saw that the flames threatened to destroy the palace, and that he was in danger of falling alive into his enemies' hands, he strangled Mustapha, threw his head to the besiegers, and then blew himself up.

BAIRD, Sir David, Bart., a general in the British army, was born 6th December 1757, at Newbyth, Scotland. He entered the service in 1772 as an ensign in the 2d Foot, was promoted to a lieutenancy in 1778, and immediately after obtained a company in the 73d, a Highland regiment just raised by Lord Macleod, with which he sailed to India. In the course of a few months, the young officer was plunged among the perils of a sudden and sanguinary war. The English had excited the hostility of Hyder Ali by a gross breach of faith; and in the July of 1780, the latter burst into the Carnatic at the head of 100,000 men, disciplined and commanded by French officers. On the 10th of September, a portion of the English army fell into an ambuscade at Perambooeum, and was cut to pieces. Among the few who remained alive to be taken prisoners was Baird, whose heroism had actually startled the French officers who were opposed to him. He was thrown into a dungeon at Seringapatam, where he endured a captivity of four years, that must have been peculiarly galling to a spirit so fierce, restless, and resolute as his. Released in July 1784, he obtained the majority of the 71st in 1789, and in the October of the same year visited England. In 1791, he returned, a lieutenant-colonel, and took part in several important sieges, attacks, and skirmishes; in 1795, he received a colonelcy; in 1798, he was raised to the rank of major-general; and in 1799 memorably signalized himself at the victorious assault of Seringapatam. He led the storming-party, having obtained that perilous honor at his own urgent request, Colonel Wellesley (afterwards Duke of Wellington) commanding the reserve. In requital of his brilliant services, he was presented by the army, through the commander-in-chief, General Harris, with the state-sword of Tippo Saib, and also with a dress-sword from the field-officers who served under him at the assault. His merit was likewise acknowledged by the home government. In the following year, he was appointed to the command of an expedition against Batavia, but which was afterwards sent to Egypt. On his return to India, he found that the star of Wellesley was in the ascendant; and B., who had already complained of the preference given to that officer, and who was, besides, of opinion that his own merits were constantly overlooked, applied for leave of absence, and sailed for Europe in 1803. He was received at court with great distinction, knighted in June 1804, and made a K.C.B. in the following August. In 1805, he commanded an expedition against the Dutch settlements at the Cape of Good Hope, which was successful; in 1807, he commanded a division at the siege of Copenhagen; and in 1808, was sent to Spain with an army of 10,000 men, to assist Sir John Moore. He distinguished himself in the battle of Corunna, January 16, 1809. Moore having been killed in the action, Sir David succeded to the chief command, and had the honor of communicating intelligence of the victory to government. On this occasion, he received for the fourth time in his life, the thanks of parliament, and was created a baronet. After this period, he retired from active service. He died August 18, 1829.

BAIREUTH, or BAYREUTH (pop. in 1881, 22,072), capital of the province of Upper Franconia, Bavaria, and formerly the capital of the principality of the same name. B. is beautifully situated on the Red Mayn, about 126 miles due north from Munich. Its streets are broad and well paved, and are interspersed with groves, promenades, fine gardens and public fountains. Its principal buildings are the old palace, the new palace, containing a gallery of paintings; the mint, opera-house, riding-school, infirmary, and town hall. A magnificent new opera-house for the performance of Wagner's music, finished in 1875, was in the following year opened with a grand representation, lasting several days, of a new work by that composer. B.'s chief articles of industry are leather, cottons, woollens, linen, tobacco, parchment, and porcelain. Jean Paul Richter died here in 1825, and a monument has been erected to his memory.

BAITOO'L, or BEITOOL, a fortified town of British India, in the presidency of Bengal, 50 miles north-east from Ellichpoor.

BA'JA, a market-town of Hungary, in the circle of Bacs, on the Danube, celebrated for its annual swine-fair. Grain and wine, in large quantities, are produced in its neighborhood. Pop. (1880) 19,241.

BA'JAN. See Bejan.

BAJAZE'T, or BAJASI'D (pronounced Bayaze't) I., Sultan of the Turks, was born in 1347. In 1389, he succeeded his father, Murad I., who fell in battle near Kossova, fighting against the Servians. Immediately on ascending the throne, he inaugurated his rule, after the fashion of eastern kings, by strangling his younger brother Yacub, lest he should dispute the succession. In three years he conquered Bulgaria, a part of Servia, Macedonia, and Thessaly; he also subdued most of the states of Asia Minor. From the rapidity with which these extraordinary conquests were effected, he received the name of Ilderim—that is, Lightning. He even blockaded Constantinople itself for ten years, thinking to subdue it by famine. To rescue this city, King Sigismund of Hungary (afterwards Emperor of Germany) assembled a large army, in which there were 2000 French nobles under the command of the Duke of Nivey. With this army, King Sigismund attacked the city of Nikopolis, in Bulgaria; situated on the Danube. B. hastened to meet him, and gained a decisive victory over the allied Hungarians, Poles, and French, on the 28th September 1396. Sigismund escaped captivity only by a speedy flight in disguise; but the greater part of the French, through whose impetuosity the battle was lost, were taken prisoners, and were nearly all executed. B. would now have entirely destroyed the Greek empire, if he had not been prevented by Timur (q. v.), who attacked his possessions in Asia Minor, and completely defeated him on the 16th June 1401, near Angora, the capital of what was anciently called Galatia, on the very spot where Pompey had overthrown Mithridates. B. himself fell into the hands of the conqueror, who treated him with great generosity. The story that he was carried about imprisoned in a cage is without any historical foundation. B. died in 1403, in the camp of Timur. He was succeeded in the government by his son Soliman I. B. was honorably distinguished by his efforts to improve the administration of justice. During the 14 years of his reign, he built a large number of mosques, among others, one at Adrianople, and a second at Broussa, which two cities were then ordinary residences of the Ottoman princes.

BAJAZE'T II., son of the Sultan Mohammed II., the conqueror of Constantinople, was born in 1447, and ascended the Ottoman throne after his father's death in 1481. His reign, which lasted 32 years, was a succession of uninterrupted wars against Hungary, Poland, Venice, Egypt, and Persia, which were carried on with various success and without any events of striking importance, yet which served on the whole to establish the Ottoman power. The last years of his reign were much disturbed by disputes between his sons about the succession to the throne. Influenced by the preference shown by the janizaries for his younger son Selim, B. abdicated in his favor, but died before he could reach the place of his voluntary exile, in the neighborhood of Adrianople, in the year 1513. B. was a friend to the dervishes, at the same time liberal and fond of pomp and splendor. Many of the most beautiful mosques in Constantinople and Adrianople were built by him, and fitted up in a style of the greatest magnificence.

BA'JIMONT'S ROLL, the name given to a valuation, according to which the ecclesiastical benefices of Scotland were taxed, from the end of the 13th c. to the Reformation. It took its name from an Italian churchman, Benemund or Baiamund de Vicci, who was sent from Rome by the pope about the year 1276, to collect the tithe, or tenth part of all the church livings in Scotland, for an expedition to the Holy Land. Hitherto, the Scotch clergy had been taxed according to a conventional valuation, called the *Antiqua Taxatio*. But Baiamund set this aside; and, in spite of their reclamations, assessed the benefices at their actual yearly worth, or *verus valor*. Although more than once referred to as an authoritative document in statutes of the 15th c., no complete copy of B. R., in its original shape, is now known to exist. A contemporary manuscript of so much of the Roll as applies to the archdeaconry of Lothian, or that portion of the diocese of St. Andrews which lies to the south of the Forth (comprehending the counties of Berwick, Haddington, Edinburgh, Linlithgow, and part of Stirlingshire), is preserved at Durham. The real value of the benefices in this district, as set down in B. R., exceeds the conventional value in the *Antiqua Taxatio* in the proportion of 420 to 286. A copy of B. R., as it appears to have existed in the reign of King James V. (1513—1542), is preserved in the Advocates' Library at Edinburgh, in a hand of the beginning of the 17th c. It is full of inaccuracies; and it omits all livings of less than 40 marks a year. Of the *Antiqua Taxatio*, which was superseded by B. R., there are good copies in the handwriting of the 13th c., so far as concerns the benefices in the four dioceses of St. Andrews, Brechin, Aberdeen, and Moray.

BA'JMAK, or BAJMOK, a large village of the Austrian empire, in Hungary, province of Bacs, 16 miles south-west of Theresienstadt. Pop. (1869) 6446.

BAJO'CCO, or BAIO'CCO (pl. BAJOCCHI), was a copper coin in the Papal States, value nearly a half-penny. It was 1-100th of the scudo, which was equal to 4*s*. 3¼*d*. In the island of Sicily, the Neapolitan *grano*, the 1-100th part of the ducato (= 3*s*. 4*d*.), was also called a bajocco.

BA'JUS, MICHAEL (properly, De Bay), one of the most distinguished theologians of the Catholic Church in the 16th c., was born in 1513 at Melun. He studied at Louvain, and became professor of theology there in 1550. He was present at the Council of Trent in 1563, and also in 1564. He was the founder of a system of theology, based directly on the Bible and the writings of the Fathers, and setting aside the scholastic method. He had studied much the writings of St. Augustine, and therefore confined himself closely within the circle of ideas held by this Father of the church, whose doctrines of the entire inability of the human will to do good, and the absence of merit in all good works, B. defended against the Jesuits. The assertions that the human will, so long as it is left to its own freedom, can do nothing but sin, and that even the mother of our Lord was not free from original and actual sin, together with other such doctrines, drew on him the accusation of heresy. Seventy-six of his propositions were condemned by a papal bull. B. submitted, but nevertheless did not give up his doctrines, and, in consequence, the persecutions to which he was subjected did not cease. He died December 16, 1589, having earned the reputation of great learning, pure manners, and singular modesty. He may be regarded as the predecessor of the Jansenists, who inherited his Augustinian views, which were at that time termed Bajanism. His writings, mostly of a polemical nature, were published by Gerberon (2 vols. Cologne, 1696).

BAJ'ZA, ANTON, a Hungarian poet and prose-writer, was born January 31, 1804, at Szücsi, in Hertes. His poems (2 vols. 1835), which were published in Pesth, earned for him a place among the best Hungarian lyric poets. In the *Kritischen Blättern*, to which he contributed from 1831—1836, the *Athenæum*, and the *Figyelmező* (Observer), to which he contributed from 1837—1843, in common with many of the best literary writers of the day, he exercised a beneficial influence on the rising literature of Hungary by his severe criticism, and his solid and theoretically correct essays. He likewise materially aided the Hungarian stage, then in its infancy, by the publication of the *Ausländischen Bühne* (Foreign Dramas, Pesth, 1830), and also by his exertions as director of the National Theater, opened in Pesth on August 22, 1837. At the same time, he had begun to occupy himself with historical studies, and enriched the literature of Hungary, very poor in this respect, with a *Történéti Könyvtár* (Historical Library, 6 vols., Pesth, 1843—1845), which contained translations from many excellent foreign historical works. He also published a compilation from the German, *Uj Plutarch* (The Modern Plutarch, Pesth, 1845—1847). His *Világtörténet* (Universal History, Pesth, 1847) is a rather unskilful compilation from Schlosser, Heeren, Rotteck, and other German historians. After March 1848, Kossuth appointed him editor of his half-official organ, the *Kossuth Hirlapja* (July till December 1848), in conducting which, however, he displayed no great editorial talent. B. was made a member of the Hungarian Academy in 1832. He died, March 1858.

BA'KER, SIR RICHARD, author of the *Chronicle of the Kings of England*, a book long esteemed and quoted on all matters of English history by the country gentry. Addison makes his model squire, Sir Roger de Coverley, refer to it frequently. Notwithstanding its reputation, however, among that class, the book had no lack of errors, and is now all but forgotten. Its author was born in Kent, or, according to other accounts, in Oxfordshire, about the year 1568. He was educated at Oxford University, and in 1603 was made a knight. About 1620 he married and settled in Oxfordshire, of which county he was made high sheriff; but he was soon after thrown into the Fleet Prison for debt which his wife's family had contracted, but for which he had become responsible. Here he wrote his *Chronicle*, first published in 1641, besides several pious works of less note. He died in prison, in great poverty, in 1645.

BAKER, SIR SAMUEL WHITE, K.C.B., an African traveler, was born in 1821. He is the son of Mr. Samuel Baker, of Thorngrove, in Worcestershire. B. was educated as an engineer, and at an early age, went to Ceylon. There, led by the love of field-sports into the recesses of the island, he gave evidence of that love of adventure which was to make him famous as an explorer. In 1854, he published a work entitled *The Rifle and the Hound in Ceylon*; and in 1855, *Eight Years' Wanderings in Ceylon*. B. afterwards superintended the construction of the railway which connects the Danube across the Dobrudscha with the Black Sea. In 1860, B. married Florence, the daughter of F. von Sass, a young Hungarian lady of great talent and enterprise; and in company with her, he undertook a journey of exploration on the Upper Nile. They set out from Cairo in April 1861; and B. devoted his attention first to the Atbara and Blue Nile, the chief affluents of the Nile, which descend from the highlands of Abyssinia. In June, he arrived at the course of the Atbara, which was at that season dry, or marked only by a few stagnant pools. On the 23d, when the Abyssinian rainy season had set in, a noise like distant thunder was heard and in a few seconds the river-bed had been converted into a torrent 20 feet deep. Eight days later, it had become a great river, charged with mud, washed from the hills, which it carried down to the Nile, to cause the inundations and mud deposits of Egypt. B. reached Khartoum in June 1862, and there he had an opportunity of contrasting the Blue and White Nile. He found the former, like the Atbara, to be a mountain torrent, rising and falling with the Abyssinian rains, but always free from deposits of mud. The White Nile did not thus rise and fall, and its water, never pure, had a disagreeable taste of vegetation, showing that it proceeded from lakes and marshes. When B., with his wife, quitted Khartoum to ascend the White Nile, he had in his pay an escort of 90 persons, 29 camels and asses, and three large boats. After passing through a wonderful region of forest and marshes, the travelers reached Gondokoro, a rendezvous of the traders of the interior. They had only been there a fortnight, when they were joined by Speke and Grant, who had penetrated into those regions from the south. Speke and Grant told B. of the Victoria N'yanza, which they had just discovered and explored, and that the natives had described to them another great lake, named Luta Nzige, which they had been unable to visit. B. resolved to reach this lake; and after a series of adventures, he and his wife arrived, on 14th March 1864, on the top of lofty cliffs, from which they beheld the vast inland sea, to which B. gave the name of the Albert N'yanza. In 1869, an expedition for the suppression of slavery in the interior of Africa was organized by the pasha of Egypt, under B.'s command. B. returned in 1873, and reported the success of the expedition. The resignation of his successor Colonel Gordon, however, and the deposition of the Khedive in 1879, again led to a suspension of government control in the valley of the Nile. B. was knighted in 1866. In 1866, he published *The Albert N'yanza;* in 1871, *The Nile Tributaries of Abyssinia;* in 1874, *Ismailia*, an account of his expedition of 1869–1873; and in 1879, *Cyprus as I saw it in* 1879.

BA'KERIES, ARMY. Armies have generally the means of obtaining soft or loaf bread, though not till recently could this be said of the British army. The French, ever since the time of Louis XIV., have been accustomed to take portable ovens with their armies; those now used will each bake 450 rations at once. Outside Sebastopol, in the winter of 1854, the British soldiers sometimes willingly exchanged with the French three or four pounds of biscuit for one pound of soft bread. The efforts since made to improve the sanitary condition of the army have included the establishment of traveling bakeries for field-service. Under the commissaries, the troops now rarely fail to obtain their daily rations of fresh-baked bread. We were last among the greater nations to make this obvious improvement; but the French depend more on bread and less on meat than the English; and this may partly account for the difference. The French soldiers are taught to construct field-ovens, and to bake their bread in camp, while government B. are established all over France, entirely conducted by soldiers. Among other lessons afforded by the siege of Sebastopol, was one relating to an improved supply of army-bread. Two screw-steamers, the *Bruiser* and the *Abundance*, were sent out to Balaklava, one provided with machinery for grinding corn, and the other with machinery and ovens for making and baking bread. In each case, the ship and the machinery were propelled by the same steam-engine. When quietly anchored in the harbor, the mill ground 24,000 lbs. of flour per day—better in quality, and cheaper than could have been obtained by contract. The bakery ship *Abundance* had four ovens of 14 bushels' capacity each; it baked in an excellent manner 6000 loaves of 3 lbs. each per day, which loaves were sent up to the siege-army as soon as cooled. The ships and machinery were sold when the war was over—a proceeding which the commissariat officers much regretted; but the experience thence obtained will not be lost. The improved arrangements suggested for meat-rations are noticed under COOKERY, ARMY.

BA'KEWELL, a small but very ancient town in Derbyshire, on the left bank of the Wye, near its confluence with the Derwent, and 24 miles north-north-west of Derby. It lies on the slope of a hill, in the midst of very beautiful scenery, in a carboniferous limestone tract, and in the vicinity of black marble quarries, and of coal and lead mines. Its chalybeate springs and warm baths are much resorted to. The celebrated Arkwright first established cotton-mills here. On the opposite bank of the Wye are the traces of a castle built by Edward the Elder in 924. B. is now the property of the Duke of Rutland, whose seat is Haddon Hall, two miles from the town. B. is a center for visiting the fine scenery of

North Derbyshire and the Peak; and the streams in the vicinity are much resorted to by anglers. It contains a spacious cruciform church, founded in Saxon times, showing specimens of ecclesiastical Gothic architecture of three different periods. The special industry of B. is the turning, polishing and inlaying of the local marble. Pop. (1871) 2283; (1881) 2502.

BA'KEWELL, ROBERT, a celebrated agriculturist, was born in 1726 at Dishley, in the county of Leicester, and died in 1795. He does not appear to have written anything, even upon the subjects with which he was so well acquainted, so that his fame rests entirely upon his successful efforts to improve the breed of domestic animals. His reputation was so great as a breeder of sheep, that he is said to have received the fabulous sum of 400 guineas for one season of a ram. The long-horned breed of cattle which he introduced is still known as the Dishley or New Leicestershire breed. His horses were also famous, and almost as profitable to him as his sheep. One of his objects was to produce a breed of animals that would fatten on the smallest quantity of food.

BAKHTEGA'N, a salt-lake of Persia, province of Farsistan, from which remarkably fine salt is obtained. Its size is variously stated—some writers making it 60 miles in length, with an average breadth of 8 miles; others, only 70 miles in circumference.

BA'KING is the mode of cooking food in an air-tight chamber or oven. The term is also applied in the manufacture of bricks (q. v.), porcelain (q. v.), &c. The B. of bread will be treated under BREAD. The oven attached to kitchen-grates for cooking is simply an iron chamber, with flues for conveying the heated gases of the fire round it. In B., strictly so called, the oven is kept close, so that the steam and aroma arising from the enclosed substances are confined; but by opening ventilators a current of air is produced, and then these ovens may be used for what is called *oven-roasting*. The rank taste that often characterizes baked dishes is thus avoided. Ovens are now often heated by water, or by steam, and also by gas. Meat for B. is placed in a dish, from the bottom of which it is raised on a wire frame or trivet. In M. Soyer's Baking-dish, a wire frame rests on the edge of the dish, and on this potatoes are laid; a trivet, rising above the frame, supports the meat; while the bottom of the dish contains a Yorkshire pudding; the dripping thus falls upon the potatoes and pudding below.

B., although a convenient mode of cooking, is not considered quite so good as Roasting (q. v.). The practice of having recourse to the baker's oven, saves both trouble and expense in heating, and is a matter of necessity with those who have not means of cooking at home; but it has this chief objection, that every dish becomes impregnated with the steam and odors of all the rest. Soyer pronounces it to be semi-barbarous.

BAKO'NY WALD (Forest of Bakony), a densely wooded mountain-range of Hungary, south of the Danube, dividing the great and little Hungarian plains. Immense herds of swine are annually driven hither to feed upon the mast of the forest. The keepers of these swine furnished those notorious robbers who play so important a part in the ballads of the Hungarian people, and in the imagination of travelers. The saintly King Stephen founded a cloister in the forest 1030 A. D. Only in recent times has this dangerous territory been thoroughly explored. The hills have an average height of 2000 feet, with quarries of valuable marble, in which a considerable export trade is done.

BA'KSHISH. The ordinary meaning of this word in Persia is a present; but in the East, in modern times, it has acquired the special signification of gratuity (Ger. *Trinkgeld*), which, however, the orientals do not quietly wait to receive, but demand loudly, and even insolently. Every traveler, whether in Turkey or in Egypt, in Asia Minor or in Syria, if he receives the smallest service from any one, is immediately reminded by the cry of 'Bakshish, Bakshish,' to pay for the courtesy by a gift of money. Even when the ambassadors to the Supreme Porte obtain an audience from the sultan, or from any of the high dignitaries, they are obliged, by the prompt gift of a B., to avoid a peremptory demand for it on the part of the door-keepers and other servants. By degrees the B. has been fixed by custom at certain sums.

BAKTSHI-SERAI' (the 'City of the Gardens'), the residence of the ancient princes or khans of the Crimea, stands in a deep limestone valley, not far from the present capital, Simferopol. The city is kept in excellent repair, and had a pop. in 1880 of 10,530, consisting almost exclusively of remnants of the old Tatar inhabitants. It thus presents a striking contrast to the modern towns of the Crimea, and is one of the most singular in Europe. The palace of the ancient khans has been completely restored by the Russian government in the oriental style. It consists of a great labyrinth of buildings, courts, and gardens, and is situated about the middle of the town, dividing it into two parts.

BAKU', an important seaport of Russian Transcaucasia, on the Apsheron peninsula in the Caspian Sea. Since 1883 it is connected by rail with Tiflis, and so with Poti and Batoum on the Black Sea. Pop. (1880) 15,600 inhabitants, chiefly Persians and Armenians. The whole soil around B. is impregnated with petroleum, which forms an important branch of its industry. Some of the fountains ignite spontaneously, and this natural phenomenon has caused B. to be esteemed as a holy city by the Parsees or fire-worshipers, many of whom resort to it from very long distances. B., besides its trade in naphtha, exports cotton, silk, opium, saffron, and salt. The Arabian, Masudi, is the first who mentions B., about 943, and he gives an account of a great volcanic mountain in its vicinity, which is now extinct. B. was ceded by the Persians to the Russians in 1813. Captain Baker states that the refuse of the oil drawn from the wells is, after the naphtha has been distilled from it, used now with great success as a substitute for coal in the steamers on the Caspian Sea. The harbor, which is strongly fortified, is one of the chief stations of the Russian navy in the Caspian, and is also of great importance as a center of trade. A good deal of shipbuilding is carried on. B. is capital of a government of Russian Transcaucasia, with a pop. (1880) of 540,800.

BA'LA BEDS, a local deposit, occurring in the neighborhood of Bala, in North Wales, and forming a group in the Lower Silurian of Murchison. They consist of a few beds, rarely more than 20 feet in thickness. The beds are chiefly composed of hard crystalline limestone, alternating with softer argillaceous bands, which decompose more freely, and leave the limestone like a cornice moulding, affording a characteristic by which, at a considerable distance, the B. B. can be distinguished from the rocks of hard gritty slate above and below. Trilobites and Cystideæ are the predominant fossils of the group. Calcareous beds, containing similar fossils, have been noticed in the Silurian district of the south-east of Ireland, and referred to this group.

BA'LAAM, the name of a prophet who figures prominently in the early history of the Israelites. He is first mentioned in Numbers xxii. 5, where Balak, king of the Moabites, alarmed at the irruption of the chosen people into his territories, is represented as sending messengers to Pethor, in Mesopotamia, the dwelling-place of the seer, to beseech him to come and curse the invaders. The narrative is, of course, familiar to every one, and it is therefore unnecessary to recount it; but it is marked by two peculiarities, which have excited much speculation and controversy. The first is, the admittedly prophetical character of B., who was a *Gentile;* the second is, the curious miracle in the case of his ass. With regard to the supernatural powers attributed to B. the most prevalent hypothesis is, that he was the last relic of the patriarchal age, during which communion with God was not formally restricted to one race, but diffused more or less among all the Semitic peoples. Some, again, suppose that his knowledge of God, from whom he apparently received miraculous communications, was derived from traditions of the primitive faith scattered over Mesopotamia by Abraham, Jacob, Laban, &c.; though Hengstenberg conceives that he had been led to renounce idolatry by hearing of the miracles which attended the exodus of the Israelites, anticipating, as a reward for his change of worship, a further insight into futurity, and a greater power over nature. B. has ever been considered a type of those men who prostitute their powers and hold the truth in unrighteousness, receiving the wages thereof.

BALÆ'NA. See WHALE.

BALÆNO'PTERA. See RORQUAL.

BALAGHA'T DISTRICTS, the name given to a large tract of elevated country in the S. of India, 28,669 sq. m. in area, and extending from the rivers Tumbuddra and Krishna in the N. to the furthest extremity of Mysore in the S. Part of the ancient Hindu kingdom of Carnata, it was conquered by the Mohammedans, and fell into the hands of the British on the final overthrow of Tippoo (q. v.) The name Balaghat signifies *Above the Ghauts.*

BALAKLA'VA, a small port in the south-west of the Crimea, separated by a rocky peninsula from the harbor of Sebastopol, from which the direct distance is about 6 miles. Population in 1880, 700. The harbor, which affords secure anchorage for the largest ships, is perfectly landlocked, the entrance being so narrow as scarcely to admit more than one vessel at a time. To the east, overlooking the bay from a rocky eminence, are the ruins of a Genoese fortress. The foundation of the work is excavated into numerous chambers and galleries. It is the *Symbolon Limen* of Strabo; and the present name is supposed by Dr. Clarke to be a corruption of the Genoese *Bella-chiava*, or Fair Haven. This was long the seat of a Greek colony; in the 14th c., it fell into the hands of the Genoese; about the end of the 15th, they were expelled by the Turks; and on the conquest of the Crimea by Catharine II. of Russia, it was made a military station for a regiment of Greeks and Albanians. In 1854, a few days after the battle of Al-

ma, the town was occupied by the British army under Lord Raglan, and the harbor formed, during the ensuing campaign, the headquarters of the fleet, and the basis of operation of the army. Here ensued those scenes of mismanagement and confusion that have rendered B. a synonym for chaos, and the recital of which, with the resulting privations and misery to the soldiers, stirred so terribly the heart of England in the winter of 1854—1855. A terrible hurricane on November 14, 1854, in which nine vessels were totally destroyed, and several others seriously injured, tended greatly to increase the confusion which incapacity and divided responsibility first occasioned at Balaklava. Soldiers, six miles distant, were dying for want of food, clothing, and medicine, which were hidden hopelessly beyond reach in store-rooms at B., or stowed away in the holds of ships that were not permitted to enter the harbor. Transport vessels, for which the country was paying enormous sums of money daily, were kept lying idle in port with their most anxiously awaited cargoes (for lack of which the troops were perishing by hundreds, unladen, while poor mutilated and dying soldiers lay miserably exposed on the heights for want of ships to convey them to the hospitals at Scutari.

The rebuilding of the greater part of the town, the formation of a line of railway between B. and the camp, and certain official investigations in 1855, completely remedied this disgraceful state of things. The 25th of October 1854 was signalized, on the heights between the town and the Tchernaya, by those unparalleled cavalry charges, the record of which is among the saddest but proudest memories of the British army. See Kinglake's *Invasion of the Crimea* (6 vols., 1863—1880), of which nearly the whole of the fourth volume is devoted to a minute account of the events connected with Balaklava.

BA'LANCE (from Latin *bilanx*), an instrument for ascertaining the weight of bodies in grains, ounces, pounds, or any other units of weight. The ordinary B. consists of a lever called a beam, whose point of support is in the middle of its length, and having dishes or scales supended from either extremity. As it is of importance that the beam should move easily round its point of support, it rests on polished agate or steel planes, by means of knife-edges of tempered steel, which project transversely from its sides, and serve as the axis of rotation. By this arrangement, the surface of contact is reduced to a mere line, and the friction of the axis of the beam on its support almost entirely obviated. The scales are hung by means of chains attached to steel hooks, which rest also on knife-edges, but turned upwards instead of downwards, as in the first case. The essential requirements of a B. of this description are: 1st, That the beam shall remain in a horizontal position when no weights are in either scale; and 2d, That the beam shall be a lever of equal arms, or have the distances between the central knife-edge and those at either end exactly the same. To insure the first of these conditions, it is necessary that the center of gravity of the beam lie vertically below the point of support, when the beam is horizontal. When such is the case, the center of gravity at which the weight of the beam may be considered to act, oscillates as in a pendulum round the point of support, and always comes to rest right under that point, thus restoring to the beam its horizontal position when it has been tilted out of it. If the center of gravity were above the point of support, the beam would topple over; and if it coincided with that point, there being no restoring force, the beam would occupy indifferently any position into which it was thrown, the B. in both cases being useless.

That a B. possesses the second of the above conditions, is ascertained by putting weights into the scales which keep the beam horizontal, and then transposing them, when, if it still remain so, the lengths of the arms are equal. Should the arms be of different lengths, a less weight at the end of the longer arm will balance a larger weight at the end of the shorter arm (see LEVER); but when transposed, the larger weight having the longer arm, and the smaller weight the shorter, the beam can no longer remain horizontal, but will incline towards the larger weight. A balance with unequal arms is called a false B., as distinguished from an equal-armed or just balance. When weighing with a false B., it is usual to weigh a body in both scales, and take the arithmetical mean—that is, half the sum of the apparent weights for the true weight. This is near enough to the truth when the apparent weights differ little from each other; but when it is otherwise, the geometrical mean (q. v.) must be taken, which gives the exact weight in all cases.

Although the preceding conditions are of essential importance, they do not supply all that we look for in a good balance. It is necessary, in addition, that the beam should turn visibly from its horizontal position, when there is a slight excess of weight in the one scale as compared with the other. This tendency is termed *sensibility*, and depends upon the weight of the beam, the position of its center of gravity, and the length of its arms. Let ABD (fig. 1) represent the beam of a balance, C the point of suspension, G the center of gravity, and ACB the straight line joining the knife-edges, which may be taken as the skeleton lever of the balance. We shall here confine our attention to that construction where the three knife-edges are in a line, because it is the most simple and at the same time the most desirable. We may, without altering the principles of equilibrium, consider the beam reduced to the lever AB, and embody its weight in a heavy point or small ball at the center of gravity, G, connected with C by the

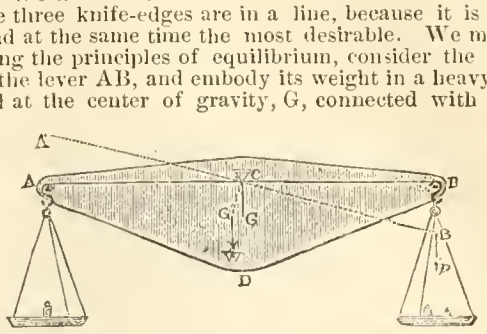


Fig. 1.

rigid arm CG. The scales (represented small in the fig. for the sake of space), with the equal weights in them being at an equal distance from C, have their center of gravity in that point; and their combined pressure acting there, is met directly by the supporting plane, so that they have no influence in determining any particular position of the beam. If a small weight, p, therefore, be put into the scale at B, the position of the beam is determined by its rotating tendency (moment) round C, and the counter-rotating tendency of the weight of the beam, W, acting at G.

The question of sensibility is thus reduced to the action of the crooked lever GCB, with p acting at one end, and W at the other. The relations of the arms and forces of a crooked lever will be found under LEVER. It is only necessary here to state, that the moment of the weight acting at the end of a crooked lever increases with its size, the length of its arm, and the smallness of the angle which that arm makes with the horizontal line passing through the fulcrum. Let us suppose that, under the effect of the opposing moments, the beam, as represented by the line AB, takes up the position marked by the dotted lines. If, now, we were to lengthen CB′, and keep CG′ as it is, CG′ would rise nearer to the horizontal line, and CB′ fall further from it, before equilibrium would be restored; and the inclination of CB′, or the beam to the horizontal line, thus being greater, the sensibility of the balance would be increased. Consequently, *the longer the arms of a B. are, all other things being the same, the greater will be its sensibility.* But the same object would be reached by keeping CB′ its original length, and shortening CG′, or bringing the center of gravity of the beam nearer to the point of support. The weight of the balance then having a shorter arm, the point G′, for the same reason as before, would need to rise higher, and B′ sink lower, before A′B′ would find its position of rest. Here, also, *the nearer the center of gravity of the beam is to the point of support, the greater will be the sensibility of the balance.* If now, however, we keep the length of the arms CG′, CB′ constant, but diminish the weight acting at G′, while p acting at B′ remains the same, it is manifest, that to make up the deficiency in the weight W, the two arms will turn to the left, as in the preceding cases, so as to give W a longer and p a shorter *effective* arm. The smaller, therefore, the weight acting at G, or *the smaller weight of the beam, the greater will be the sensibility of the balance.*

In the construction of the B., it is a matter of importance to have the sensibility independent of the amount of weight in the scales, so that, when heavily loaded, a small weight will produce the same inclination as when not loaded at all. This condition is implemented, as we have already shown, when the three knife-edges are kept in the same straight line. If the line joining the two terminal knife-edges lie below the point of suspension, then the center of gravity of the equal weights corresponding with the middle of that line, will, upon the turning of the beam, be forced from below that point, and will accordingly have a tendency to resume its former position. The equal weights thus counteract to some extent the effect of the additional weight, in causing the beam to incline, and their influence in this way will be all the greater as they themselves increase. When a B is too heavily loaded for its strength, the three knife-edges, although previously in a line, do not retain that position, for the arms of the beam yielding to the pressure, cause the terminal knife-edges to sink below the one in the middle, and the knife-edges themselves losing their shape under the pressure, the sensibility is considerably diminished.

When a B. is very sensible, the beam keeps oscillating for a considerable time from one side to the other of the position in which it finally settles. Although such an instrument may be useful for physical and chemical experiments, it is not serviceable for the purposes of ordinary life, where minute quantities of the substance to be weighed are of little value, and where time, and consequently rapidity of indication, are matters of importance. The sensibility of a B. must, therefore, be adjusted to the purpose for which it is designed; sensible balances being employed for weigh-

ing finer, and less sensible, or *stable* balances, for weighing coarser materials. The stability, or the tendency of the beam to come quickly to rest, depends on requirements nearly the opposite of those which conduce to sensibility. In the construction treated of above, the stability increases with the moment of the weight of the beam acting at G round C, so that it thus increases with the weight of the beam, and the distance of the center of gravity from the point of suspension. The stability is also increased, as already shown, by having the line joining the scale knife-edges below the point of support.

Fig. 2 is the representation of a common form of the delicate balances employed in physical and chemical researches. The beam is constructed so as to combine lightness with strength, and rests by a fine knife edge on an agate plane. It is surmounted by

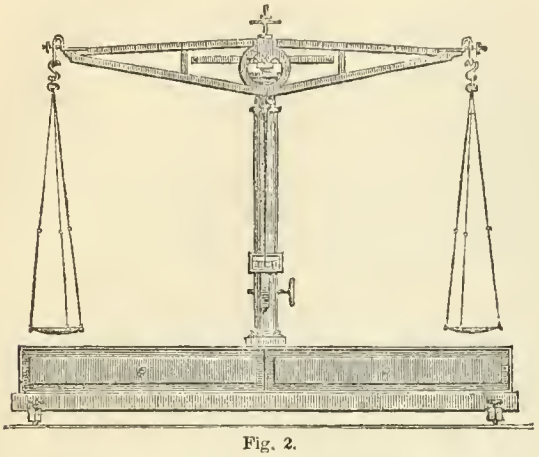


Fig. 2.

a weight moving on a screw, so that the sensibility may be increased or diminished, according as the weight is raised or depressed. In order that the knife-edge may not become blunted by constant contact with the supporting plane, a cross-bar, with two projecting pins, is made to lift the beam from the plane, and sustain its weight when the balance is not in play. The beam is divided by lines marked upon it into ten equal parts, and a small weight made of fine wire bent into the form of a fork, called a rider, is made to slide along to any of the divisions.

If the rider be, for instance, $\frac{1}{10}$ of a grain, and if, after the weight of a body is very nearly ascertained, it brings the beam, when placed at the first division next the center, exactly to its horizontal position, an additional weight of $\frac{1}{100}$ of a grain will be indicated. The use of inconveniently small weights is, by this arrangement, to a large extent obviated. As the beam takes some time before it comes to rest, it would be tedious to wait in each case till it did so, and for this reason a long pointed index is fixed to the beam below the point of suspension, the lower extremity of which moves backward and forward on a graduated ivory scale, so that when the index moves to equal distances on either side of the zero point, we are quite certain, without waiting till it finally settles, that the beam will be horizontal. The same is seen in ordinary balances, only the tongue or index is above the beam; and according to its deviation on each side of the fork or cheeks by which the whole is suspended, is the future position of the beam ascertained. The finer balances are never loaded to more than a pound in each scale, and when so charged, will deflect with $\frac{1}{100}$ of a grain of additional weight in one of the scales, or will turn, as it is technically called, with $\frac{1}{1152000}$ of the load. The finest balances turn with $\frac{1}{10000000}$ of the load, and some have been constructed which turned with much less. Even with the best achievements of mechanical skill, no B. can be made whose arms are absolutely equal; and to remedy this defect, the method of double-weighing is resorted to, when the utmost accuracy is demanded. This consists in placing the body to be weighed into one scale, and sand, or the like, into the other, until exact equilibrium is obtained, then removing the body, and putting weights or another body in its place which exactly counterbalance the sand. Both being thus weighed in precisely similar circumstances, must weigh precisely the same.

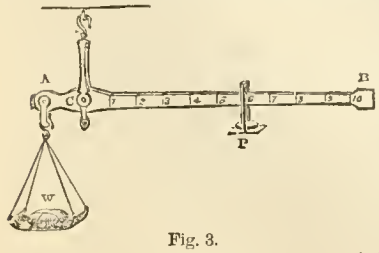


Fig. 3.

The Roman B., or *Steelyard* (Ger. *Schnellwage*), is more portable than the ordinary balance. It consists of a lever (fig. 3), AB, moving round a knife-edge or point at C. The body to be weighed, W, is put into the scale which hangs from A; and a movable weight, P, is made to slide along the longer arm, until the lever, AB, remains horizontal. The weight of W is then read off from the divisions at which P rests. If the lever lie horizontal when unloaded, then equal weights at equal distances from C will balance each other, so that when W is balanced by P at a distance from C equal to AC, the two are of equal weight, but if equilibrium take place when P, say, is ten times as far from C as A is, then W will be ten times the weight of P; and the same holds for any intermediate point at which P may stand, W weighing as many times P as P's arm is a multiple of W's arm. To weigh a body of 10 lbs. by the ordinary B., a counterweight of 10 lbs. is necessary, making a total load of 20 lbs.; but in the case just supposed, 1 lb. balances 10, making a total load of only 11 lbs.

The steelyard has, therefore, this advantage over the common B., that the load on the fulcrum, and consequently the friction, is less. On the other hand, however, there is this disadvantage, that the arms of the steelyard bend unequally under the strain of great weights, which in a B. with equal arms cannot, to the same extent, take place. As the steelyard is ordinarily made, the longer arm preponderates when the lever is unloaded, so that the graduation of the longer arm begins at a point between A and C, and not at C. The *Danish B.* differs from the ordinary steelyard in having the weight fixed to the extremity of the lever, and the fulcrum movable.

The *Bent Lever B.* (Fr. *pèson*, Ger. *Zeigerwage*), shown in fig. 4, is a lever of unequal arms, A, C, B, moving round the pivot C, having a scale, Q, attached to the shorter arm AC, and a fixed weight, W, to the longer arm CB. The longer arm ends in a pointer moving in front of a fixed graduated arc. When a body is put into the scale, the pointer rises from the bottom or zero point of the arc, and rests opposite the mark corresponding to the weight of it. The higher the weight W rises, the longer becomes its *effective* arm, and the greater must be the weight it balances. The arc is generally graduated experimentally, the geometrical graduation being somewhat complicated.

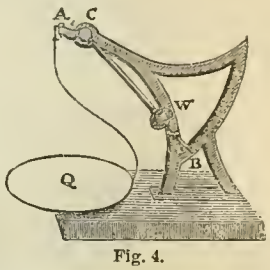


Fig. 4.

For other weighing apparatus, see SPRING-BALANCE; WEIGHING-MACHINES.

BA'LANCE AND BA'LANCE-SPRING. The balance of a watch is a wheel finely poised on its axis; the pivot-holes in which it turns being frequently—in chronometers and clocks, as well as in watches—jewelled, or made of small rubies, diamonds, &c., for the sake of durability. The natural effect of an impulse given to such a wheel would be a complete rotation on its axis. This, however, is convertible, by the escapement (q. v.), and by the balance-spring, into a vibratory motion. The balance-spring is held to be a crowning invention in the mechanism of the watch; and the honor of its first suggestion has been claimed for no less than three very eminent men—for Dr. Hooke, an Englishman; for Abbé Hautefeuille, a Frenchman; and for Hüygens, the Dutch astronomer. The honor, however, undoubtedly belongs to Hooke.

The balance-spring consists of a coil of steel-wire, so delicately manufactured that 4000 of them scarcely weigh more than one ounce, though often costing more than £1000. In its application to the balance of a watch, one of the extremities (*e*, fig. 1) of the spring is fastened to a point independent of the balance, while the other is attached near its axis. When the balance is at rest, the spring is inclined neither way, this position being called the point of rest; but when the impulse is given to the balance by the crown-wheel of the escapement, the balance moves round just so far as the impulse given is able to overcome the elastic resistance of the spring. When that resistance becomes equal to the impulse given, the balance stops for a moment, and then is driven back by the elastic recoil of the spring, and continues thus to vibrate so long as the impulse is repeated or the watch is in motion.

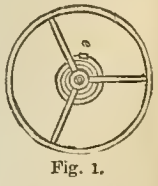


Fig. 1.

The recoil of the spring is sufficient to drive back the balance to a distance nearly double the length of its first motion; this is, therefore, called the long arc of vibration. But when the motion of the balance is free, with a certain length of spring, the *long* arc of vibration is made in less time than the short one, to which the impulse is given: with a spring of greater length this relation is reversed; whence it was concluded by Le Roy and Berthoud, that equality of time, or *isochronism*, in unequal vibrations, could be more easily obtained by lengthening the spring

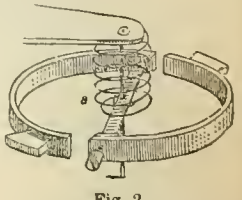


Fig. 2.

than by tapering it. In England, where time-keepers have been brought to their greatest perfection, it is considered that isochronism is most easily obtainable by using the cylindrical helical spring (*s*, fig. 2), which is applied to all marine chronometers.

An improvement in watches, or rather in chronometers, invented by Mr. Dent of London, consists in coating the balance and balance-spring with gold by the electro-metallurgic process, by which means they are secured from rust.

BA'LANCE OF POWER, an expression used in diplomacy for that state of matters in which no one of the European states is permitted to have such a preponderance as to endanger the independence of the others. This idea is not, as some say, confined to modern times. The Greek states acted upon it by a kind of instinct of self-preservation, though it was not directly formulated. It has, however, become more distinctly avowed as a motive of political conduct and more systematically acted upon, since the time of Charles V., whose overgrown power and ambitious designs awakened the other European powers to the danger of such overwhelming preponderance in one state. The motive of preserving the B. of P. came first distinctly into the foreground in those unions which England, Holland, and Austria repeatedly formed against the menacing schemes of Louis XIV. for acquiring the dominion of all Europe. It was the same cause that broke up the most dangerous (for Louis) of these coalitions; for in the war of the Spanish Succession, when the Hapsburg pretender to the Spanish throne became, by the death of Joseph I., sovereign of Austria and Emperor of Germany, and the power which, in the hands of Charles V., had menaced the equilibrium of Europe, was thus likely to be again wielded by one man, England withdrew from the coalition, and thus saved Louis from a decided overthrow. The aggressions of Napoleon called all the powers of Europe to arms against him in the name of the B. of P.; and in readjusting the map of Europe, the B. of P. was often invoked to cover the jealousy which resisted not a few claims to restitution of territory. For some time, the B. of P. in Europe has been embodied, as it were, in a pentarchy or permanent congress of the five great powers, who mutually watch one another's movements. This mutual jealousy among the leading powers on the score of extension of boundaries, is looked to as the great safeguard of the smaller states, preventing their absorption by their powerful neighbors. It was the dread of a coalition against him that made the Emperor of Russia agree to the treaty of 1841, and the Crimean war arose out of Russia's renewed attempt to extend her dominion over Turkey. Latterly, the doctrine of non-intervention has to a certain extent gained ground among politicians; and the formation of the kingdom of Italy, the results of the Franco-German war of 1870—1871, and the formation of the German empire, have modified the old ideas, and brought into play new combinations whose results can hardly yet be foreseen.

BA'LANCE OF TRADE. In the 'mercantile system' of political economy, which looks upon the possession of gold as the grand aim, it not unnaturally came to be a maxim that a nation becomes richer just in proportion as the money-value of its exports exceeds that of its imports; the excess, it was thought, being paid in gold, is just so much added to the national wealth. Now, the difference between the money-value of the exports and imports of a state is called the 'balance of its trade;' and by the adherents of the mercantile system, this balance was said to be 'in favor' of the country or 'against' it, according as the exports or the imports showed the excess.

But this view of the matter rests on a twofold error; for, in the first place, the increase of national wealth is by no means to be identified with the immediate influx of hard cash; nor is gold the highest expression of national wealth, but only a means of turning real wealth and the faculty of labor to account. Further, the assumption that excess of exports represents excess of income, is completely false. It takes exports for income (because payment is received for them), imports for expenditure (because they must be paid for), while it would be more consistent with the truth to say that exports are identical with expenditure, and imports with income; so that wealth increases in proportion as the value of the imports (what is received) exceeds that of the exports (what is given away); and that whether these exports and imports consist solely of goods or partly of money. It may sometimes be desirable to get payment of exports in gold—that is, to import bullion. But the case in which this will be beneficial to the merchant seeking his own profit in the transaction, will be that in which it will be beneficial to the community. In the majority of cases, however, the individual merchant finds it his best policy to lay out the money due to him in a foreign country in purchasing the wares of that country as return-value. The far-sighted Venetians early recognized the truth of the principle in a national point of view; for, by a law of 1272, they laid a tax of one-fourth the value on the importation of all coined gold and silver. The mercantile system of political economy, on the contrary, consistently following up the notion of the B. of T., enacted laws prohibiting importation of foreign manufactures, or imposing high duties upon them, and giving premiums and other protective encouragements for exportation; as if it were possible to go on exchanging always for gold only—ever exporting goods and goods alone, and never importing any.

If this could be, and if it were true that a nation with the B. of T. constantly in its favor must become richer, while, with the balance against it, it must become poorer, England, whose official returns have for many years exhibited a large excess of exports over imports, must have had at this time about 500 million pounds in precious metals, while in reality the amount does not exceed perhaps 60 millions. The truth is, that no safe conclusion can be drawn from the B. of T. exhibited in official statements; from the way in which they are arrived at, a great part of the facts of the cases are necessarily left out. Almost all nations exhibit favorable balances, and how could that be possible, if the whole affair were not deceptive? In the regular legitimate commerce between two nations, both actually gain, though the gain may not be exhibitable in the form of a money-balance. If the gains of nations from commerce consisted of differences between the amount of exports and of imports to be compensated by balances in money, nearly all nations would be yearly receiving accessions of gold and silver, the united amount of which would exceed, by more than ten times, the produce of all the mines in the world.

BA'LANUS, a genus of *Cirrhopoda* (q. v.); the type of a family, including all those cirrhopods which are destitute of a flexible stalk, and of which the shell is symmetrical, These characters at once distinguish them from Barnacles (q. v.). In the genus of B., the base is usually formed of a thin calcareous plate, the sides of six valves; and four small valves form the operculum, exactly closing the aperture at the top. The name (signifying an acorn) was originally given by the ancient Greeks, from a supposed resemblance of some of the kinds of acorns; and acorn-shell has sometimes been adopted as an English name. There are many species, and they are found in almost all seas, attached to stones, timber, shells, crustaceans, &c. They cover the rocks between high and low-water mark on many parts of the coast as with a white and calcareous incrustation, so that arithmetic fails in computing, and imagination in conceiving their multitudes.

They may, however, be readily passed over as individually objects of little interest when they are seen after the tide has left them, for then their valves are closed, and they exhibit no sign of life; but if observed in a pool of the rocks, or anywhere under water, they present a very different and pleasing spectacle, the opercular valves continually opening and shutting with a quick but pretty regular motion, and an exquisitely delicate apparatus of feathery arms or cirrhi (see CIRRHOPODA) being as frequently thrown out and retracted like a hand or a little net, to seize and carry in to the mouth the minute nutritious particles or very small animals upon which the creature feeds. Thus, the little balani, immovably fixed to the rock, or carried about at the pleasure of mollusks or crustaceans to which they adhere, obtain their food from the waters around them.

A remarkable fact in the natural history of these creatures has recently been discovered by Mr. Thompson of Cork, that in the early stages of their existence they are not fixed as in their adult state, but move about very actively in a succession of bounds, by means of swimming-feet like those of the *Cyclops* (q. v.); having, however, a shell, apparently of two valves, resembling a very minute muscle. Still more remarkable is the discovery made along with this, that in their early locomotive state they possess large stalked eyes, which disappear along with the organs of locomotion when they attach themselves—probably by the guidance of some peculiar instinct—to their final place of repose, undergoing a transformation into perfect cirrhopods, and acquiring as a covering their many-valved shell.

Some of the larger species of B. were esteemed a delicacy by the ancient Romans. The Chinese entertain the same estimation of *B. tintinnabulum*, which is said to resemble lobster in taste; and *B. psittacus*, a South American species, which is in like manner compared to a crab, is exported in large quantities from Conception de Chili to Valparaiso and Santiago. This species is sometimes almost four inches in diameter, the height considerably more. It is chopped off the rocks with a hatchet. The two posterior opercular valves are beaked, from which it receives the name of *Pico*, and its scientific trivial name, *psittacus* (a parrot).

BALASINO'RE, or BALASINESHWAR, a petty native state, or *jaghire*, of India, in the province of Guzerat, protected by the British government, and politically connected with the presidency of Bombay. It extends from N. lat. 22° 53′ to 23° 17′, and from E. long. 73° 17′ to 73° 40′, and contains an area of about 80 sq. miles. The river Mahi flows through the jaghire. The native ruler is styled Nawab of Balasinore. He has a revenue of 41,548 rupees, of which he pays 10,000 rupees as tribute to the British government. The pop. of B. is estimated at 41,984. The Nawab

maintains a force of only 8 horsemen and 50 foot-soldiers, who are employed in revenue, police, and other services.—The capital of the jaghire also bears the name of Balasinore. It is rather a thriving town, and is surrounded by a wall. It is 51 miles north from Baroda.

BALASO'RE, a seaport in the district of Cuttack and presidency of Bengal, near the Boorabullung, which enters the sea to the west of the Hoogly or Calcutta River. It is situated in lat. 21° 30′ N. and long. 87° E., and has dry-docks and a coasting-trade; but it is entitled to notice chiefly in connection with the past, having been the seat, successively, of Portuguese, Dutch, and Danish factories. It was only in 1846 that the Danes sold their interest in the place to the English.

BA'LATON, Lake of (Platten-See), a lake, the largest in Hungary, about 55 miles south-west of Pesth. Its extreme length is 48 miles, with a breadth of from 3 to 10 miles, and an estimated area, including its frequently submerged marshes, of 420 square miles. Its greatest depth is 39 feet. It is supplied by upwards of thirty streams—the chief of which is the Szala—as well as by numerous springs which rise on its margin. Its outlet is by the Sio, which discharges itself into the Sarvitz, a feeder of the Danube. The waters of B. are clear and transparent except when they are agitated by a storm, when they assume a bluish color. They have a slightly brackish taste. Fish of various kinds are found in abundance, and sand impregnated with iron, interspersed with which are small garnets, rubies, and other precious stones, is taken from it. Woods and vineyards cover the hills which encircle its northern sides, and on its banks near the town of Füred there is a spring of acidulous water. The surrounding country is rich in rare plants and mineral treasures, and was the scene of several bloody conflicts during the Hungarian war (1848—1849). The lake itself figures prominently in the old romantic ballads of the Magyars.

BALAU'STA. See Berry.

BA'LAY, or BA'LAIS, the name now used to distinguish the ruby of a bright rose-color from the ruby proper, which is of a bright red or cochineal color, and from the *spinelle* ruby, which is of a red hue approaching to rose-color. This last kind of ruby has been recognized only in times which are comparatively modern. In the middle ages, they seem to have known only the B. ruby and the ruby proper, or *le beau rubis*, as it was often called. M. de Laborde thinks that the term B. was anciently employed as a name for all sorts of rubies.

BA'LBI, Adriano, well known by his geographical, and more especially by his statistical works, was born in Venice on the 25th of April 1782. In 1808 he gained so much credit in Italy by his first geographical work, that he was appointed Professor of Geography in the College of San Michele at Murano, and in 1811 Professor of Physics in the Lyceum at Fermo. Subsequently he resided for a time in Portugal, and then went to Paris, to superintend the publication of his *Essai Statistique sur le Royaume de Portugal et d'Algarve* (2 vols. Par. 1822). This work was soon followed by the *Variétés Politiques et Statistiques de la Monarchie Portugaise* (Par. 1822). B. lived in Paris till 1832. He was the intimate friend of Malte Brun, from whose papers he, jointly with Larenaudière and Huot, published the *Traité Elémentaire de Géographie* (2 vols., Par. 1830—1834). He also published several works of comparative national statistics. His *Atlas Ethnographique du Globe* (Par. 1826) is distinguished by its extensive accumulation of facts and views, giving an account of German researches on the subject, and entering into questions of comparative philology. B.'s best known work is, however, the *Abrégé de Géographie* (3d edition, Par. 1838), which has been translated into several languages. In the year 1832 he returned to Italy, and settled at Padua, where he died 14th March 1848. A collection of his *Scritti Geografici* was made by Eugene Balbi (5 vols., Turin, 1841—1842).

BA'LBI, Gasparo, a Venetian merchant of the 16th c., who is worthy of mention as the first traveler, who has left an account of India beyond the Ganges. In the pursuit of his calling, B. was often led to Aleppo, and from thence, on one occasion, he made a visit to India, which lasted several years. After his return to Venice, he published, in 1590, the results of his travels in a volume entitled *Viaggio all' Indie Orientali*. A Latin translation was printed in De Bry's *Collections of Voyages and Travels to the East Indies*, published at Frankfort in 1590—1594. B. appears to have set down, without exaggeration, all that he himself saw, and is particularly minute and exact concerning commercial matters; but there is scarcely any limit to his credulity with regard to what he heard from others about the country. From Aleppo, his journey was down the Euphrates until opposite Bagdad; thence down the Tigris to Bassorah, where he embarked for the Malabar coast. Having visited Goa and Cochin, and other Portuguese settlements, he sailed for Pegu, then an independent empire, where he remained two years, returning by the same route. The most interesting part of his narrative is that relating to Pegu.

BALBI'NUS, Decimus Cælius, one of the two emperors of Rome whom the senate elected on hearing of the death of the elder Gordianus, and his son, in Africa, in opposition to Maximinus, who had the support of the legions in Germany. He was celebrated as an orator and a poet, and was a man of mild disposition.

His coadjutor, Marcus Clodius Pupienus Maximus, was a bold and resolute soldier who had risen from the people. They had only reigned a few months, during which time Maximinus had been killed by his own soldiers, who afterwards submitted to Maximus, when they were both killed in 242 A.D. by the prætorians, who at that time were animated by bitter hostility to the civilians, and extended it to the rulers who had been elected by them.

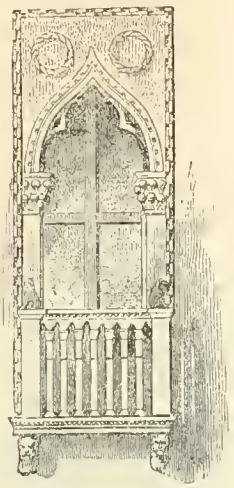
BA'LBO, Cæsare, an Italian statesman and author, was born 21st November 1789 at Turin. When 18 years old, B., whose father had enjoyed the patronage of Napoleon, was appointed auditor of the Council of State in Paris, and in 1812 he was made commissioner for the Illyrian provinces ceded to France by the Peace of Vienna. After the fall of Napoleon, B. went to London as secretary of the Sardinian embassy. After leaving political affairs, he devoted himself to the study of history, and among other works produced during the years 1821—1843, were a *History of Italy*, which, however, extended only to the reign of Charlemagne; and a translation with commentary of Leo's *Development of the Constitution of the Lombardic Towns*. His *Speranze d'Italia* ('Hopes of Italy'), published in 1843, first extended his literary reputation to foreign countries. One of its main objects was to prove that national independence must precede the enjoyment of constitutional liberty; and that to strive after the latter, however good in itself, so long as the former had not been secured, was both foolish and reprehensible. It gave a vivid and intelligent picture of the political condition of Italy, its aims and prospects. His compendium of Italian history (*Della Storia d'Italia*, &c.) was also successful. B. took a prominent part as a moderate liberal in the political movements of 1847—1848, and subsequently supported the ministry of Azeglio. He died 3d June 1853. He was a man of strict morality and unspotted character. In all his writings, B. adhered strongly to the Roman Catholic Church, whose truth he conceived to be the healing of nations as well as of individuals, and the only source of true culture.

BALBO'A, Vasco Nunez de, a Spanish conqueror, was born of a noble but reduced family at Xeres-de-Caballeros in 1475. After leading rather a dissolute life in his youth, he gladly took part in the great mercantile expedition of Rodrigo de Bastidas to the New World. He established himself in St. Domingo, and began to cultivate the soil; but fortune proving adverse, in order to escape from his creditors, he had himself smuggled on board a ship, and joined the expedition to Darien in 1510, commanded by Francisco de Enciso. It is curious to reflect that the man destined to discover the eastern shores of the largest ocean on the globe, should have been compelled to secrete himself in a cask before he could share in the new enterprise. An insurrection which took place obtained for B. the supreme command in the new colony. Confused accounts which reached him of a great western ocean, impelled him, in 1513, to set out in quest of it. On the 25th of September of this year, he obtained the first sight of the Pacific Ocean from a mountain-top in the Isthmus of Panama. His natural enthusiasm at this great discovery was shared by all the educated men of his time, and the descriptions of it by contemporary authors may still be read with much interest. The governorship of the territories conquered by B. was obtained in 1514 by Pedrarias Davila, by means of his intrigues at the Spanish court. B. resigned the command into the hands of the new governor, a narrow-minded and cruel man, and, in a subordinate situation, undertook many successful expeditions; but these, and all his other merits, only served to increase the hatred of Pedrarias Davila towards him. The government of the mother-country sought in vain to mediate between them, and B. even married the daughter of Pedrarias. But on the first occasion of dispute which arose, B., having been induced by Pedrarias to deliver himself up, was accused of a design to rebel, and in violation of all forms of justice was beheaded at Santa Maria in 1517.

BALBRI'GGAN, a small maritime town in Dublin county, 22 miles north of Dublin. It is a seat of cotton, calico, and stocking manufactures. The cotton stockings made here are remarkable for fineness of texture and beauty of open work. Many females are employed in embroidering muslins. B. is a favorite watering-place. After the battle of the Boyne, William encamped here. Pop. (1881) 2443.

BA'LCONY, or BALCO'NY (Ital. Balcone), a projecting gallery in front of a window or of several windows, with a balustrade

or parapet before it, and supported by consoles, or brackets fixed in the wall, or by pillars resting on the ground below. The B. was unknown in Greek and Roman architecture, and is probably an Italian contrivance, as the earliest examples of it occur in Italy, to the climate of which country it is peculiarly adapted. Balconies constructed of wood are of constant occurrence in the cottage architecture of Switzerland, to the picturesque character of which they add very essentially.


Balcony.

BA'LCONY, the gallery or stern-walk outside the stern of a large ship. Three-deckers have two such balconies, and two-deckers one. Where there are two, the lowermost is connected with the admiral's state-cabin, and the uppermost with the captain's cabin.

BA'LDACHIN (Ital. *Baldachino*), signifies a kind of canopy, of the form of a tent or umbrella, made of costly materials and richly adorned, which is either supported on pillars, or fastened to the wall over a throne or couch, or over a pulpit, an altar, or other sacred object. One of the most celebrated is the B. in the church of St. Peter's in Rome, cast in bronze by Bernini, which is supported on four large twisted columns. B. was also the name formerly given to a kind of umbrella of a square form, made of silk brocade or other rich material, and supported on four poles, carried in the middle ages at solemn processions, coronations, marriages, etc., over the heads of royal personages, or high dignitaries as a symbol of their rank. In Europe, the B. is now chiefly used in the processions of the Roman Catholic Church. It is generally borne over the priest who carries the Host.

The word B., as well as the thing itself, comes from the east. Partly as a protection from the burning rays of the sun, partly as a symbol of their power and dignity, the rulers and great personages of the east seldom appeared in public, whether on foot or on horseback, in a litter or on an elephant, without a splendid canopy, often borne by the great men or chief officers of their kingdom. These canopies, generally made in the form of a tent or umbrella, were often sent, in the early part of the middle ages, as presents from eastern princes to those in the west; as, for example, from the Calif Harun-al-Raschid to Charlemagne. During the Crusades, and the consequent trade with the east, they became well known to the Italians. Such canopies, as well as the rich stuffs of which they were made, were called, from the land whence they came, Babylonica; and also Baldachins, from Baldach, the eastern name of the city of Bagdad.

BA'LDER, or BA'LDUR, a divinity worshiped by the ancient Scandinavians, and probably also by the other Germanic nations, is the hero of one of the most beautiful and interesting of the myths of the Edda. B., who, according to the old northern mythology, was the second son of Odin and Frigga, and the husband of Nanna (maiden), dreamed evil dreams which threatened his life. When he related them to the gods, they held a council and endeavored to secure his safety. Frigga took an oath from fire and water, from iron and all metals, from stones, earth, and plants, beasts and birds, the serpent, poison and all diseases, that they would not harm Balder. After this was done, the gods in their mirth sported with B., wrestled with him, and cast darts at him, but nothing could injure him. While the gods rejoiced at this, the thing displeased Loki (mischievous cunning or destructive fire). He changed himself into the form of an old woman, and inquiring the cause of the invulnerability of B., was told by Frigga that all things, animate and inanimate, had sworn not to harm him, with the exception of one little shrub, the mistletoe. Loki went in haste to fetch this shrub, and repaired with it to the assembly of the gods, where he placed it in the hands of the blind Höder, the god of war, directed his aim, and B. fell pierced to the heart. The sorrow of the gods was unutterable. Frigga asked who, to win her favor, would journey to Hel—the goddess of Hades or the grave—to release Balder. Hermoder and Helmod (the heroic), the son of Odin, readily offered his services, and Hel consented to grant his request on condition that all things should weep for Balder. All men, all living beings, and all things wept, save the witch or giantess Thöck (the step-daughter of Loki), who refused to sympathize in the general mourning. B. was therefore obliged to remain in the kingdom of Hel until the end of the world.

The myths of B. have been very differently interpreted. B., as the originator of all that is beneficient and good—for B. and the other *sons* of Odin (see SCANDINAVIAN MYTHOLOGY) are only personified aspects or functions of the dimly conceived one unseen Power that moves all nature—is represented as a hero of so lovely and graceful a manly beauty, that a brilliant light streams from his person; the whitest of the northern flowers is named *Baldersbrow*. As the god of peace of the Germanic nations, who conducts to peace through battle and victory, he is a purely ethical conception, a mythical personification of the peace obtainable through conflict, and agreed to by compact among the gods. The gods, foreseeing doubtless that peace cannot long endure, seek in every possible way to secure the precious life of B., as even the weakest and most insignificant have it in their power to destroy peace. Loki, in his symbolical character as the god of retributive justice, stirs up Höder, or War, through whom the god of peace falls. Höder, indeed, is also slain by Wali, or Val-fader, the battle-god, and the war is ended by a bloody overthrow; but once violated and broken peace is irrevocably lost along with Balder. Hermoder or Helmod labors in vain to restore it, for the giantess Thöck (retaliation, revenge) prevents it. Holy and true peace can only revive again in a new world, when the old sinful world and the old guilt-stained gods now ruling it shall have been destroyed.—Others (among them Max Müller) see in the myth of B. a representation of the contest between Winter and Summer. Compare Weinhold *Die Sagen von Loki*, in Haupt's *Zeitschrift für Deutsches Alterthum* (Leip. 1849).

BA'LDNESS (*alopecia*). See HAIR. There are some rare cases on record in which the hair has never been developed. This is termed *congenital baldness*.

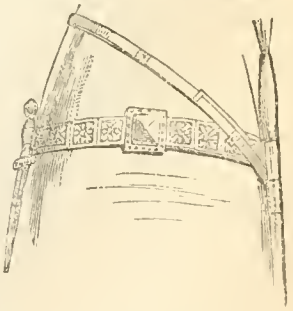
Accidental baldness may involve the whole scalp, or may be only in patches; these patches may run into each other, and hence some consider this condition a species of ringworm. It is caused, says Mr. Erasmus Wilson, by an atrophy of the hair-follicles (q. v.). B. in the comparatively young and middle-aged may occur from wearing waterproof caps, which, by preventing evaporation from the head, occasion an unhealthy state of skin. Naval and military officers are liable to B. arising from this cause.

Senile baldness (calvities) is not necessarily the consequence of age—it may arise, like the preceding variety, from an atrophy of those parts on which the hairs depend for nutrition. It generally commences on the crown of the head, where the supply of blood is naturally less abundant. Women have a greater quantity of soft tissue under the skin, therefore the vessels are less likely to be interfered with; hence they are not so frequently bald as men.

The causes of B. are the defective supply of nutrition just mentioned, a family tendency, late hours, dissipation, but especially old age. The hair falls off after severe illness, or after other causes of general debility. During pregnancy the hair falls out; and in this country we often see the long hair of young women, victims to consumption, almost completely shed.

Treatment of baldness consists in attention to cleanliness, and in exciting the languid circulation of the scalp to greater activity, by using a hard hair-brush and the application of stimulants, as the Spanish-fly ointment in the proportion of two drachms to an ounce of lard mixed with about the same quantity of pomatum. Or the stimulants may be applied in the form of lotions. But at the same time constitutional debility should be remedied by attention to the various functions of the body; tonics should be administered; and, if possible, causes of anxiety or night-watching should be avoided. Shaving the whole head is sometimes resorted to. If these remedies are successful, downy white hair, like that of an infant, begins to grow, which may or may not acquire the color and vigorous appearance of the former growth.

BA'LDO, MO'NTÉ, a mountain of Lombardy, on the east of Lake Garda, with an elevation of 7100 feet. It contains interesting petrifactions, and the fine green sand known as the sand of Verona.


Baldrick.

BA'LDRICK, or BAU'DRICK (Fr. *Baudrier*), is a band or sash worn partly as a military and partly as a heraldic symbol. It passes round the waist as a girdle, or passes over the left shoulder, and is brought down obliquely under the right arm, or is suspended from the right shoulder in such a way as to sustain a sword. Many of the effigies of knights contain representations of the B., more frequently as a belt than a shoulder-sash. Queen Victoria frequently wears a blue silken B. on state occasions. The name is derived from the *balteus* of the Roman soldier.

BA'LDUNG, HANS, called also Hans Grün, a German painter and wood engraver, a contemporary of Albert Durer, to whom, in expression, coloring, and finish, he was little inferior as a painter. He was born in Gmünd, Swabia, about 1470, and died in Strasburg in 1552. His master-piece, a painting of the Crucifixion, is in the cathedral of Freiburg; his wood engravings are numerous.

BA'LDWIN I., the first Latin emperor of Constantinople, was born at Valenciennes in 1171 A. D., his parents being Baldwin, Count of Heinault, and Margaret, Countess of Flanders.—In 1193, he succeeded to his mother's possessions, and in the year following, to the title and county of his father. In 1200, he appointed his brother Philip, along with other persons, to the regency of Heinault and Flanders, and joined the fourth Crusade. Part of the Crusaders—B. among others—were induced to assist the Venetians in reconquering Zara, in Dalmatia, from the king of Hungary. While at Zara, the young Alexis, son of Isaac II., emperor of Constantinople, craved the assistance of the Crusaders against his uncle Alexis Angelus, who, having deposed and blinded Isaac II., had usurped the throne. In return for their aid, he promised them a liberal sum of money, and also to help them to recover Palestine. The Crusader agreed, and soon defeated the usurper's forces, and restored the rightful emperor; but Alexis having some difficulty in carrying out his promises, they turned their arms against him. A revolution breaking out in the city at the same time, Alexis the younger was murdered, and his father is said to have died of grief. Alexis Ducas Murzuphlus then usurped the throne, but was defeated by the Crusaders, and the city was sacked—the Crusaders and Venetians sharing the booty. B. was chosen emperor, and crowned on the 9th May 1204; but he received only about the fourth part of the empire—Constantinople and Thrace—the Venetians obtaining the greater share of the provinces. A part also fell to the French adventurers who accompanied the expedition, and several provinces remained in the hands of Greek princes. The abilities of B.—and they appear to have been of a superior character—were not able to cope with the evils necessarily attending so anomalous a position. The Greeks were discontented, and, backed by Calo-Joannes, king of Bulgaria, while B.'s brother, with the flower or his troops, was away on an expedition in Asia, they rose and massacred the Latins scattered throughout the town of Thrace, and made themselves masters of Adrianople. B. laid siege to the town with the forces he had at his disposal; but he was defeated and taken prisoner by the Bulgarian king, and died about a year after (1206) in captivity. He was succeeded by his brother Henry.

BA'LDWIN II., emperor of Constantinople, was born in 1217. He was the son of Peter de Courtenay and Yolanda, Countess of Flanders, sister of Baldwin I. Being but 11 years old when, by the death of his brother Robert, he succeeded to the throne, he was placed under the guardianship of John of Brienne, titular king of Jerusalem, who died about 1237. B. then assumed the rod of empire, but he had neither the means nor the ability to wield it successfully against his powerful Greek and Bulgarian opponents. Two begging-visits to Western Europe, in one of which he left his son Philip in pledge at Venice for a debt, and disposed of several most holy relics for money, were not successful in procuring him sufficient forces to resist his foes; and on the night of the 15th of July, 1261, his capital was taken by one of the generals of Michael Palæologus, ruler of Nicæa, and B. fled to Italy. With him terminated the Latin Empire in the East, after it had lasted 57 years. His descendants for more than a century retained the title of emperor.

BA'LDWIN I., king of Jerusalem, 1100—1118, was born in 1058. He was the youngest brother of Godfrey de Bouillon (q. v.), Duke of Lower Lorraine or Brabant. He took part in the first Crusade; but having quarrelled with Tancred, he retired to Edessa, at the request of the Christian inhabitants of the place, and was soon after elected to be Count of Edessa. After the death of his brother Godfrey, in 1100, he became Protector of the Holy Sepulchre, and Baron of Jerusalem, and immediately assumed the regal title, which his brother had refused. He conquered Cæsarea, Ashdod, and Tripolis, and with the assistance of a Genoese fleet, he became master also of Acre, and subsequently of Sidon, but failed to reduce Ascalon. He died in 1118. Unlike his brother, who was a disinterested enthusiast, B. was worldly and ambitious.—BALDWIN II. (Baldwin du Bourg), cousin of Baldwin I., who had made him Count of Edessa when he ascended the throne of Jerusalem, succeeded him, and reigned from 1118 to 1131. During his reign Tyre was taken, in 1124, with the assistance of a Venetian fleet; and the order of the Templars was instituted. Having been taken prisoner by the Turks, B. endured a captivity of six months. He died on the 21st of August, 1131, leaving four daughters.

Shortly before his death he resigned the crown in favor of his son-in-law, Foulques of Anjou, who reigned till 1134.—BALDWIN III., king of Jerusalem, 1143—1162, the son and successor of Foulques of Anjou, was born in 1129. He was a model of knighthood which, during the period of the first Crusades, was a personification of Honor, Justice, Devotion, and Love. Edessa was lost to the Christians during his reign. In 1152, he fought victoriously at Jerusalem against Noureddin, the sultan of Aleppo. In 1157, after he had defeated the same prince at Jacob's Ford, on the Jordan, he again humbled him severely near Putaha. After this, he ruled in peace, and endeavored to improve both the external and internal defences of his kingdom. The authority and influence of B. were so great, that even Saracens followed under him the banner of the Cross. By his marriage with Theodora, the daughter of the Greek Emperor Manuel, he gained a faithful ally in that prince. He died, it is believed, of poison, in the flower of his age, at Tripolis, in Syria, on the 10th of February 1162. With his death the Christian power in the east began to decline. He was succeeded in the government by his brother Amalric or Amaury, who died in 1173.—BALDWIN IV., the son and successor of Amalric, surnamed the Leper, reigned till 1183.—When a child of 5 years old, BALDWIN V., the son of Sybilla, sister of Baldwin IV., was called to the throne. He died in 1187, a year before Jerusalem was retaken by Saladin.

BA'LDWIN'S PHO'SPHORUS is a term applied to the nitrate of lime, which, on evaporation, parts with its water of crystallization, and then, as discovered by Baldwin in 1675, assumes a luminous appearance in the dark.

BALE, JOHN, Bishop of Ossory in Ireland, was born at the village of Cove, in Suffolk, in November 1495. He was educated as a Carmelite monk, but afterwards turned Protestant, and, being persecuted by the Roman Catholics, fled to Flanders, where he remained eight years, during which he wrote numerous works. He was recalled by Edward VI., and successively presented to the living of Bishopstoke, in Hampshire, and the bishopric of Ossory. In this latter sphere he made himself so obnoxious to the Catholics by his zeal in the Protestant cause, that on news of the death of Edward, his house was attacked, and five of his servants killed. He himself escaped out of the country after great difficulty, and the loss of all his effects. On the accession of Elizabeth he returned to England, and was made a prebend in the Cathedral of Canterbury. He died in 1563. His fame mainly rests on a collection of British Biography, which, notwithstanding that sections of a book are not unfrequently set down in it as distinct works, and that the names of persons who never wrote anything are set down as authors, is a valuable work. It was first published in 1548 under the title of *Illustrium Majoris Brittaniæ Scriptorum, hoc est, Angliæ, Cambriæ, et Scotiæ Summarium.*

BÂLE. See BASEL.

BALEA'RIC ISLES, a group of five islands—Mallorca (Majorca), Minorca, Iviza, Formentera, Cabrera—lying off the coast of Valencia, in lat. 38° 4′—40° 5′ N., and long. 1°—5° E. They at one time formed the kingdom of Mallorca, which was united in 1289 with the crown of Aragon. They now form a Spanish province, and have unitedly an area of 1753 square miles, with a population, in 1877, of 289,035. The soil generally is good. Vines, olives, and other fruit-trees are cultivated abundantly; but corn has to be imported. The coasts are precipitous, with some excellent harbors — Port Mahon, in Minorca, being one of the finest in Europe. The Phœnicians visited the B. I. at a very early date, and they were followed by the Greeks, from one or other of whom they are said to have received their name. If from the Phœnicians, the name is derived from a Phœnician word equivalent to the Greek *gymnetas*, signifying light-armed troops; if from the Greeks, then it is from *ballein*, to throw, and was given because of the expertness of the natives in using the sling, to the use of which they were trained from their infancy. Later, the B. I. became subject to Carthage; but after a short period of freedom, during which their inhabitants became pirates, were annexed to the Roman empire by Metellus (*Balearicus*), 123 B.C. From that time their history is involved in that of the peninsula. See SPAIN.

BA'LE-FIRE. See BEACON.

BALFE, MICHAEL WILLIAM, an English composer of operas, &c., was born May 15, 1808, in Dublin. His musical talent received early culture, and several anecdotes are related of his singular precocity. When only seven years old, he played publicly one of Viotti's concertos for the violin. At nine, he wrote the ballad entitled *The Lover's Mistake*, which achieved popularity through the singing of Madam Vestris. At sixteen, he made his début in London, at the Drury Lane Theatre, as conductor of the orchestra. In 1825, he left this situation, in order to visit Italy, where he studied counterpoint under Frederici at Rome, and singing under Felippo Galli at Milan, and began his successful career as a composer, with music for the ballet *La Peyrouse*, performed at the Theatre La Scala, in Milan. In 1827, he returned to the stage, and sang in the Italian Opera at Paris, where in concert with Malibran and Sontag, he gained great applause, and many warm friends.

He, however, returned to Italy, and devoted himself to composition, producing in rapid succession the operas—*I Rivali* (1829), *Un Avvertimento* (1830), *Enrico IV.* (1831), *Siege of Rochelle* (1836), *Maid of Artois* (1836), *Joan of Arc* (1837), *Falstaff* (1838), *Keolanthe* (1841), *The Bohemian Girl* (1843), *Les Quatre Fils Aymon* (1844), *The Bondman* (1846), *The Maid of Honour* (1847), *The Sicilian Bride* (1852), *The Rose of Castile* (1857), *Blanche de Nevers* (1860), *The Puritan's Daughter* (1861), *The Armourer of Nantes* (1863), and

others. *Il Talismano* first saw the light in June 1874, nearly four years after B.'s death, which happened on October 20, 1870; and is perhaps his greatest work. Of the others named, *The Bohemian Girl* and *The Rose of Castile* have been most permanently successful. If B. was not a very original writer, he had a very thorough knowledge of effect and command of orchestral resources; and his compositions are distinguished by fluency, facility, and melodic power. See Kenney's *Memoir of Balfe* (1875).—His daughter, Mdlle. Victoria Balfe—who became Duchess of Frias in Spain—was for some years a very acceptable public singer both in England and on the continent. She died in 1871.

BALFOU'R, Sir James, Lord President of the Court of Session, and author of an able book, *Practicks of Scots Law*, was a son of Sir Michael Balfour of Pittendreich and Montquhany, in Fifeshire. In early life he was implicated in the conspiracy against Cardinal Beaton, and being in the Castle of St. Andrews when it surrendered, in 1547, he was carried prisoner to France in the same vessel with John Knox. About two years after, returning to Scotland along with other of his fellow-prisoners, he changed his religion, his apostasy gaining for him the appellation of the 'Blasphemous Balfour' from Knox, but unusual honors and emoluments from the queen and court. B. was sagacious enough to notice the increasing influence of Bothwell, and he immediately insinuated himself into his confidence, joined the conspiracy for the assassination of Darnley, and framed the bond for mutual support, signed by the conspirators.

He was afterwards accused by Lord Lennox as an accomplice in the murder of Darnley, but the trial was hurried over before proof of his guilt could be brought forward. In 1567, at the instance of Bothwell, he was appointed governor of Edinburgh Castle; and he repaid the kindness of that nobleman and the queen, by handing over to the confederate lords the celebrated letters upon which they endeavored to found Mary's guilt, and which had been given him by Bothwell for safe custody. He afterwards surrendered the castle to Murray, on certain conditions, in which his own safety and interests were the chief considerations. The great object of B.'s life appears to have been self-aggrandizement, without regard to the means by which that was accomplished. Accordingly, we find him the recipient of favors under the regency, as he was under the queen. He was made a privy-councillor, Commendator of the Priory of Pittenweem; and in exchange for the clerk-registry, he received the Lord Presidentship of the Court of Sessions, and a pension of £500. When Morton was made regent, B. contrived to curry favor with him, and received from him a commission to make a general digest of the law. Not feeling himself safe in Scotland, however, he left it for France, where he remained for some time. When the young king ascended the throne, he joined the party hostile to Morton, but again fled to France, when in 1579 Morton recovered his authority. In 1580 he returned, and was instrumental in obtaining Morton's death, by producing the deed compassing the murder of Darnley, which that nobleman, along with others, had signed. He died 1583.

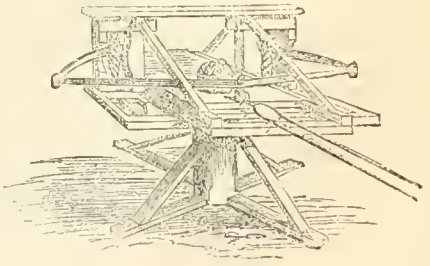
BALFRU'SH (or more correctly BARFURU'SH, 'mart of burdens'), an important commercial town in the Persian province of Mazanderan, and situated on the river Bahbul, about twelve miles from its mouth in the Caspian Sea. The river, which is here about fifty yards broad, but shallow, is crossed by a fine stone-bridge of eight arches. It is not navigated, all goods being landed at the port of Mesh-hedi-Ser, on the Caspian, from whence they are conveyed to B. by an excellent road. To the south of the town there is an artificial island, about half a mile in circumference, on which the palace of Shah Abbas formerly stood. B. has excellent bazaars, and several Mohammedan colleges; the population is variously estimated at from 50,000 to 200,000. The latter estimate was made by Fraser, who visited it in 1822, since which time it has been greatly depopulated by plague and cholera. Flax and cotton are much cultivated in the vicinity.

BA'LI, an island east of Java; area, 2300 square miles; pop. 760,000. B. is volcanic—its highest mountain, 12,379 feet, having been an active volcano as late as 1843. Agriculture is the chief employment. The inhabitants grow rice, indigo, cotton, fruits, maize and edible roots, and possess buffaloes and cattle. Fish is plentiful. Coffee culture is extending; and of late its export from Bolèlêng, the trading capital, reached upwards of 20,000 cwts., valued at £60,000. B. is well situated for trade. The Balinese are a superior race, and speak a language related to Javan. They excel as sculptors, and in working gold, silver, and iron. Their religion is Brahmanism. Under the Dutch, the eight kingdoms are governed by native rulers. Chinese and a few Europeans are the chief traders.

BA'LIOL, John, Lord of Galloway, and afterwards King of Scotland, was born in 1259, and on the death of Princess Margaret in 1290, became a competitor for the crown of Scotland. As the grandson of the eldest daughter of David Earl of Huntingdon, brother of William the Lion, his claim was pronounced superior to that of the other principal competitor, Robert Bruce, Lord of Annandale, son of the second daughter. The arbiter on the occasion was Edward I. of England who found this a fit opportunity for asserting his claim as lord-paramount of Scotland. That claim was acknowledged by the Scottish estates in submitting the contest to his decision; and, consistently with this ignominious submission, B., before and after receiving the crown (November 30, 1292), swore fealty to Edward as his feudal superior. He was soon made to feel that his sovereignty was merely nominal, and, abject as he had shown himself, the indignities which he experienced at length roused him to an assertion of his rights as king. In 1295 he took upon him, by the advice of his nobles, to conclude an alliance with France, then at war with England. This act of revolt was followed by speedy chatisement. Edward invaded Scotland with a large force; defeated the Scottish troops; took B. prisoner, and compelled him, after performing a humiliating penance, formally to surrender his crown, July 2, 1296. B. was confined for three years in the Tower, enjoying however, a limited freedom, and something of royal state. At the end of that time he was permitted to retire to his patrimonial estates in Normandy, where he died in 1314, a short time after the battle of Bannockburn. The estimate by his subjects of this unfortunate and poor-spirited prince was significantly indicated, by the surname of 'Toom Tabard,' or Empty Jacket.

BA'LIOL, Edward, son of John, makes himself momentarily conspicuous in history by his daring and successful invasion of Scotland, then under the regency of Randolph, Earl of Moray, in 1332. Accompanied by some English noblemen bent on recovering their forfeited estates in Scotland, he landed with a few hundred followers at Kinghorn, in Fifeshire; defeated the Earl of Fife; pushed boldly into the country; and on Dupplin Moor, in Perthshire, routed with immense slaughter an army upwards of ten times more numerous than his own. On the 24th of September, seven weeks from the date of his landing, he was crowned king of Scotland at Scone. He had only enjoyed the kingly dignity for about three months, when he was surprised in his camp at Annan, and nearly lost his life as well as the crown he had so recently assumed. His subsequent career is the very reverse of what might have been anticipated from so adventurous a beginning, being marked only by weakness, servility and misfortune. He died at Doncaster in 1363, and with him ended the house of Baliol.

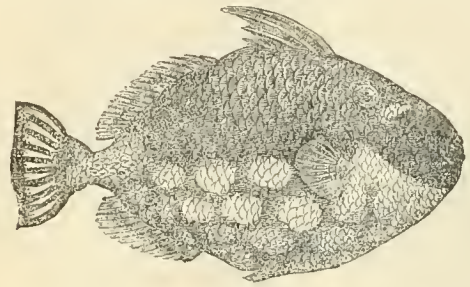
BALI'STA, or BALLI'STA (Gr. *ballein*, to throw), was one among the larger kinds of military weapons in use before the invention of gunpowder. The *B.*, the *catapulta*, the *scorpion*, and the *onager*, propelled large and heavy missiles, chiefly through the reaction of a tightly twisted rope of hemp, flax, cat-gut, sinew, or hair; or else by a violent movement of levers. The scorpion was a kind of large crow-bar; the B. threw stones; the catapulta threw heavy darts or arrows, and was somewhat smaller than the Balista. One man could manage the scorpion, but two or more were needed for the B. or the catapulta. There was a good deal of mechanism necessary to bring about the propulsive force. The makers of those machines were very particular in the choice of women's hair, the sinews of a bull's neck, and the tendons of the deer, wherewith to fashion the elastic cord. The onager was a kind of B., which threw a stone by the agency of a sling instead of a stretched cord. The early chroniclers tell of catapultas that would throw an arrow half a mile, or hurl a javelin across the Danube; and of a B. which threw a stone weighing 360 lbs. Numerous other weapons of an analogous character were known in the middle ages—such as the *mangonel;* the *trebuchet*, which threw a large stone by the action of a lever and a sling; the *petrary*, which, (as its name implies) threw a stone; the *robinet*, which threw darts as well as stones; the *mate-griffon* and *mate-funda*, both slinging-machines; the *tricolle*, which hurled quarrels, or square-headed arrows; the *espringal* or *springal*, which threw large darts; the *ribaudequin*, a large kind of cross-bow; the *war-wolf*, a stone-throwing machine, &c. The Arbalest (q. v.) may be regarded as a small portable arrow-throwing Balista.



Balista.

BALI'STÉS, or FI'LE-FISH, a genus of osseous fishes of the order *Plectognathi* (q. v.) of Cuvier; the type of a family, *Balistidæ*, the species of which are almost all inhabitants of tropical and sub-tropical seas, frequenting rocky coasts and coral-reefs. Their colors are generally brilliant. The body is remarkably compressed. The ossification of the skeleton, as in the other Plectognathi, is

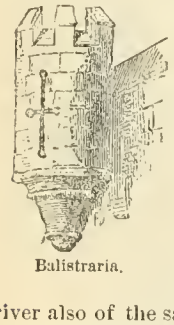
very incomplete, and the external covering of the body resembles that of the Ganoid (q. v.) fishes, consisting, in some of the genera, of large rhomboidal scales, disposed in regular rows, and not overlapping; in others, of very small rough scales, with stiff bristles, as densely crowded as the pile of velvet. But the most interesting thing in connection with these fishes, is the provision for fixing the first dorsal spine in an erect position, or lowering it at the will of the animal. The spine is articulated 'by ring and bolt to the broad interneural osseous plate.' 'When the spine is raised, a depression at the back part of its base receives a corresponding



Balistes conspicillum.

projection from the contiguous base of the second ray, which fixes it like the hammer of a gun-lock at full cock, and it cannot be let down until the small spine has been depressed, as by pulling the trigger; it is then received into a groove on the supporting plate, and offers no impediment to the progress of the fish through the water. This trigger-like fixing of the spine takes place also in the dead fish; and when a B. is removed from the bottle for examination, it is generally necessary to release the spine by pressing on the small trigger-ray.' The spine is roughened with enamel grains, whence the name File-fish. The flesh of these fishes is generally regarded as unwholesome.

BALISTRA'RIA (Ital. *Balestriera*), one of the names given to those narrow apertures so often seen in the walls of old castles, and through which the cross-bowmen discharged their arrows. See BALISTA. B. do not seem to have come into use till the 13th c. The lower terminations of B. are generally circular, sometimes in the form of a shovel. See LOOPHOLES.



Balistraria.

BALI'ZE, BELI'ZE, or BRITISH HONDURAS, a British colony on the Bay of Honduras, in the Caribbean Sea, extending in N. lat. from 16° 45′ to 18° 30′, and in W. long. from 88° 10′ to 89°. It forms the south-east part of the peninsula of Yucatan, which here divides the Caribbean Sea from the Gulf of Mexico. Its area is 13,500 square miles. In 1881, the population was 27,452, of whom about 500 were whites; nearly half of the whole being in the town of B., which stands at the mouth of a river also of the same name. The Balize traverses the middle of the country for about 200 miles, and the Rio Hondo and Siboon form respectively its N.W. and S.E. boundaries. The early British settlers were frequently attacked by the Spaniards; but since 1798, when they repulsed a fleet and land-force of 2000 men, their occupation has been formally acquiesced in. Since 1862, B. has ranked as a British colony, and has had a governor and local magistrates. The country has a general tropical fertility, but its chief exports are mahogany, sugar, coffee, cotton, india rubber, and logwood with other dye-stuffs. B., the capital, is a depôt for British goods for Central America, and has a varying pop. of 8000 to 15,000.

BALKA'N, or HÆ'MUS, the eastern branch of that mountain-system which comprehends the ranges of Montenegro, Herzegovina, and the Dinaric Alps. It extends from the plain of Sophia to Cape Emineh, on the Black Sea, and forms the southern boundary of the basin of the Danube, and dividing the principality of Bulgaria from Eastern Roumelia. Its highest summit, Tchat-al-dagh, is 8340 feet above sea-level; but the general height of the range is about 4000 feet. Toward the Black Sea, the mountains become lower, and diversified with wooded slopes. They send several offshoots N. and S., and are of great strategical importance in the defence by Roumelia. The chief route across them is that of Trajan's Gate, which connects Constantinople with the west of Europe. The attempt by the Turks to regain possession of the Shipka Pass was one of the fiercest contests of the war of 1877.

BALKA'SH, or TENGI'Z (Tenghiz or Tenguiz), a lake near the eastern borders of Russian Central Asia, lat 45° and 47° N., long. 75° and 79° E. Its length is stated at about 300 miles, and its greatest breadth 75 miles. Its principal feeder is the river Ili. It has no outlet.

BALKH, a district of Afghan Turkestan, the most northerly province of Afghanistan. It was for some time subject to the Khan of Bokhara. It corresponds to ancient Bactria, and lies between lat. 35° and 37° N., and long. 64° and 69° E. It is bounded on the N. by the river Oxus, on the E. by Budukshan, on the S. by the Hindu-Kush, and on the W. by the Desert. Offsets of the Hindu-Kush traverse it in a north-west direction, and slope down to the low steppes of Bokhara. Its length is 250 miles; its breadth, 120. Its situation was once important during the overland commerce between India and Eastern Europe before the sea-route by the Cape of Good Hope was followed. The soil has the general characteristics of a desert land; only a few parts are made fertile by artificial irrigation; and such are the vicissitudes of climate, that where grapes and apricots ripen in summer, and the mulberry-tree permits the cultivation of silk, in winter the frost is intense, and the snow lies deep on the ground. The natives are Usbek Tatars; and their character seems to depend very much on that of the country. In the barren region, they are simply plunderers of caravans; in the more favorable ones, they are peaceful nomades; and in the most prosperous districts they are tillers of the soil, and artisans in towns and villages. Pop. estimated at about 1,000,000.

BALKH, the chief town, 23 miles from the Amu, is situated where the Rudi Haaj is distributed in numerous canals. It is surrounded by a mud wall; but though bearing the imposing title of Amu al Bulud ('mother of cities'), it has little of the grandeur of ancient Bactra, on the site of which it is built. It was twice destroyed by Genghis Khan and Timur; and as late as 1825, it was plundered by the powerful ruler of Kunduz, Mir-Murad-Bei. The neighborhood is famous for its corn and fruits. As a boundary town between Afghanistan and Bokhara, B. assumed a prominent position in the British-Afghan war. Pop. 2000.

BALL. Games with balls were among the most favorite gymnastic exercises of the ancients. They were played almost daily by all, young and old; by the highest statesman equally with the lowest of the people. The Greeks prized the game as a means of giving grace and elasticity to the figure, and erected a statue to one Aristonicus for his skill in it. The effeminate Mæcenas amused himself during a journey by playing B., as we learn from Horace. In the gymnasia of the Greeks, and in the Roman baths, there was a special compartment for B.-playing (*sphæristerium*), where certain rules and gradations of the exercise were to be observed according to the state of health of the player. The balls were of very various kinds; they were generally of leather, and filled with air; others were stuffed with feathers. Ornamented balls, composed of 12 differently colored segments (such probably as are to be seen in modern toy-shops), are mentioned in Plato's *Phædon*. There was also great variety in the kinds of game, each having a name. In one, the B. was thrown up, and the players strove who could catch it as it fell; another was the same as our foot-ball; in a third, a number of persons threw it at one another, either with a view to hit, or for the B. to be caught and returned; in a fourth, the B. was kept rebounding between the earth and the palm of the player's hand as often as possible.

Ball-playing seems to have been of equal antiquity in the west of Europe, and to have come down uninterruptedly to modern times. In the 16th c., it was in great favor in the courts of princes, especially in Italy and France. The French *jeu de paume*, and the English *Tennis* (q. v.), are often mentioned. Houses were built for playing in all weathers; and in gardens and elsewhere long alleys were laid out for the purpose, the names of which still adhere to many localities. The B. was struck with a mallet—It. *maglia;* Fr. *mail* or *maille;* Eng. *mall*. The mallet was also called by the compound name *pall-mail, pell-mell*, or *pall-mall*, from It. *palla* (Lat. *pila*), a ball. The same names signified also the game or the alley where it was played; hence the English Malls and Pall-Malls. The game is thus described in *Blount's Glossographia*, quoted in Cunningham's *Handbook of London:*

'Pale Maille (Fr.), a game wherein a round bowl is with a mallet struck through a high arch of iron (standing at either end of an alley), which he that can do at the fewest blows, or at the number agreed on, wins. This game was heretofore used in the long alley near St. James's, and vulgarly called Pell-Mell.'

Towards the end of the 18th c., the game of B. ceased to be played at courts, and at the same time went out of fashion in the higher circles of continental society, though it is still practised by the people in Spain and Italy. The forms of it called *Cricket* (q. v.), *Golf* (q. v.), *Football* (q. v.), *Fives* (q. v.), *Lawn-tennis, Polo*, &c., are more or less practised throughout Great Britain.

For cultivating graceful motion, agility, and strength, as well as promoting general health of body and cheerfulness of mind, B.-playing is one of the best gymnastic exercises. Ancient physicians were in the habit of prescribing a course of balls to their patients where most modern doctors would likely prescribe *pills;* and in this point at least the ancient practice might be copied with advantage.

BALL. In the somewhat indefinite language of the military and naval arts, all kinds of shot and bullets are occasionally called by the collective name of *ball*. This was especially the case when nearly all such projectiles were solid and spherical, before the era of hollow and spheroidal shells. At present, when the varieties are so numerous, it is more usual to employ the terms BULLET and SHOT (q. v.). These, together with SHELL, are subdivided into numerous kinds, the most important of which will be found noticed under their proper designations. A particular class of spherical combustibles is described under BALLS. For BALL-CARTRIDGE, see CARTRIDGE.

BALL (Fr. *bal*), a dancing entertainment. In England there are county balls, attended by the gentry of the shire or county, military balls, court balls, subscription balls, besides balls on various festive occasions. Whether designated balls or assemblies, these entertainments are conducted with great decorum, according to certain established usages. If of a general kind, it is expected that those who avail themselves of tickets shall be of undoubted respectability; and, as a further voucher of propriety, a number of lady-patronesses (married ladies of distinction) take a lead in the management, and grace the assembly by their presence. Ordinarily, the charge for gentlemen's tickets at subscription balls is at least two thirds higher than those for ladies. According to etiquette, no unmarried lady can attend a ball unless she accompany a gentleman, or a married lady. All, of both sexes, are expected to be in full dress—anything else would be held disrespectful. Fancy balls are entertainments at which every person attending is expected to be in a fancy or peculiar national costume; in other respects, they are conducted like ordinary balls. Masked balls, once so common, have now, for obvious reasons, lost their repute. At all high-class balls, there is an appointed master of the ceremonies, or 'director,' who superintends the proceedings, and, in the event of there being no programme, prescribes the dances.

BALLACHU'LISH, a *quoad sacra* parish, partly in Argyle and partly in Inverness shires. In the Argyleshire part of the parish, 11½ miles south-south-west of Fort-William, on the south side of Loch Leven, an east branch of Loch Linnhe, are the celebrated quarries of blue roofing clay-slate. These quarries, which have been wrought for some time previous to 1760, employ from 200 to 300 men. White and gray marble quarries exist also in the neighborhood.

The slate is exposed on the mountain-side, and the quarries, commencing on the shore, extend southwards along the side of the mountain. The face of the rock is laid open by three workings fronting the west, and rising one above another in successive step-like terraces, all of them being entered from the north end of the bed. The height from the lowest terrace to the top of the workings is about 216 feet, and the face of rock wrought about 536 feet. The situation of the quarries permits the water and débris of broken and waste slate, which amounts to about six times the quantity of saleable material raised, to be at once got rid of into the sea. A few years ago, the annual produce amounted to from 5,000,000 to 7,000,000 of roofing-slates, weighing about 10,000 tons. The village of B. contained in 1881, 1019 inhabitants.

BALLAD. The name is of Italian origin (*ballate*), and meant originally a dance-song, being derived from the mid. Lat. *ballare* or *balare*, corresponding to the Gr. *ballizein*, to dance. The B. is a kind of poem which it is very difficult to characterize. In the course of centuries it has undergone various transformations, and the name has been transferred to pieces which in extent, subject, and character have no longer anything in common with the primitive ballad. The confusion of ideas was rendered still worse from the circumstance that poems of exactly the same nature were styled sometimes romances, sometimes ballads, sometimes epic or lyrico-epic, or poetic narratives; so that it was left to the caprice of the poet which of these generic names he would give to his production. As early as the 12th c. the Italians gave the title of B. to short, purely lyrical pieces, allied to the sonnet or still more to the madrigal, and which generally had love-sorrows for their subject. Dante has such *ballate*. Akin to these are those French ballads which Molière set himself against, and which fell into disuse. The earliest ballads, as the word is now understood, are those of England, and of Scotland, beginning about the 14th c. They in so far resemble the Spanish Romances, that the subject in both is narrative, and handled lyrically. See LYRIC. The Spanish romance, however, has more of the lyrical element, and is of a gayer cast reflecting the southern character of the people; while the northern B. took a more earnest, sombre shape, especially among the Danes; though in the north also there are ballads of a cheerful and sportive tone.

As far as subject is concerned, the B. is a species of minor Epic (q. v.). The name is generally applied to a versified narrative, in a simple, popular, and often rude style, of some valorous exploit, or some tragic or touching story. Ballads are adapted to be sung or accompanied by an instrument. They are comparatively short, the story being circumscribed, and not embracing a combination of events, as the plan of the grand epic does. There can be little doubt that the B. has been the first form of poetry among all nations; and that the earlier epics or heroic poems of the higher kind, such as the Spanish Cid and the German Nibelungen, grew out of such simple beginnings. Of the popular B., Scotland, or more correctly the border-land of Scotland and England, is allowed to have produced the best examples—as *Chevy Chase*, *Fair Helen of Kirkconnel Lee*, and many others. As a B. of modern composition may be instanced Goldsmith's *Edwin and Angelina*.

Many of the old popular songs of the Germanic nations are just narratives of epic events and incidents in which the feelings of the composer manifest themselves. But the name of B. was not then in use, and such poetical narratives were called simply songs, or more specifically perhaps *lays* (Ger. *lieder*). It was not till the last half of the 18th c. that the foreign name was transferred to them.

The B. has, in recent times, been cultivated chiefly by the Germans, and in their hands it has assumed a more artificial development. Bürger may be said to be the creator of the modern ballad. He was intimately acquainted with the more simple Scotch and English B. poetry; but while adhering to its spirit, he gave to his own compositions a far wider extent, surrounded his narration with descriptions of scenery and other decorations, and by means of dialogue imparted to them the vivacity of the drama. His *Leonore* has become at once classical and popular. Bürger, Schiller, Göthe, and Uhland are the greatest German names in this department of composition. Following the practice of these writers, it has become common to confine the name B. to an epic narrative with something fabulous and supernatural in the background. In this sense, Göthe's *Erlkönig* is a ballad; and Coleridge's *Ancient Mariner* is perhaps the best exemplification in English.

BALLARAT, the oldest of the *considerable* gold-fields of Victoria, and in fact the oldest but one of all the gold-fields of the colony. It is about 100 miles west-by-north of Melbourne. It was first worked in September, 1851, the comparatively unimportant ground at Anderson's Creek, which dated from August of the same year, having been the earliest result of the 'prospecting' which, a few months previously, had been stimulated by the newly-discovered 'diggings' of New South Wales. Though B. was speedily rivalled by Mount Alexander and Bendigo, yet it has by no means lost its original pre-eminence. As its surface-digging became exhausted, mines were formed—some of them now as deep as average English coal-pits. B. (also spelt *Ballaarat*), or B. West and B. East, separated by a small creek, are separate municipalities. The former had in 1881 a pop. of 22,425; the latter, 16,044. The total accordingly was 38,469 (of whom about 500 were Chinese). B. is connected by railway with Melbourne.

BA'LLAST is a heavy substance employed to give a ship sufficient hold of the water, to insure her safe sailing with spread canvas, when her cargo and equipment are too light. The amount of B. required by a ship depends not only on her size and cargo, but also on her build; some forms of construction require more B. than others. It is not merely the *quantity* of B. which a skilful mariner has to consider; he is required also to take in account its *distribution*. If a heavy mass of B. be deposited within a small compass near the keel, it places the center of gravity very low down; the ship will sail sluggishly, and is said to be 'stiff.' If, on the other hand, the B. be massed too high up, the ship becomes 'crank,' and cannot carry much sail without danger of being upset. Under average circumstances, it is considered that a ship is well ballasted when the water comes up to about the extreme breadth amidships.

In ballasting a ship, the cargo and B. are considered together, the quantity and distribution of the latter being dependent on the former. In a ship of war the B. is made subservient to the requirements of the necessary stores and war *material*; in a merchant or passenger vessel, to the convenience of the passengers and the careful stowage of the cargo. During the period of the Crimean war, the ships of the British navy were supplied with a certain conventional weight of B., according to size and armament. Thus, a 100-gun ship had 550 tons of B.; an 80-gun, 440 tons; a 50-gun, 235 tons; a 36-gun, 225 tons; a 20-gun, 110 tons, &c. The recent revolution in the sizes and shape of war-ships, however, and the introduction of steam-propulsion, have rendered all such fixity of ratio inapplicable.

The substances used as B. are various—chiefly iron, stone, gravel, sand, mud, and water. Iron is now superseding the next three varieties in ships of any importance; and water-ballast is gradually being introduced in the collier-ships of the Tyne, Wear, and Tees. Water-ballast is employed in four different ways. *Bag-water* B. is contained in water-proof bags laid on the floor of the vessel, and filled or emptied by means of a pump and a hose. *Bottom-water* B. is confined beneath a false bottom in the vessel. *Hold-water* B., first employed in screw-steamer colliers constructed by Mr. Scott Russell, is contained in a large recepta-

cle, which may be filled with the cargo when the ship is not in B. *Tank-water* B. is contained in two fore-and-aft tanks, which can easily be filled and emptied. The customs' laws relieve merchant-ships from certain formalities and payments when leaving a port in ballast.

The term B. is employed by civil engineers to signify the sand or gravelly material which is laid as a packing between railway-sleepers, in order to give them solidity. No English railway is considered to be complete, or safe for transit until it is dressed and finished by ballasting. The possibility of procuring ballast at a cheap rate, considerably affects the cost of railway undertakings.

BA'LLAST HEA'VING has reference to the use of sand or mud ballast. In order to prevent captains from filling up, or otherwise injuring the entrance to rivers, ports, havens, roadsteads, &c., by the discharge of ballast, certain regulations have been made at most maritime places as to its disposal. The Trinity House Corporation has a peculiar jurisdiction over the bed of the Thames, and regulates all the proceedings touching the reception and discharge of ballast. Before the use of water-ballast, the collier captains ballasted their empty ships with gravel or sand, mostly dredged up from the bed of the Thames in and near Woolwich Reach. Generally about 10,000 tons per annum were thus used. The ballast-heavers were men employed by the Trinity House Ballast-office in transferring sand from the bed of the Thames to the empty ships. When the collier vessels returned to the Tyne or its neighborhood, they were not permitted to empty the sand in the river, but were under penalties to discharge it on shore. This is the origin of the vast mounds, or sand-hills on the banks of the Tyne, which have been made very useful in the construction of railways. Ships coming into, as well as those leaving the Thames in ballast, are equally subject to Trinity House control. The Ballast-office Corporation of Dublin has similar powers in reference to the river Liffey.

BA'LLATER, a village of Aberdeenshire, Scotland, on the banks of the Dee, 36 miles west-south-west of Aberdeen. It is remarkable as the resort of numerous visitors, on account of its chalybeate springs. Pop. (1881) 759.

BA'LLENY ISLANDS, a group of five small volcanic islands discovered in the Antarctic Ocean, 1839. Lat. 66° 44′ S., long. 163° 11′ E.

BA'LLET (of similar derivation with the word *ball*—see BALLAD), a species of dance usually forming an interlude in theatrical performances, but confined principally to operas. Properly, a B. is a theatrical exhibition of the art of dancing in its highest perfection, and must therefore, in general, comply with the rules of the drama as to its composition and form. The pantomimic sacrificial dances of antiquity, although they may be regarded as the source of Attic tragedy, are not to be considered as directly the origin of the ballet. The B., as known to us, undoubtedly originated in the service of the courts. We find it existing in Italy in the beginning of the 16th c., especially at the court of Turin, where it was enriched by the inventive genius of Count Aglio; and where the princes and princesses of the court themselves took part in it, in song and declamation as well as in dance; for the B. at first appeared in combination with the other theatrical arts, and completed the chaotic medley exhibited in these spectacles, which were at once mythological, allegorical, fantastic, warlike, and pastoral. From these mingled elements the individual species of dramatic entertainments were gradually evolved in their distinct forms. Baltagerini, director of music to Catharine de' Medici, was the first to introduce the B. into France, where it soon became such a favorite, that Louis XIII. danced in one of these ballets, and his example was followed by Louis XIV. in his youth. The latter made his last appearance on the stage in 1699, in the B. of *Flora*. Hitherto, the B. had always appeared in combination with the characteristic features of the opera, and even of comedy, as is evident from the works of Quinault and Molière, arranged by Lully. The art of dancing possessed then little dramatic expression, and still required to be introduced and explained by singing and recitation. In 1697, Antoine Houbart de la Motte undertook to reform the B., to which he imparted both dramatic action and the expression of passionate feeling. About this time, women first made their appearance in the B., as well as in plays and operas, which had till then been performed exclusively by men. There is no mention of any female B.-dancer of note before 1790. About the middle of the 18th c., Noverre separated the B. from the opera, gave it an independent dramatic form, and laid the foundation in his writings of an ingenious theory on the subject. The Mythological B., a relic of the magnificence of Versailles, came to an end during the Consulate, when it gave place to the newly invented Comic Ballets *Dansomanie*, *La Fille mal Gardée*, and the *Arlequinades*. Vincenzo Galeotti, in Copenhagen, carried out the ideas of Noverre so far as to subordinate the dance to purely dramatic principles, instead of giving it the first place as formerly; and thus he gave to his ballets the character of great rhythmical pantomimes.

These splendid and talented performances were longest kept up in the theater of Milan, where the most lifelike and magnificent tableaux were exhibited in pantomime; and subjects were attempted far beyond the limits of the ballet. The story of *Hamlet* was turned into a B., and the subjects of several other tragedies were similarly treated. In general, the B. has now become unfaithful to its original design and its true artistic signification; and exhausts itself in the exhibition of mere feats of bodily agility, tasteless displays of artificial dexterity, distortions of the person almost to dislocation, and balancings of the figure in attitudes often indelicate. Consisting as it does more of external show than internal meaning, it contributes gradually to blunt the public taste for the enjoyment of the legitimate drama, which speaks more to the mind than to the eye.

Ball-flower.

BA'LL-FLOWER, so named from its resembling a ball placed in a circular flower; an ornament peculiar to the decorated style of Gothic architecture which prevailed in the 14th c. The B.-F. is supposed by some to be an imitation of a pomegranate, by others of a hawk's bell. Its form will be better understood from illustration.

BALLINA', a seaport town on the confines of Mayo and Sligo counties, Ireland, but chiefly in Sligo, on the Moy, 7 miles south of its entrance into Killala-Bay. The Moy runs through the town, is crossed by two bridges, and separates the two counties. B. proper is on the Mayo side, the Sligo portion being a suburb called Ardnaree. The tide runs up to the town, but the river is only navigable from the sea up to a mile and a half below Ballina. B. has a brisk trade in agriculture produce, salmon, and cured provisions. Coarse linens and snuff are manufactured here. Many anglers resort to the river Moy and Lough Conn. Killala Bay was the rendezvous of the French invaders in 1798. They landed, and took B., but were, three weeks afterwards, defeated at Killala. Pop. (1881) 5760.

BALLINASLOE', a small inland town on the borders of Galway and Roscommon counties, near the center of Ireland, on both sides of the river Suck—which divides the two counties—8 miles from its confluence with the Shannon, and 81 miles west of Dublin. The Suck at B. is divided into several channels, over which the road from Athlone to Galway is carried by a succession of bridges and causeways 500 yards long. B. is noted for its great annual fair in October, one of the largest in the kingdom. It is the seat of a poor-law union, and the station of the Galway militia staff. Pop. (1881) 4772.

BALLINRO'BE, a small town of Ireland, county Mayo, picturesquely seated on the Robe, about 3 miles from its mouth in Lough Mask, and about 16 miles S.S.E. of Castle Bar. B. is a seat of petty and general sessions, and has a union workhouse and a barrack. It has a weekly market and two annual fairs. Pop. (1881) 2286.

BA'LLIOL CO'LLEGE, Oxford, was founded between 1263 and 1268 by John de Balliol, father of John Balliol, king of Scotland. The original foundation consisted of 16 poor scholars, and the revenue for their maintenance amounted for many years to only 8d. per week for each. In 1340, the establishment was enriched by benefactions from Sir William Fenton and Sir Philip Somervyle, the latter of whom gave the college a new body of statutes. Its most important subsequent benefactors were Bell, Bishop of Worcester, in 1566; Will. Hammond, Esq., in 1575; Peter Blundell's executors in 1615 and 1676; Lady Periam, 1620; Warner, Bishop of Rochester, 1667; John Snell, Esq., 1677; and Mrs. Williams, 1830. The society consists of a master, 13 fellows, and 24 scholars. The number of members on the books is about 600. The master and fellows enjoy the privilege of electing their own visitor. John Wycliffe was master of this college in 1361; among its scholars have been John Evelyn, and Bradley the astronomer. The Snell Exhibitions for students of Glasgow University, attract annually to this college a few disguished Scottish students. Among these have been Sir William Hamilton, J. G. Lockhart, and Dr. Tait, Archbishop of Canterbury.

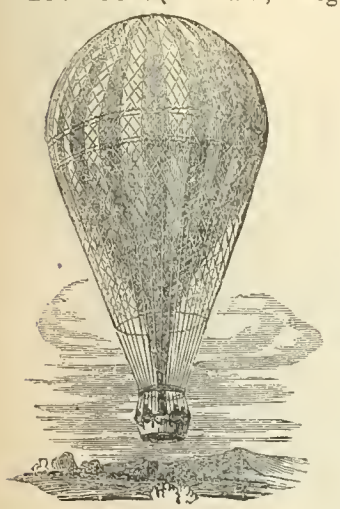
BALLI'STA. See BALISTA.

BALLI'STIC PE'NDULUM. An instrument so named was invented by Robins, in the latter part of the last century, to ascertain the velocity of projectiles, and to prove the quality of gunpowder. It consist of a large block of wood, suspended from a strong horizontal axis; and it is so solidly constructed as to bear the heaviest blow of the heaviest shot without injury. An excavated center on one side of the block is filled with sand, packed in leather upon an iron frame; four bags form a filling or core. The core, forming the place of impact, is easily replaced after each firing. Straps of wrought-iron suspend the block from the

wrought-iron axis or shaft. The shaft-ends have knife-edges, which rest on V supports. The construction is such, that a violent percussion makes only a very slight oscillatory movement in the block. A brass graduated limb measures the arc of vibration; and a brass slide is pushed forward by an index attached to a bar connected with the suspension straps. Another form of instrument for similar purposes is described under EPROUVETTE; and some of the results of these experiments are noticed under GUNNERY. See WAR-SERVICES.

BA'LLIUM. See BAILEY.

BALLOON (Fr. *ballon*, a large ball). According to the principle of Archimedes (q. v.), bodies immersed in a fluid are buoyed upwards with a force equivalent to the weight of the fluid displaced by them. If their own weight is not sufficient to counterbalance this force—that is, if they are lighter than the fluid—they rise upwards with a force equal to the difference of the weight of the displaced fluid, and of their own weight. A B., therefore, which consists of an integument enclosing a gas within it, will rise in air in the same way that a cork rises in water, provided that the weight of the whole be less than that of an equal volume of air. If one, for instance, occupy as much space as 1000 lbs. of air, but weigh itself—covering, gas, and appendages—600 lbs., it will be impelled upwards with a force of 400 lbs. The gases employed for filling balloons are either hydrogen or ordinary coal-gas. The former, when pure, is between fourteen and fifteen times lighter than atmospheric air, and the latter generally about two and a half.



Balloon.

The B. as it is at present employed, is a large pear-shaped bag, made of any pliable silk cloth, covered with a varnish, made by dissolving caout-chouc in oil of turpentine, to render it air-tight. The common size of this bag varies from 20 to 30 feet in equatorial diameter with a proportionate height. The mouth or neck of this bag is just large enough to enable a man to get inside to make any necessary repairs, and is, of course, turned downwards when the B. is inflated. A net-work of hempen or cotton twine is accurately fitted to the B., and the separate cords, on which it ends, are tied to a circular hoop placed a few feet below the neck. The car, generally a large wicker-basket, is suspended by ropes from this hoop, and hangs at a considerable distance, below, so that the aëronaut may be removed from the vicinity of the gas. The net-work serves to distribute the weight of the car and its charge equally over the whole upper surface of the balloon. One of the most important requisites in the construction is the valve, which is introduced into the top of the balloon. It consists of a wooden clapper, four or five inches square, opening inwards and kept closed by a sufficient spring. A rope attached to this valve descends through the neck into the car, where, to prevent accidental opening, it is allowed to dangle freely. The furniture of the car are the ballast or sand-bags, by emptying which the B. may be lightened; the barometer, or corresponding apparatus for telling the height ascended, or the upward or downward course of the B.; the map and compass for showing the direction of the voyage; and the grappling-iron tied to the end of a long rope, for anchoring the B. at the descent. During his flight, the aëronaut has at his disposal the means of guiding his air-ship only in an upward or downward direction, the motion of translation being wholly dependent on the wind by which it is borne. If he wishes to ascend, he throws some of the ballast over the side of the car; and if to descend, he pulls the valve-rope, so that, the gas rushing by virtue of its specific lightness through the passage made for it by the open valve, the buoyant material may be lessened. It is evident that the power of thus directing his machine becomes more limited with each exercise of it, for in each case there is an unrepaired loss of the means necessary to it. All attempts at guiding balloons in a horizontal direction have hitherto proved failures. In ordinary flights, the mouth of the B. is left open, so that there is no danger of explosion arising from the expansion of the gas in the rarer regions of the atmosphere. The diffusion that takes place through the open neck is inconsiderable during the few hours that an aërial voyage lasts. Early aëronauts, who kept their balloons closed, frequently ran considerable risk by inattention to the valve when the imprisoned gas demanded vent for its expansion.

The art of traversing the air by means of balloons, generally called Aëronautics, and sometimes Aërostation, is of comparatively recent date. The germ of the invention of balloons is to be found in the discovery of Cavendish, in 1766, of the remarkable lightness of hydrogen gas, then called inflammable air. Professor Black, of Edinburgh, seems to have been the first who conceived the idea that a light envelope, containing this gas, would rise of itself. He requested Dr. Monro, the professor of anatomy, to give him some thin animal membrane for the experiment, but for some reason or other, it was never made. The first practical attempts were made by Cavallo, who, in 1772, filled swine's bladders and paper-bags with the gas, but found the former too heavy, and the latter too porous; and he only succeeded in raising soap-bubbles inflated with the gas. The invention of the B. is due to two brothers Stephen and Joseph Montgolfier, paper-makers at Annonay, in France, whose names are as distinguished in the development of their own branch of manufacture as in the history of aëronautics. It immediately struck these brothers, on reading Cavendish's *Different Kinds of Air*, that the air could be rendered navigable by enclosing a light gas within a covering of inconsiderable weight. Led by their avocation, they fixed upon paper as the most fitting material for the purpose, and first attempted to make balloons of paper filled with inflammable air. Finding that these emptied themselves almost as soon as they were filled, instead of abandoning the paper as an unsuitable covering for the gas, they sought after another gas more suited to the paper. By a chain of false reasoning which need not here be detailed, they thought they found such in the gas which resulted from the combustion of slightly moistened straw and wool, which had, as they imagined, an upward tendency, not only from its being heated, but from its electrical properties, which caused it to be repelled from the ground. It is hardly necessary to say, that this so-called Montgolfier gas possessed no advantages for raising balloons other than that possessed by heated air of any kind; in fact, the abundant smoke with which it was mixed, by adding to its weight, rather detracted from its merits. At Avignon, in November 1782, Stephen Montgolfier first succeeded in causing a silk parallelopiped, of about 50 cubic feet, to rise to the roof of a room. Encouraged by this success, the brothers made experiments on a larger scale at Annonay with an equally happy result; and finally, in June 1783, in the presence of the states of Vivarais, and of an immense multitude, they raised a B., 35 feet in diameter, to a height of 1500 feet. This last, nearly spherical in shape, was made of patchcloth, covered with paper, and was heated by an iron chaffer placed beneath it, in which 10 pounds of moist straw and wool were burned.

The news of this extraordinary experiment soon reached Paris, where it produced a most lively impression. A commission was appointed by the Academy of Sciences to report upon it. Public curiosity, however, could not await the tardy decision of this body, and accordingly a subscription was entered into to defray the expense of repeating the Annonay experiment. Such was the excitement that the subscription was filled in a few days, and the construction of the B. was intrusted to the brothers Robert, famous philosophical instrument-makers of the day, and to Professor Charles, a young but experienced physicist. As the detailed account of the Annonay ascent had not reached Paris, and as nothing was therefore known of the Montgolfier gas, Charles fixed upon hydrogen as the gas most likely to insure success. It was, however, a formidable undertaking to produce it in sufficient abundance for a B., as it was at that time only dealt with in small quantities in the lecture-room. By ingenuity and perseverance combined, he triumphed over this difficulty, and succeeded in filling, in the course of four days, a silk globe of 12 feet in diameter. This B. was transferred to the Champs de Mars, the largest open space in Paris, where, on the 27th of August 1783, it ascended in the presence of 300,000 spectators, half the population of the city. At the instance of the commission already referred to, Stephen Montgolfier constructed a fire-B., 72 feet high, and 41 feet in diameter. It ascended before the commission on the 12th of September 1783, but being held captive, it was much injured by a violent wind, which blew at the time, and after it descended it was finally broken up by heavy rains. Another was made of nearly the same dimensions, which ascended on the 19th of the same month at Versailles, the king and royal family 'assisting' at the spectacle. This ascent is worthy of note, from the fact that a sheep, a cock, and a duck were placed in an ozier-basket attached to the lower part of the B., and that these first aërial voyagers reached the ground again in safety.

The B. was now a *fait accompli*, and it began to be seriously discussed whether it might not be serviceable as an air-ship for bearing men aloft as passengers. The solution of this question was first given by Pilâtre des Rosiers. In a Montgolfière, as the heated air-B. was called, 74 feet high, and 48 feet in diameter, supporting at its base a gallery of wicker-work, he, in company with the Marquis d'Arlandes, made the first aërial voyage, 21st November 1783. They remained in the air twenty-five minutes,

and sailed across the Seine and over a considerable part of Paris. The year 1783, so fertile in the annals of aërostation, was destined not to pass away without witnessing an additional, and even more satisfactory triumph.

On the 1st of December, Professor Charles, along with Robert, rose from the Tuileries gardens with a hydrogen B.—then called a *Charlière*—made from the proceeds of a public subscription. This B. was made of alternately red and yellow gores of silk sewed together, and coated with caout-chouc varnish. It was covered with a net which supported the car, and was furnished with a valve, a barometer, and sand-ballast, and was, in fact, a complete aërial machine. It may be said that the art of aërostation at once attained perfection in Charles's B., and no essential change or improvement has taken place since. In consequence of the danger attending the use of fire-balloons, and the engrossing attention which they demand of the aëronaut, they have now entirely given way to the hydrogen or coal-gas balloons. Before they became obsolete, several remarkable voyages were made in them. The same Pilâtre des Rosiers made 30 leagues in one of them, the longest voyage ever executed in a Montgolfiere. Among the names of the first professional aëronauts, those of Lunardi, Blanchard, and Garnerin deserve special note. Lunardi was the first who made the ascent in Great Britain; and Blanchard, along with the American Dr. Jeffries, crossed the English Channel from Dover to Calais in circumstances of almost unparalleled danger, January 7, 1785. Garnerin first descended from a B. by a Parachute (q. v.), October 22, 1797. It is much to be regretted that the first aëronaut, Pilâtre des Rosiers, fell a victim to a blind devotion to his art. In order to outvie Blanchard he constructed a compound machine, consisting of a hydrogen B. above and a Montgolfière below, and started from Boulogne, accompanied by a young natural philosopher named Romain, on the morning of the 5th of June 1785. He had not ascended many minutes, when, as it afterwards appeared, on attempting to open the valve of the hydrogen B. by the rope attached to it, he caused a rent of several yards in it, so that it emptied itself almost immediately, and fell on the Montgolfière beneath. The fire in the latter not being kindled, the whole machine fell with a frightful rapidity to the earth, and the ill-fated aëronauts perished on the spot whence they had risen. It is worthy of remark, that though several melancholy incidents of this kind are on record, the number of casualties in the navigation of the air has been less in proportion than in the navigation of the sea. For 1500 aëronauts and 10,000 ascents, calculating approximately, only 15 lives have been lost, certainly a small proportion considering dangers and inexperience.

In 1794, during the wars of the Revolution, an aërostatic institution was formed at Meudon, near Paris, for training a corps of 'aërostiers,' in order to observe the enemy by means of balloons. A balloon under the management of this corps was present at the battle of Fleurus, near Charleroi, fought against the Austrians. During the siege of Paris, 1870—1871, the B. was extensively employed. Countless letters and several persons left the beleagured city in balloons. There was, of course, no attempt made to come back in such a conveyance: carrier pigeons were the return messengers.

Balloons have been enlisted in behalf of science. The first ascent for scientific objects was made at Hamburg, July 18, 1803, by Robertson and Lhoest. The results obtained, more particularly regarding the diminution of terrestrial magnetism, and the general feebleness of electrical and galvanic phenomena in the rarer portions of the atmosphere, were considered of such importance by the French Institute, that another ascent was determined on; MM. Biot and Gay-Lussac were appointed to take the management of the B. and of the physical experiments; and they started, accordingly, on the 20th August 1804. As this aërial expedition was not altogether successful, a second was undertaken by Gay-Lussac alone, in the same year, in which he rose to a height of 23,000 feet. The observations of the French savans did not confirm those made by Robertson, for after a series of experiments, as careful as their novel situation would admit, they found that no diminution was perceptible in the intensity of electrical phenomena in the upper air. Since then, many scientific aërial voyages have been undertaken, among which may be mentioned that by Humboldt in America; those made by Mr. Rush, in company with Mr. Green as steersman, on behalf of the British Association, during 1847—1849; and that by MM. Baral and Bixio (1850) at Paris. Recently, the most remarkable ascents have been made by Mr. Glaisher for meteorological observation. On one occasion he ascended to a height of 7½ miles, the barometer standing at 7 inches. The B. contained 90,000 cubic feet of gas, and carried 600 lbs. The hygrometric and thermometric laws of the air may yet be ascertained by B. ascents, as well as the nature of aërial currents, at present so imperfectly understood. The introduction of coal-gas, instead of hydrogen, by Mr. Green, is the most important advance in aërostation since the earliest days of the art. His large coal-gas B., in 1836, bore Messrs. Green, Holland, and Mason from London to Weilburg, in Nassau, distant 500 miles, in 18 hours. Mention should also be made of the spindle-shaped navigable balloons of MM. Girard and De Lôme.

In the United States, aërostation has been prosecuted with great zeal. Mr. J. Wise has more than once exploded his B., when high up in the air, to show what he considers to be always the case, that the fragments with the net-work form in such circumstances a parachute, which moderates the rapidity of descent, and shields the aëronaut from danger. During 1859, a remarkable flight was made by Mr. J. Wise, Mr. La Mountain, and others, who, starting from St. Louis with the intention of reaching New York, traveled 1150 miles in less than 20 hours. M. Nadar made an important ascent in 1863, and M. Godard in 1864. In 1873, a B. of 400,000 feet of cubic capacity was made to enable Mr. Wise to cross the Atlantic; but the B. burst. Of late many ascents have been made for scientific purposes, as by Mr. Glaisher under the auspices of the B. committee of the British Association. During the siege of Paris in the Franco-German war of 1870–71, balooning was extensively used by the besieged for communication with the outer world, and also by the besiegers for military purposes; and since that date, military ballooning has become an important subject of study and experiment by soldiers.—See *Voyages Aériens* (Eng. edit. by T. Glaisher, 1871); *Les Ballons dirigeables*, Tissandier (1872); 'Aeronautics' in *Ency. Brit.*; and *Quart. Rev.*, July 1875.

BA'LLOT (in French, *ballotte*) is a little ball used in the practice of secret voting, which is thence generally called 'voting by B.,' whether it be a ball or a ticket that is used. Votes may be taken by B. in various ways—e. g., the voter may deposit a ball in either of two boxes, so conjoined that no one shall be able to say into which he drops it; or he may be presented with two balls—a white and a black—and so drop one of them into a box that it shall be unknown which he used. Tickets marked 'Yes,' 'No,' or with the names of candidates, will clearly serve the purpose of balls in private voting. The Dikasts in Greece voted secretly by means of balls, stones, or shells, with marks. From this use of marked shells (Gr. *ostrakon*) in popular voting came the Greek *ostracism*, or secret vote of the people, by which they drove into exile those who became obnoxious to them. Tabulæ or tickets were chiefly used by the Romans. If the vote concerned a change in the law, the tickets were marked V. R., the initial letters of the words 'Uti Rogas,' expressing consent to the proposer's proposition; and A. for 'Antiquo,' expressing adherence to the old law. If the vote concerned the election of candidates to a public office, then the tickets bore the names of the candidates. The system of secret voting in Rome was fixed by various laws, of which the Gabiniana Lex most closely resembles the modern project of vote by ballot.

The system of vote by B. is much in use among moderns in private or social clubs, and in the election of officers and other acts of public or joint-stock companies. The propriety of employing it in private clubs has never been questioned, for to the harmony of these it is essential that the votes of a few should suffice to exclude an obnoxious person; and looking to the personal and invidious nature of the vote, it is equally essential to their harmony that the voting should be secret. A candidate for admission, who succeeds in the face of a few, though not a sufficient number of voters, could not but regard those who voted against him as enemies. But if the voting be by B., all he can know, if the voters keep their own counsel, is that some persons are unfriendly. It is thus left open for him to associate on friendly terms with all the members—a condition of the success and continuance of such associations. But whether the system was suited to political and municipal voting, used to be in this country the subject of keen debate, at a time when it was in use in France, in several of the United States, and in the Australian colonies.

We have said that the system prevailed in Greece, and on its fruit there—especially in the exercise of the ostracism—there have been various opinions. While some have considered that the Athenians, for instance, acted under cover of secrecy, frequently without a just sense of responsibility, there is the authority of Mr. Grote, in his *History of Greece*, on the other side, to the effect, that they exercised the right most beneficially. But if we have in Mr. Grote an advocate of the B., in Gibbon we have an opponent of it. In his *Decline and Fall of the Roman Empire*, that philosopher dates the decline of the republic from the introduction of secret voting, which, he says, destroyed public confidence—in effect, broke up the ancient relations of patron and client, and caused a general demoralization of the people.

To come to modern times, we find the B. in use in the Venetian senate and that in Britain it was first demanded, not for the purpose of elections, but of votes in parliament. In Scotland, during the revulsions against the court in the reign of Charles II., the system was actually adopted in the legislature; but it does not appear to have afforded voters in all cases the desired protection. No one would now dream of demanding its introduction in parliament, whose proceedings, according to popular opinion, cannot be too open and above board. On this point it may be mentioned that

secret voting was the rule, for over five years (from 1840—1845), in the Chamber of Deputies in France, when it was abolished, as being productive of abuse. This, however, as we have said, bears on a use of the system that has now no advocates. Two illustrations remain of its use in elections. In the colonies of Melbourne and Sydney, the B. is said to have worked well, though it has been doubted whether its efficacy has been properly tested in these countries, in which there is so much individual independence, peculiar to new countries, that those who vote care little for concealment. In the United States, on the other hand, it is said to be the general opinion that the system has proved inefficacious. In the state of New York, where the B. was adopted several years ago, there is now a party demanding open voting, as a cure for evils introduced by the secret system. They say it has among the Americans opposed no effectual obstacle to coercion and intimidation from the majority, while those to whom the arrangements for secrecy are intrusted, flagrantly betray their trust, and the voters on either side are, as a rule, well known to the public.

The advocates of the B. used to maintain that it would prevent bribary, intimidation, and undue influence. They regarded its reputed failure in America as being beside the question as to its suitability for this country, because in America what the voter has to contend against is the pressure of the many, while with us he seeks to resist coercion by individuals. The tenants, for instance, they said, want security, through concealment, against the loss of their farms, should they vote against the wishes of their landlord. They believed it would prevent bribery, through the uncertainty that the bribed party would vote as he promised. And as a candidate would not give bribes, because he could not trust that he would get value for his money, so intimidation would not be attempted in the absence of any security that it would be of effect. To this it was answered, on the other side, that the case of America was in point, inasmuch as intimidation might arise here, as there, from a majority, and that the case of a shopkeeper and his patrons was that of many against one all over the world. If the B. failed to protect the unit against the crowd in one country, how could it succeed in another? As to the undue influence of individuals over many—as of a landlord over his tenants—it could only be prevented providing the many, in all their public acts, contradict their secret votes. If the many acted publicly as if they agreed with the few, and privately voted against them, we should have had a state of things in which the professed public opinion would have been in antagonism with the public policy, supported by private votes—a state of things justly regarded as being impossible to be produced. The influence of individuals, then, must remain—i. e., the secret voting would be of no use, since, short of lifelong hypocrisy, it must fail to be a protection. As to bribery, the opponents of the B. thought better of human nature than those who would purify it by machinery. 'Honor among thieves,' they said: 'he who takes a bribe, either has no principle left in him for which to vote contrary to his promise, or will be guided by his deceased sense of honor.' On the other view, they put it, you secure the vote of a rogue, through his playing the knave doubly, by the public in taking a bribe, and by the briber in not fulfilling his pledge. That men will be inclined to give and take bribes as formerly, despite the somewhat diminished security, they appeared not to doubt.

An element in the controversy was the question—whether the franchise was to be regarded as a public trust, or a private power to be used at the individual's discretion. The opponents of the B. maintained the franchise to be a trust, on which view, certainly, it should be openly exercised. Its advocates, on the other view, held the object of the franchise to be the ascertainment of the conscientious opinions of the people. The fact is, the right partakes of both characters: it is a power of expressing opinion by the agent under a sense of responsibility. The B. gives greater security for independence of thought; but the public vote is attended by the greater security for sense of responsibility. It used to be common to sprinkle pleas against the B. with high praise of the whole scheme of British politics, as open, manly, and candid, and with expressions of contempt for the B., as sneaking, and dissonant with that scheme. But the advocates of the B. were not unprepared with a ready and obvious retort to such arguments. Public feeling was kept alive on this question by annual motions in parliament. From 1835, its introduction was an open question with the Whigs. The Radicals, in 1859, were greatly pleased to find Lord John Russell expressing himself as being almost a convert to their views. The controversy was put an end to in July 1872, when voting at parliamentary and municipal elections in Great Britain and Ireland was decreed to be by ballot.

BA'LLOT FOR MILITIA. See MILITIA.

BALLO'TA. See HOREHOUND.

BALLS, HOLLOW. In military pyrotechny, many varieties of B. are made, differing in purpose from bomb-shells, but, like them, filled with ignitible composition. They are used to give light, to produce a dense smoke, or to diffuse a suffocating odor. Some of them, though called B., are not globular in shape. *Light B.* consist of canvas stretched over a skeleton-frame, and painted; the frame is filled with a composition of saltpetre, sulphur, resin, and linseed-oil, rammed down hard; and is provided with a fuse, the length of which determines the time that will elapse before the composition ignites. These light B. weigh from 5 lbs. to 70 lbs. each, according to their size. They are intended to give out a brilliant light, which may reveal the operations of the enemy during night at a siege or in the field. *Smoke-B.* are made of several thicknesses of paper, shaped by means of a globular core or mould. They are filled with gunpowder, saltpetre, powdered sea-coal, Swedish pitch, and tallow; and are calculated, after being fired off, to send out a dense smoke for nearly half an hour, in order to blind or incommode the enemy. *Stink-B.* are filled with a composition which, when ignited, diffuses an odor almost intolerable. Some of the contrivances of Captain Norton and other inventors at the present day, noticed under ASPHYXIANTS, are extensions of the same principle as these inflammable balls. It may be here added, that most of these projectiles, especially light B. and smoke-B., are fired from mortars, rather than from guns.

BA'LLY, BAL, a Celtic word or prefix, signifying 'town' or 'dwelling,' enters into the composition of hundreds of names of places in Ireland and Scotland. It is allied (see letter B) to Gr. *polis*, city, and to the Lat., Ital., and Span. *villa*.

BALLYCA'STLE, a small seaport town in the north of Antrim county, Ireland, in an open bay opposite Rathlin Isle, 88 miles north of Belfast, and 5 miles south-west of Fairhead. It lies at the base of Knocklayd Mountain, 1635 feet high; and the marine and mountain scenery around is very romantic. B. consists of an upper and lower town, a quarter of a mile apart. Its harbor and pier cost £150,000, but the former is now filled with sand. Coal was dug here at least 500 years ago. Linen manufacture and salmon-fishery are carried on here. Near B. are the Bonnamargy Abbey ruins. There is a singular fissure, called the 'Gray Man's Path,' in the face of a greenstone precipice near B. on the way to Fairhead. Pop. about 2000.

BALLYME'NA, a small inland town in the center of Antrim county, Ireland, in a plain, on the right bank of the Braid, 2 miles above its junction with the Maine, and 33 miles north-north-west of Belfast. It lies in a densely peopled and well-cultivated district, the inhabitants uniting the pursuit of agriculture with the manufacture of linen. B. is one of the greatest linen and flax markets in Ireland, and its vicinity is covered with extensive bleach-fields. Pop. (1881) 8883.

BALLYSHA'NNON, a small seaport town in the south of Donegal county, Ireland, the chief town of the county, though not the capital. It is situated at the mouth of the river Erne, on a small inlet running off from Donegal Bay, and 120 miles north-west of Dublin. A bridge of 14 arches crosses the Erne here. The Erne discharges more water than any other Irish river except the Shannon, and falls 140 feet over a rugged bed in the last 9 miles of its course; 400 yards below the bridge at B. the river falls in a cataract 16 feet high at low water, and 450 feet wide, over a limestone ledge of rock. The chief streets of B. are very steep. There is a valuable salmon-fishery on the river. The export trade is small, in consequence of the existence of a bar at the mouth of the harbor and the prevalence of west winds. Pop. (1881) 2840.

BALM (*Melissa officinalis*), an erect, branching, perennial, herbaceous plant, of the natural order *Labiatæ*, a native of the south of Europe, naturalized in a few places in England. It has ovate crenate leaves, and axillary half-whorls of white flowers on one side of the stem. The whole plant as an agreeable lemon-like smell, on account of which it is frequently cultivated in gardens. The stems and leaves are used in medicine as a gentle aromatic, stimulant, and tonic. B. is also employed for making an agreeable and somewhat exhilarating beverage called B. Wine. B. was formerly in much higher repute than now for its medicinal virtues. Its qualities depend on an essential oil of a pale yellow color, called Oil of Balm.

Balm (*Melissa officinalis*)

For medical use, the herb should be cut before the appearance of the flowers, which begin to expand in July. It is nearly inodorous when dried. The taste is somewhat austere, and slightly aromatic. B. scarcely produces any remedial operation upon the system. The quantity of oil which it contains is not more than sufficient to communicate a

pleasant flavor to the infusion, which forms an excellent drink in febrile complaints, and when taken warm, tends to promote the operation of diaphoretic medicines.—A variety of the common Catmint (*Nepeta cataria*), with a smell like that of B., is often mistaken for it.—MOLDAVIAN B. (*Dracocephalum Moldavicum*) is a native of the country from which it derives its name, and of Siberia, &c.; an annual plant, having, when fresh, a smell like that of B., but less pleasant. It is much used in Germany for flavoring dishes.—BASTARD B. (*Melittis Melissophyllum*), a native of the south of England and of many parts of Europe, is a very beautiful plant, which when dried has a delightful fragrance, and retains it long. All these are of the natural order *Labiatæ*.

BALM OF GI'LEAD. See BALSAM OF GILEAD.

BALMO'RAL CASTLE, the autumnal residence of Her Majesty Queen Victoria, is situated in a beautiful dell in Braemar (the south-west district of Aberdeenshire), on a natural platform that slopes gently down from the base of Craigan-gowan to the margin of the river Dee in front; and about 48 miles west of the city of Aberdeen. The castle commands a magnificent prospect on all sides. In 1848, Prince Albert purchased the reversion of a 38 years' lease from the representatives of Sir Robert Gordon, who had held it under the Earl of Fife; and in 1852 he acquired the fee-simple of the estate from the Fife trustees for a sum of £32,000. The old castle not being sufficiently commodious for the royal family, Prince Albert erected a new one at his own expense, in what is called the Scottish baronial style of architecture. The castle consists of two separate blocks of building, united by wings, and a massive tower 35 feet square, rising to the height of 80 feet, surmounted by a turret 20 feet high. At a distance, the castle, which is built of granite, has a strong and imposing appearance, looking almost as if it had been hewn out of one huge rock of that material. Great improvements have been made, chiefly those projected by the late Prince Albert in the approaches to the royal residence. The estate now includes Birkhall, Knock Castle ruins, Lock Muick, and 'dark Lochnagar,' celebrated by Byron (which is about seven miles south-west of B. C.), and contains about 10,000 acres, in addition to 30,000 acres of hill-ground, which have been converted into a deer-forest.

BA'LNAVES, HENRY, of Halhill, an eminent lay-reformer of the 16th c. Born at Kirkcaldy in Fifeshire of poor parents, who, however, contrived to give him a university education at St. Andrews, he went to the continent, and entered a free school at Cologne, where he greatly improved his scholarship, and received instruction in the principles of the new faith which Luther had just promulgated. On his return to Scotland, he studied law, and acted for some time as a procurator at St. Andrews. In 1538, James V. made him a senator of the College of Justice; and on Arran being appointed to the regency, B. was made secretary of state. In 1543, he was imprisoned on account of his Protestantism, but appears to have been liberated in the following year.

He now appears to have made himself active on the Protestant side; and it is asserted that he was privy to the conspiracy formed for the murder of Cardinal Beaton, and that he acted for the conspirators at the English court. In 1547, he took refuge in the Castle of St. Andrews, and was declared a traitor and excommunicated. When the castle was captured by the French, B., with Knox and others, were sent to Rouen as prisoners of war. While in prison here, B. wrote a treatise on Justification, to which Knox added marginal notes, and prefixed a dedication, and which was afterwards published with the title of *The Confession of Faith*. When Mary of Guise was raised to the regency in 1554, B.'s forfeiture was rescinded, and he returned to Scotland, and took an active part on the side of the Lords of the Congregation, by whom he was appointed one of the commissioners who settled the treaty of Berwick in 1559—1560, which established by law the reformed religion in Scotland. In 1563, B., was nominated a commissioner to revise *The Book of Discipline*. He afterwards acted for the Regent Murray in the inquiry into the charges against Mary for the murder of Darnley. He died in 1579; one account says 1570. Both Knox and Melville had a high opinion of him alike for his piety, wisdom, and learning.

BALO'TRA, a town of India, in the Rajpoot state of Joudpore, 59 miles south-west of the city of Joudpore. It is situated on the right bank of the river Loonee. Being on the high-road from Joudpore to Dwarka, a celebrated place of pilgrimage in the west of Guzerat, it is a great resort of pilgrims, with whom its bazaar is often crowded. Many of the inhabitants of the town subsist by providing for their wants. The town is supplied with good water from 125 wells, lined with masonry. Pop. 7275.

BA'LSAM, a name formerly comprehensive of many resinous substances and oils, to which important medicinal virtues were ascribed, as well as of medicines compounded of resins and oils. When the term B. is now used without addition, the balsams of Peru and Tolu are generally intended.—These two balsams are very similar in all their more important properties, and are both produced by trees of the genus *Myrospermum* (or *Myroxylon*), of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, natives of the tropical parts of America. *M. Peruiferum*, which is called the Quinquino, a beautiful tree, common from Peru to Mexico, is generally regarded as the species which produces the B. of Peru; and *M. toluiferum*, a very similar species, found on the mountains of Tolu, the banks of the Magdalena, &c., as that which produces the B. of Tolu; but it is doubtful if the difference is not at least as much owing to the modes of procuring and preserving the B.; and other species of the same genus (*M. punctatum* and *M. pubescens*) are supposed also to yield it. B. of Peru appears in two forms, known as *White B. of Peru* and *Black B. of Peru;* the former of which has been said to be obtained from the pods, and the latter from incisions in the trunk of the tree; but it has also been stated that the white B. flows from the trunk, and that the black B. is obtained from distilling down the wood after the manner of tar-burning, or by boiling with water. The actual evidence is insufficient to determine these points with certainty, and it is not improbable that different methods may be employed. White B. of Peru is at first of the consistence of recent honey, and of a light yellow color; the black B. is of a reddish or blackish brown color, and of the consistence of treacle. B. of Tolu, until recently, appeared in commerce dry and friable, but is now generally soft and tenacious when first imported, becoming hard by age. Both balsams have a fragrant odor. They are used in confectionary, to impart a flavor like that of vanilla; also in perfumery, and for pastilles, &c. In medicines, they are administered as gentle stimulants and tonics, and particularly in chronic bronchial affections. *Tolu lozenges* are a popular and pleasant remedy for troublesome coughs. These balsams are also used for cleansing ulcers.—They contain Cinnamic Acid, and a peculiar oily substance which has been called *Cinnameine*, and is also known as Oil of B. of Peru. The name of *White B. of Peru* is sometimes given to a balsamic substance which flows from the *Liquidambar styraciflua*. See LIQUIDAMBAR.

BALSAM is also the common name of a natural order of succulent herbaceous plants *Balsamineæ* or *Balsaminaceæ*, of botanists, of which the beautiful B. (*Impatiens balsamina* or *Balsamina hortensis*), so much cultivated in gardens and green-houses, is a familiar example. Upwards of one hundred species are known, natives chiefly of damp bushy places in the East Indies, and many of them plants of great beauty. They are almost all annuals, and have generally white or red flowers. This natural order is very closely allied to *Geraniaceæ* (see GERANIUM) and *Oxalideæ* (q.v.), wood-sorrel, &c., but is distinguished from both by the extreme irregularity of the flowers, and from the former also, by the beakless fruit, which is a five-celled capsule, bursting by five elastic valves. The leaves are simple and without stipules, the flowers generally axillary.—The common B. is a native of the East Indies and Japan. Many fine varieties have resulted from careful cultivation. It has an upright succulent stem, usually about 1—2 feet high, but in favorable circumstances will attain a greater size. It often appears with flowers partially double, but still capable of producing seed. In Britain, the seed is usually sown on a slight hotbed, and the plant is often kept in the green-house; although even in Scotland it may be made an ornament of sheltered border. It is one of the flowers frequently to be seen in cottage-windows. A vulnerary was formerly prepared from it, whence it has its name. One species of B. (*Impatiens Noli-me-tangere*), called Yellow B. or Touch-me-not, is a native of Europe, and a doubtful native of Britain. It has yellow flowers, and one of the petals prolonged into a spur. Its ripe capsules burst on the slightest touch. This and two other species are natives of North America.

Balsam (*Impatiens Noli-me-tangere*).
a, top of stem with leaves and flowers; *b*, ripe fruit unopened; *c*, ripe fruit, elastically opening.

BALSAM, or BALM OF GILEAD, is a liquid resinous substance, which has long enjoyed a very high reputation in the East, being prized not only for its fragrance, but also for the medicinal virtues which it is supposed to possess. It is the subject of several allusions in the Old Testament, which strongly indicate the

prevalent opinion of its preciousness; and is celebrated by Strabo, Pliny, Diodorus Siculus, and other ancient writers, almost as a cure for every disease. It is still somewhat doubtful what tree furnishes it, but it is generally believed to be a species of *Balsamodendron* (q. v.)—a small tree growing in Arabia and Abyssinia, and known as *B. Gileadense*. The finest balsam, called Opobalsam or Balm of Mecca is obtained by incisions, is at first turbid and white, but finally becomes of a golden yellow color, and of a consistence like honey. Inferior kinds are obtained by boiling the fruit and the wood. B. of Gilead is irritating when applied to the skin, and is believed to resemble B. of Copaiva in its effects upon the human system. *Balsamodendron Opobalsamum*, a species very nearly allied to *B. Gileadense*, is sometimes said to furnish this balsam.

Other substances, sometimes designated balsams, and possessing a somewhat similar fragrance, are produced by different species of *Amyridaceæ* (q. v.). Among them is one called American Balm of Gilead, the produce of a tree called *Icica Carana*.—Balsamic substances are furnished also by a number of species of *Clusiaceæ*—Balsam of Umiri, a fragrant yellow fluid, by *Humirium floribundum*, a South American tree of the natural order *Humiriaceæ*.—CANADIAN BALSAM is a kind of turpentine obtained from the Balm of Gilead Fir (*Abies balsamea*); HUNGARIAN BALSAM, from the Mugho or Mountain Pine (*Pinus Pumilio* or *Mughus*); and CARPATHIAN BALSAM, from the Stone Pine (*Pinus pinea*). See FIR and PINE.—BALSAM OF COPAIVA is the produce of different species of *Copaifera*. See COPAIVA.

BA'LSAM OF SU'LPHUR is a mixture employed for medicinal purposes, and considered of service when applied to foul ulcers. It is prepared by dissolving 1 part of flowers of sulphur in 8 parts of olive oil, which yield a dark, reddish brown, thickish substance, with a very unpleasant odor.

BALSAMODE'NDRON (Gr. balsam-tree), a genus of small trees or bushes of the natural order *Amyridaceæ* (q. v.), having small green axillary flowers, small dry oval fruits, and small pinnated leaves with 3 or 5 leaflets. Some of them are spiny: they generally exhibit a scrubby appearance, and have little foliage. They are remarkable for the balsamic substances obtained from their wood and fruit—as Balsam of Gilead (q. v.), Myrrh (q. v.), Bdellium (q. v.), and Oriental Elemi (q. v.). The red resinous wood of *B. Katof* is a common article of sale in Egypt; and a species called Schnee is much cultivated in Afghanistan for its aromatic and stimulant properties. All the known species are natives of the East Indies, Arabia, and the east of Africa, except that which yields African bdellium, which is found in Senegal.

BA'LTA, a well-built and thriving town on the Kodema, an affluent of the Bug, in the government of Podolia, Russian Poland. Pop. (1880) 18,450.

BA'LTIC PRO'VINCES (in Russia). This term, in a wider sense, comprehends the five Russian governments bordering on the Baltic—viz., Courland, Livonia, Esthonia, Petersburg, and Finland; in a restricted sense, it often designates the first three. The B. P. once belonged to Sweden, except Courland, which was a dependency of Poland. They came into the possession of Russia partly in the beginning of the 18th c., through the conquest of Peter the Great, partly under Alexander in 1809. They have still very various constitutions, though the usual 'government' machinery has been introduced, and every effort is made completely to Russianize them. The three Baltic governments in the stricter sense have an area of 36,500 square miles, and (1880) a population of 2,152,500.

BA'LTIC SEA, is the great gulf or shut sea bordered by Denmark, Germany, Russia, and Sweden, and communicating with the Kattegat and North Sea, by the Sound and the Great and Little Belts. Its length is from 850 to 900 miles; breadth, from 100 to 200; and area, including the Gulfs of Bothnia and Finland, about 160,000 square miles. Its depth is on an average 15—20 fathoms, in many places not half so much, seldom more than 40—50, and never exceeding 167. Its shallowness and narrowness, the flat coasts of Prussia on the one side and the rocky coasts of Sweden on the other, and above all the numerous and sudden changes of wind accompanied by violent storms, make the navigation of the Baltic very dangerous. The group of the Aland Islands divide the south part of the sea from the north part or Gulf of Bothnia (q. v.). The Gulf of Finland (q. v.), branching off eastwards into Russia, separates Finland from Esthonia. A third gulf is that of Riga or Livonia. The Kurisch and other Haffs (q. v.) are not gulfs, but fresh-water lakes at the mouths of rivers.

The water of the Baltic is colder and clearer than that of the ocean. It contains only a fifth of the salt of the Atlantic, and ice hinders its navigation from three to five months yearly. Tides, as in all inland seas, are little perceptible—at Copenhagen, about a foot; yet the water rises and falls at times, though from other causes, chiefly from the varying quantity of water in the rivers at different seasons. Upwards of 250 rivers flow into this sea. The chief from Germany are the Trave, Warnow, Oder, Rega, Persante, Vistula, Pregel, and Niemen; from Russia, the Windau, Düana, Narva, Neva, and Ulea; and from Sweden, Tornea, Lulea, Pitea Umea, Angerman, Dal, the water of Lake Maeler, and that of Wetter and other lakes through the river Motala. The basin of the Baltic occupies at least 880,000 square miles, or about one-forth of all Europe; and only about a fourth of the boundary of the basin is mountainous. The principal islands are Zealand, Fünen, Bornholm, Samsöe, Möen, Langeland, and Laaland, belonging to Denmark; the Swedish Gottland, Oland, and Hveen (in the Sound); the Aland Islands, Dagö, and Oesel, belonging to Russia; and Rügen to Prussia. The number of vessels that pass the Sound to or from the Baltic annually is very large. See SOUND DUTIES. Timber, hides, tallow, and grain, are the chief exports from the countries bordering on the Baltic. The Eider or Schleswig-Holstein Canal, connecting the Baltic near Kiel with the North Sea at Tonningen, facilitates the grain trade in mild winters. The two seas are also connected by the Gotha Canal, which joins the lakes of South Sweden. The most important harbors in the Baltic are: in Denmark, Copenhagen and Flensburg; in Germany, Schleswig, Kiel, Travemünde (Lubeck), Wismar, Rostock, Stralsund, Stettin, Swinemünde, Danzig, Elbing, Königsberg, Pillau, and Memel; in Russia, Riga, Reval, Narwa, Kronstadt, and Sveaborg; and in Sweden, Stockholm, Karlskrona, and Ystad. —The shores of the Baltic in Prussia and Courland have been long noted for the amber cast ashore by the waves in stormy weather. Another important phenomenon connected with the Baltic is an alleged slow vertical movement of its coasts, *downwards* in the south of Sweden, but further north *upwards*, being there supposed to be at the rate of three feet in a century. See Lyell's *Principles of Geology*.—The Germanic nations call this sea *Ostsee*, or Eastern Sea; the name Baltic is derived by Dr. Latham, from an island Baltia, mentioned by Pliny, and which Dr. Latham considers to be Zealand.

BA'LTIMORE-BIRD, or BALTIMORE ORIOLE (*Icterus Baltimorii*), a very beautiful American bird, found in all parts of the United States, and as far north as 55° N. lat., but migrating to tropical or subtropical regions in winter. The genus to which it belongs is usually referred to the natural family of *Sturnidæ* (see STARLING). The B.-B. is in size somewhat less than a common starling; the bill conical, very acute, and a little curved: the plumage brilliant, particularly in the adult males, glossy black finely contrasting with bright orange and vermilion; the tail longish, rounded, and slightly forked. The bird is remarkably active and lively; its song extremely agreeable. Its nest is a curious and interesting structure, a pendulous cylindrical pouch of six or seven inches long, usually suspended from two twigs at the extremety of a lofty drooping branch; the materials, which vary according to circumstances, being woven together with great nicety. It is sometimes sewed through and through with long horse-hairs. Thread, which may happen to be bleaching, is very liable to be appropriated to the purpose of nest-building.

Baltimore-Bird, and nest.

The nests of other species of *Icterus* are also pensile. Several are natives of North America and others of South America. They are quite distinct from the true Orioles (q. v.).

BA'LTIMORE, a city, port of entry, and seat of justice of Baltimore county, Maryland, U. S., in lat. 39° 17′ N., and long. 76° 36′ W. It stands round a small bay which runs back from the left side of the Patapsco, about 12 miles from its entrance into Chesapeake Bay, and about 200 miles, by a ship's course, from the open Atlantic. The city was founded so late as 1729. The surest test of its prosperity is to be found in the rapid increase of its population. In 1800, there were 26,514 inhabitants; in 1830, 80,620; in 1850, 169,054; in 1870, 267,354; in 1880, 332,190; so that B. ranks as seventh in size of the cities of the United States. From east to west, the city is about 4½ miles long; and from north to south, about 3½ broad, and covers about 10,000 acres. It is divided into two nearly equal parts by 'Jones's Falls,' a rapid stream which supplies immense water-power, and an abundance of pure water for domestic use.

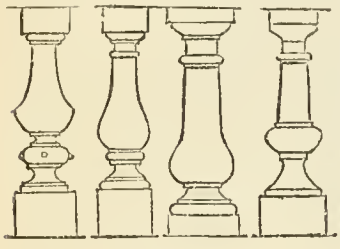
Besides her safe and easy communication with the sea, B. has ample railway connections, and is a great center of traffic, especially for the north and north-west. Grain, tobacco, cotton, petroleum, bacon, and butter are largely exported to Europe. In or

near B. much of the copper ore of Lake Superior is smelted. Iron works, cotton factories, and other industrial establishments abound. The canning of fruits is carried on to a great extent; and 500,000 hides are here annually made into leather. B. has near 30 newspapers.

Among the commemorative structures which have gained for B. the name of the 'Monumental City,' the most interesting is an elegant obelisk, erected in 1815 to the memory of those who had fallen in defending the town against the British. The Johns Hopkins University (endowed with $3,000,000 by a wealthy citizen who died 1873) is a most important institution, and promises to make its mark on science. The Roman Catholic cathedral takes the lead among the ecclesiastical edifices of B. It is of granite, being 190 feet long, 177 broad, and 127 high; and has one of the largest organs in the United States. In B., however, the Roman Catholics have now only 23 churches out of 189. The new city hall is one of the finest buildings of the kind in the United States, and there are numerous handsome educational and charitable institutions. See BALTIMORE in AM. SUPP.

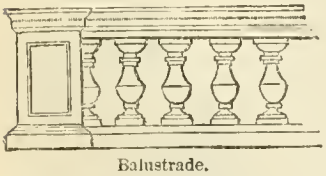
BALTSCHI'K, or BALDJI'K, a town of Bulgaria, Turkey, 18 miles north-east of Varna, noteworthy in consequence of being in the vicinity of the ruins of Tomi, to which place Ovid was exiled.

BA'LUSTER, popularly, *banister* or *ballaster*, (Ital. balaustro; Fr. balustre), the name given to the small shafts or pillars set in a line at short equal distances, and supporting a cornice or coping. These miniature pillars have generally either a pear-shaped swelling at the lower end, or consist of two pear-shaped pieces, placed above each other, a ring of mouldings being set between them. This makes the profile resemble an ancient bow or Balista (q. v.), from which some derive the name; others derive it from Lat. *palus*, Eng. *pole* or pale.



Balusters.

BALUSTRADE, a range of balusters, together with the cornice or coping which they support. The B. is often used as a parapet for bridges, the roofs of large edifices, &c., or as a mere termination to the structure. It is also used to enclose stairs, altars, balconies, &c. Balustrades are made of stone, metal, or wood.



Balustrade.

BALZAC, JEAN LOUIS GUEZ DE, born at Angoulême in 1594. In his youth he was secretary to Cardinal la Valette at Rome, where he cultivated his taste for elegant composition, and on his return to Paris devoted himself to the refinement of his native language. His efforts in this direction have given him a permanent place in the literature of his country; and though his writings do not possess much intrinsic worth, they heralded the splendid phalanx of genius which adorned the subsequent age of Louis XIV. He was a favorite of Cardinal Richelieu, a member of the French Academy, a councillor of state, and historiographer. His violent literary disputes with Father Goula, caused him to leave Paris and retire to his hereditary property of Balzac, where he died on the 18th February, 1655. A collection of the works of B. appeared in Paris, edited by L'Abbe Cassaigne (2 vols. Par. 1665; 3 vols. Amst. 1684). Of all his works, his *Lettres* (3 vols. Par. 1806) have been most generally admired, and are still read. A selection from his writings was aranged by Malitourne (2 vols. Par. 1822). Compare Moreau de Mersan, *Pensées de B.* (Par. 1807).

BALZAC, HONORÉ DE, one of the best of the modern French novelists, was born on the 20th May 1799, at Tours, where his father held a civil office. At the age of twelve, he entered the college of Vendôme, but finished his studies at the Pension Lepitre, in Paris. His father, who had been impoverished by the loss of his situation, then placed him with a notary, to whom he acted as clerk. This occupation proving intolerably irksome, B. soon after began his literary career, and wrote about thirty volumes, under the names, St. Aubin, M. de Veillergré, St. Alme, &c. He received some trifling assistance in writing these novels, which were, however, so unsuccessful, that he lived in the greatest poverty. In the year 1826, he entered into partnership with the printer Barbier, and published various works; but the speculation turned out so ill, that he fell into debt, and returned once more to book-making. His perseverance was admirable. Although long utterably unsuccessful he continued, to write on until at last he opened a path for himself by his novel *Les Derniers Chouans, ou la Brétagne en* 1800 (Par. 1829). In this book he abandoned for the first time the manner of Pigault and Lebrun, which he had hitherto adopted. Among his best works are the *Physiologie du Mariage* (2 vols. Par 1831), *Scénes de la Vie de Province* (1832), *Scines de la Vie Privée* (5 vols. 1831), *Scines de la Vie Parisienne* (1832), *Le Médecin de Campagne, Le Père Goriot, La Peau de Chagrin, La Recherche de l'Absolu*, which were all received with much favor by the public. Of all his novels, two only can lay claim to anything like artistic completeness. They are the *Histoire Intellectuelle de Louis Lambert*, and *Eugine Grandet*. His other works suffer more or less from unnaturalness, diffuseness, and the want of solid knowledge of the world, although there is a richness of description in portraying individual features of character, as drawn directly from the heart not to be denied. B. exercises immense power over the female part of his readers. In his *Contes Drolatiques, colligez ès Abbaies de Touraine, et mis lumière par le Sieur de Balzac pour l'esbattement de Pantagruelistes et non aultres* (2. vols. Par. 1833), he follows exactly in the footsteps of Rabelais. Success made B. conceitedly ambitious. He thought himself equal to the most distinguished authors of all time, and represented the aim of his literary activity to be, to give a complete picture of human life in all its varied phases. As a dramatic author he decidedly failed. He died Aug. 1850. A collected edition of his works in 45 vols. was published in Paris, 1856–59. An English translation of his Letters, with a Memoir by his sister, was issued in 1878.

BAMBA'RRA, one of the states of Sudan, Western Africa, lying, so far as has been ascertained, between lat. 12° and 14° N., long. 15° E. and 5° W., and occupying both sides of the Joliba or Niger, which flows through its center from south-west to north-east. The principal towns of B. stand on the banks of this river. The mountains in which the Niger has its source divide it on the S. from Guinea; the Sahara desert bounds it on the N.; on the W., Senegambia; and on the E., some of its sister-states. In its general aspect, the country is said to bear a considerable resemblance to the agricultural districts of England; but in the west there are low chains of granite hills, forming continuations of the highlands from which the Niger springs. The climate in some parts is intensely hot; in others, it is more temperate, but it is generally healthy. The rainy season lasts from June to November. The land is well watered and fertile. Double crops of corn, rice, maize, yams, &c., are raised annually without much labor.

The butter-tree, cotton-tree, oil-palm, baobab, and date, are among the most important indigenous growths. The manufacturing industry of B. is important; the women making a soft coarse cloth, much esteemed for its beautiful blue color, and the men articles in gold, iron, and ivory, in which a pretty extensive trade is carried on. The inhabitants, chiefly Mandingoes, are said to be superior to their neighbors in intelligence, and to be much sought after as warriors by the petty chiefs around them, who are at constant war with each other. They generally lend their assistance on condition of a certain payment. The upper classes profess Mohammedanism, but the lower are pagans. The introduction of the former religion has had at least one good effect. It has supplied the native dialect with a written speech through the use of Arabic letters. The chief domestic animals are horned cattle, goats, sheep, and fine horses. The wild animals are lions, leopards, elephants, wolves, panthers, &c.; and venomous reptiles, of which the natives are much afraid. Crocodiles are numerous in the rivers, which also abound with fish. The principal towns are Sego, Sansanding, Yamina, and Bammaku, which are all populous. The country has a nominal monarch, but it is in reality ruled by several chiefs.

BA'MBERG, a city of Bavaria, in the district of Upper Franconia, beautifully situated on the banks of the Regnitz, not far from its confluence with the Main, and in the midst of vineyards, orchards, and hop-gardens. B., which has considerably declined in importance since the Reformation, is a city of considerable antiquity, having originated, it is said, with a colony of Saxons who settled here in 804. The most noteworthy of its public buildings is the cathedral, a magnificent edifice in the Byzantine style, founded by the Emperor Henry II. in 1004, and restored after fire in 1110. It contains, among other monuments, the elaborately carved tomb of the founder and his empress, Cunigunda. Attached to the cathedral is a library, with valuable missals and manuscripts, and what is represented to be the prayer-book of Henry II. There are several other fine ecclesiastical structures of early date, and the old palace of the former prince-bishops of Bamberg. The ruins of the castle of Altenburg, originally the seat of the Counts of Babenberg, and the scene of many important historical events, stand on an eminence about a mile and a half from the town. The educational institutions of B. are numerous. Pop. (1880) 29,587, chiefly engaged in the manufacture of beer, which is famous throughout Germany, cotton, cloth, gloves, musical instruments, &c. A large export trade in liquorice and garden-seeds is carried on.

BAMBI'NO, a term in art descriptive of the swaddled figure of the infant Saviour, which, surrounded by a halo, and watched over by angels, occasionally forms the subject of altar-pieces in Roman Catholic churches. The *Santissimo* B., in the church of the Ara Cœli at Rome, is held in great veneration for its supposed miraculous power of curing the sick. It is carved in wood, painted, and richly decorated with jewels and precious stones. The carving is attributed to a Franciscan pilgrim, out of a tree that grew on Mount Olivet, and the painting to St. Luke. The festival of the B., which occurs at the Epiphany, is attended by great numbers of country people, and the B. is said to draw more in the shape of fees than the most successful medical practitioner in Rome.

BAMBO'CCIADES, in painting, are grotesque scenes from common or low life—such as country-fairs, penny-weddings, boors merry-making. The name is derived from Peter van Laar, a painter, who, on account of his personal deformity, was surnamed Bamboccio (Cripple); but he was not the first painter of such scenes.

BAMBOO' (*Bambusa*), a genus of grasses, of which most of the species attain a great size, many of them 20 or 30 feet, some 70 or 100 feet in height. The species are numerous, and are found in tropical and subtropical regions, both of the eastern and western hemispheres. They are of great importance to the inhabitants of the countries in which they grow. All of them have a jointed subterranean root-stock (rhizome), which throws up 10—100 stems. These are generally straight and erect; although one large species (*B. agrestis*), common in dry mountainous situations in the south-east of Asia, has crooked and sometimes creeping stems. The stems grow to their full height unbranched, but afterwards throw out straight horizontal branches, especially in their upper parts, forming a dense thicket; and many of them being strongly armed with spines, they are planted for defence, presenting a formidable barrier, even against regular troops. Some of the smaller kinds are often planted as hedges. The stems are jointed like those of other grasses, very hard, but light and elastic, hollow, containing only a light spongy pith, except at the joints or nodes, where they are divided by strong partitions. They are, therefore, readily converted into water-vessels of various sorts; and when the partitions are removed, they are used as pipes for conveying water. They are also much employed for house-building, for bridges, &c. The smaller stems are converted into walking-sticks, and are imported into Europe under the name of B. cane, both for that purpose and to be employed in light wicker-work. In China, the interior portions of the stem are used for making paper. Some of the species grow to the height of only a few feet; and almost all of them are slender in proportion to their height, although *B. Guadua*, a native of New Granada and Quito, has a trunk 16 inches in diameter.

Bamboo.

The stems of different species vary also very much in the thickness of the woody part, and so in their adaptation to different purposes. The external covering of the stem is, in all the species, remarkably silicious; the stem of *B. tabacaria* is so hard that it strikes fire when the hatchet is applied. This species is a native of Amboyna and Java; its slender stems are polished, and used for the stalks of tobacco-pipes. The leaves of some kinds are used for thatch, and the Chinese plait hats of them; of the external membrane of the stems of some, they make paper. From the knots of the B. there exudes a saccharine juice, which dries upon exposure to the atmosphere, and which the Greeks called *Indian Honey*. It is also sometimes named *Tabaris* or *Tabasheer;* but this name more properly belongs to a phosphorescent substance, containing silica and lime, and possessing remarkable properties, which forms in the joints of some species of B., and of other large grasses growing in dry situations. See TABASHEER.—The young shoots of some kinds of B. are eaten like asparagus, or are pickled in vinegar. Those of *B. Tulda*, a common Bengalese species, are used for these purposes when about 2 feet long. The seeds of some species are used as rice, and for making a kind of beer. Bamboos are generally of very rapid growth, and they are often found in arid situations, which would otherwise be destitute of vegetation. It is not improbable that they may yet be employed, where they do not naturally abound, to render districts productive which are now little else than deserts, in climates like those of Arabia, the north of Africa, and Australia; and the quality of the grain of different species seems to deserve more attention than it has ever received. The species common in the West Indies (*B. vulgaris*) is supposed to have been introduced from the East Indies. A few species are found in the Himalaya, to an altitude of 12,000 feet, and a dwarf species from that region has been successfully tried in the open air in England.

BA'MBOROUGH CASTLE, on the site of which Agricola is said to have built a Roman fortress, is one of the oldest in Britain, having, according to the Saxon Chronicle, been erected by Ida, the first Saxon king of Northumbria, in 550. It appears to have been a royal residence for long after. In 642 it was unsuccessfully besieged by Penda, king of Mercia; and during the Danish descents on England it was twice partly demolished. Mowbray, Earl of Northumberland, was besieged in B. in 1095 by William Rufus, and having fallen into the king's hands, Lady Mowbray surrendered under the threat of his eyes being put out. When Northumberland was granted to Henry, son of David of Scotland, B. C. was reserved for the English crown, and here Baliol acknowledged Edward I.'s supremacy in 1296. During the Wars of the Roses, it was the scene of several conflicts, and so battered and destroyed that it has not been again used as a fortress. In the time of Queen Elizabeth, its governor was Sir John Forster, in whose family it continued till 1715, when it was bought, with the Forster estates, by Lord Crewe, Bishop of Durham, who left it with other property to trustees for benevolent purposes. The restoration of the castle, and its conversion to its present charitable uses, were chiefly carried out by one of these, the Rev. Dr. John Sharpe, who bequeathed his library to the institution. The income, which is about £9000, is expended in providing a market for the sale of provisions and groceries to the poor at prime cost, a dispensary for gratis advice and medicines to the sick; funds for maintaining, educating, and starting in life poor children of the district; lifeboats and apartments for shipwrecked sailors; a constant patrol during stormy nights for 8 miles along the coast; repairing churches, and aiding young men at the universities. B. village, near the castle, was a royal borough before the Conquest, and in the time of Edward I. returned 2 members to parliament. Its pop. in 1871 was 320. Opposite B. C. are the Farne Isles, where Grace Darling and her father saved the crew of the *Forfarshire* steamer in 1838.

BAMBOU'K, a country of Senegambia, Western Africa, lying in the angle formed by the Senegal and Faléme rivers. Its extent is roughly estimated at 140 miles in length, and from 80 to 100 in breadth. The climate is unhealthy, especially during the rainy season; but the valleys are remarkable for their fertility. Trees common to Western Africa here attain enormous proportions. Vast herds of wild oxen roam the hills, and most of the wild animals of Africa abound. B. is chiefly remarkable for its gold, which the natives exchange for salt, cotton and other manufactured goods. Its inhabitants, the Mandingoes, are professedly Mohammedans, but they cling to many pagan superstitions, and are very ferocious. B. was, four centuries ago, a short time in the possession of the Portuguese.

BAMIA'N, a fruitful valley and pass of Afghanistan, about a mile in breadth, and enclosed by steep rocks, leading from Cabul to Turkestan. It is at an elevation of 8496 feet, and is the only known pass over the Hindu Kush for artillery and heavy transport. It was one of the chief centers of Buddhist worship, and with its two colossal statues was described by the Buddhist monks who visited India in the 4th and 5th centuries. The statues are found on a hill about 300 feet high, in which are a multitude of cells excavated in the rock all round, and rising above one another in irregular tiers. The male figure is about 160 feet, the female, 120. Both are natural in attitude, and clothed in light drapery; the face of the former is the most perfectly preserved. Each figure is hewn out of a deep niche, and elaborately carved, and representing royal personages and a variety of symbols which resemble those on the coins of the Sassanidæ. Each contains a winding stair by which it is possible to ascend to the head. The whole valley is covered with the ruins of tombs, mosques, and other buildings, once belonging to the town of Ghulghuleh, which more recently occupied this site, and was destroyed by Genghis-Khan in 1221. Eight miles eastward of B. lies the ancient fortress of Zohak, attributed to the fabulous Persian Serpent-king of that name. The fortress is preserved for the purpose of guarding the important pass. Both there and in the valley of B., a great number of coins, ornaments, and other antiquities have been recently found, and fully described by Masson, Wilson, Prinsep, Wood, and others.

BA'MPTON, a small town in the north-east of Devonshire, chiefly on the left bank of the Batham, a tributary of the Exe, and 22 miles north of Exeter. There are here extensive carboniferous limestone quarries. The manufacture of serge and pottery is carried on. St. Michael's Church was built in the 14th c., and has a tower 70 ft. high. Pop. (1881) 1089.

BA'MPTON IN THE BUSH, a small town in Oxfordshire, 14 miles south-west of Oxford. It has an ancient cruciform church, with a large Norman tower, and examples of every period of the pointed Gothic style. Pop. (1871) 764.

BA'MPTON LE'CTURES. These lectures are so called after the name of their founder, the Rev. John Bampton, Canon of Salisbury, who left estates originally worth £120 per annum, to the university of Oxford, for the endowment of eight divinity-lecture sermons, to be preached at Great St. Mary's every year, and to be published, at the expense of the estate, within two months of their being preached. The preacher is to lecture on one of the following subjects: The Confirmation of the Christian Faith, and the Confutation of all Heretics and Schismatics; the Divine Authority of the Scriptures; the Authority of the Primitive Fathers in Matters of Christian Faith and Practice; the Divinity of Christ; the Divinity of the Holy Ghost; the Apostles' and Nicene Creeds.

No person is qualified to preach these lectures who has not taken the degree of M.A., either at Oxford or Cambridge, and the same person shall never preach them twice. The first course was delivered in 1780. In 1834 and 1835, no lecturers were appointed, and no lecture was preached in 1841. With these exceptions there has been an unbroken series of very valuable, but rather learned than popular, discourses. The most remarkable are the following: Those delivered in 1784, on Christianity and Mohammedanism, by Dr. White, who was accused of having obtained assistance in their composition from Dr. Parr and Dr. Badcock; those by Dr. Tatham in 1790, on the Logic of Theology; those of Dr. Nott in 1802, on Religious Enthusiasm—this series was directed against the pretensions of Wesley and Whitefield—those of Dr. Mant in 1812; those of Reginald Herber in 1815; Whateley in 1822; Milman in 1827; Burton in 1829, on the Heresies of the Apostolic Age; Soames in 1836, on the Doctrines of the Anglo-Saxon Church. But of the whole series, none have caused greater excitement and controversy than those delivered by Dr. Hampden in 1832, on 'The Scholastic Philosophy considered in its Relation to Christian Theology.' They were attacked on all sides, but especially by the leaders of the Oxford Tract Association. Hampden was accused of Rationalism and Socinianism. When he was appointed Regius Professor of Divinity in 1836, a petition against his appointment was sent up to the throne; and upon this being rejected a censure was passed upon him in convocation by a large majority, declaring his teaching to be unsound, and releasing undergraduates from attendance at his lectures. Notwithstanding this, he was raised to the see of Hereford in 1847, under the government of Lord John Russell—thirteen of the bench of bishops protesting against the appointment. The course of B. L. delivered by the late Dean Mansel, in 1858, on 'The Limits of Religious Thought,' caused a less bitter, but scarcely less interesting controversy. Mr. Mansel possessed great power as a dialectician, and his lectures contained many very eloquent passages. The main position which he took up was, 'That the human mind inevitably, and by virtue of its essential constitution, finds itself involved in self-contradictions whenever it ventures on certain courses of speculation,' i. e., on speculations concerning the infinite nature of God. He maintained that all attempts to construct an objective or metaphysical theology must necessarily fail, and that the attainment of a philosophy of the Infinite is utterly impossible, under the existing laws of human thought—the practical aim of the whole course being to show the 'right use of reason in religious questions.' Mr. Mansel was accused by his critics of condemning *all* dogmatic theology (e. g., all creeds and articles), and of making revelations itself impossible. Mr. Maurice was one of his principal opponents. Canon Liddon's lectures in 1866, on our Lord's Divinity, have been the most important since Dean Mansel's. The B. L. for 1874 were delivered by the Rev. Stanley Leathes, on 'The Religion of the Christ;' in 1879, by Mr. Wace, on 'The Foundations of Faith;' and in 1880, by Mr. Hatch, on 'Early Christian Organization.'

A course of lectures similar to the Bampton was founded about the same time at Cambridge, by the Rev. John Hulse. See HULSEAN LECTURES.

BAMPU'RA, BHAMPURA, or BHANPURA, a town of Hindustan, in the territory of Indore, on the Rewa, 1344 feet above the level of the sea, about 180 miles south-west of Gwalior. It is situated at the base of a range of hills, is surrounded by a wall, and has an unfinished fort, built of stone, which encloses an unfinished palace. Both palace and fort were begun by Jeswunt Row Holkar, of whom there is a beautiful marble statue in the palace. B. is the principal place of a pergunnah containing 70 villages. Pop. 20,000.

BAN. This word occurs in most of the modern languages of Europe, and its primary signification appears to have been, 'to make a signal' (see BANNER), 'to proclaim' or 'publish.' This meaning it retains in the phrase, *bans* or *banns* (q. v.) of marriage. In Germany, the *acht* or *bannum* was a sentence of outlawry pronounced in the middle ages against those who escaped from justice, or refused to submit to trial. We often read of refractory princes, and even cities, being placed under the *ban of the empire*. The following are the terms of banning used in an old formula: 'We declare thy wife a widow and thy children orphans; we restore all thy feudal tenures to the lord of the manor: thy private property we give to thy children; and we devote thy body and flesh to the beasts of the forest and the fowls of the air. In all ways and in every place where others find peace and safety, thou shalt find none; and we banish thee into the four roads of the world—in the devil's name.' Besides these sentences of outlawry, other announcements were accompanied with denunciations and imprecations. When a grant of land was made for a religious purpose, or when a charter of liberties was granted, the transaction was proclaimed in public with certain ceremonies, and curses were denounced against any one who should violate the deed. The *banning*, or publishing, came to be associated with cursing; and hence the origin of the popular use of the word. It occurs in this sense in Shakespeare and Milton, and other old writers.

BAN; ARRIÈRE BAN. Besides the civil use of the word ban, as a proclamation or prohibition, there was a military application of the term in former days in France. When the feudal barons, who held their estates and honors from the king, were summoned to attend him in the time of war, they were called the *ban*, or the levy first called out; while the tenants, subordinate to these barons, formed the *arrière ban*, or secondary levy.

BAN, or BA'NUS, supposed by some to be a contraction of the Illyric word *Bojan*, i. e., lord, but more probably another form of the Slavonic word *Pan*, which possesses the same signification. Formerly, it was a title given to some of the military chiefs who guarded the eastern boundaries of the Hungarian kingdom, and was therefore synonymous with the German *Markgraf*. The ban, who was appointed by the sovereign, but not for life, and whose appointment had to be ratified by the national diet, had originally very extensive, in fact, almost unlimited powers. In political, judicial, and military affairs, he was the supreme authority. Within his own territory, he exercised an influence similar to that of the Palatin in Hungary, and only lower than a king. In time of war, he headed the troops of his *Banat* (q. v.), and if the campaign occurred within its limits, it was his duty invariably to occupy the post of danger. He led the van to battle, or covered the rear in retreat. For these services, he was recompensed partly in ready money, and partly by a monopoly of salt. The most important banats were those of Dalmatia, Croatia, Slavonia, Bosnia, Machow, and Szorény, but their boundaries changed so frequently, that at the present day it is impossible to ascertain what they originally were. The encroachments of the Turks in the 16th c. rendered the union of the various banats necessary; and after some time, the whole were formed into the double banat of Dalmatia and Croatia. A still more complete unity was subsequently obtained by centralizing the military power. In 1723, the authority of the B. was made entirely subordinate to that of the supreme government of Hungary. After numerous vicissitudes, his powers, rights, and titles were strictly defined during the reign of Maria Theresa. He was then acknowledged to be the third dignitary of the Hungarian kingdom, appointed a member of the Hungarian council of government, and president of the council of the banat, and at the coronation of the Hungarian king went before him, bearing the golden apple, the symbol of sovereignty. Such was the position of the ban until the 4th of March 1849, when Croatia, Slavonia, and Dalmatia were transformed into Austrian crown-lands, and the ban made wholly independent of Hungary. In 1868, Croatia and Slavonia were reunited with Hungary. One of the Hungarian ministers superintends the affairs of the 'Kingdoms of Croatia and Slavonia;' while there is a special local administration for internal affairs. The head of this administration is called the Ban.

Banana.

BANA'NA, a fruit originally East Indian, but much cultivated in warm countries over the whole globe. It is now generally regarded as a mere variety of the Plantain (q. v.); although they were formerly ranked by botanists as distinct species, the Plantain under the name of *Musa Paradisaica*, and the B. of *M. sapientum*—the specific name signifying 'of the wise men,' and being intended to convey an allusion to a statement by Theophrastus concerning a fruit which served as food for the wise

men of India, and which, from his description, is supposed to have been the plantain or banana. The names plantain and B. are somewhat vaguely used in their application to different cultivated varieties, which are very numerous; those called B. have generally dark purple stripes and spots on their stems, and the fruit is smaller, less curved, and of more delicate taste than the plantain, with a soft and luscious pulp. Each fruit is generally about four or five inches long. The B. is always used in a ripe state, and never like the plantain, as a substitute for bread; unless when the pulp is squeezed through a sieve, and formed into small loaves, which, when dried, may be kept for a great length of time, but which are saccharine, and not farinaceous. It is sometimes fried in slices; it is often made into preserves; and its juice affords an excellent wine. It has been produced of good quality in hothouses in Britain.—The fruit of *Musa Cavendishii* is sometimes also called banana. See PLANTAIN.

BANA'NA BIRD (*Xanthornus Icterus*), a beautiful bird, allied to the Baltimore Bird (q. v.), which it considerably exceeds in size; a native of the West Indies and warm parts of America. Its colors are tawny and black, with white bars upon the wings. It is very lively and active. It is gregarious, and a number of the nests may often be seen near each other, suspended to the extremities of slender branches of trees, so as to be out of the reach of snakes and monkeys. It is often kept in houses to destroy insects. It is very easily domesticated, and delights to be caressed.

BA'NAS, or BUNAS, the name of three rivers of India.—1. A river of Rajpootana, rising on the western frontier of Mewar, in the Aravulli Mountains, about N. lat. 24° 47′, E. long. 73° 28′. Flowing through Mewar 120 miles, in a generally north-eastern direction, receiving the Beris, or Beruch, on the right, and the Botaseri on the left, it passes the town of Tonk, where it changes its course to the south-east, and falls into the Chumbul in N. lat. 25° 54′, E. long. 76° 50′, after a total course of 320 miles.—2. A river which also rises in the Aravulli Mountains, and after a south-westward course of 180 miles, is lost in the Runn of Cutch, terminating in a number of small and intricate channels.—3. A river of Rewah, in Bundelcund, having a north-westward course of about 70 miles, and falling into the Sone near Rampur.

BA'NAT, any district or territory under a ban, but specially applied to a province of the Austrian empire, which has, curiously enough, *no* ban. It is bounded on the W. by the Theiss; on the S., by the Danube; on the E., by the line of mountains which separates Hungary from Walachia and Transylvania; and on the N., by the Maros. It consists of the three Comitate, Temesvár, Torontál, and Krassowa. Pop. (1880) 1,308,341. It is partly mountainous and partly flat, but is everywhere copiously watered, and exceedingly fertile. The chief rivers are the Temes and Karasch. The climate is warm in summer, and comparatively cold in winter; but, though not unpleasant, it is far from salubrious in the west, on account of the swamps and morasses which abound. Nevertheless, it is the most productive of the Austrian provinces, yielding rich crops of wheat, spelt, and other grains; the vine is little cultivated. Wild-fowl are numerous, and the rivers swarm with fish. The mines are valuable; coal, iron, copper, gold, silver, and zinc being procured in considerable quantities. The mineral springs of Mehadia are in great repute. The principal town is Temesvár.

B. Belongs to the Hungarian portion of the Austrian Empire. It was formed into an Austrian crown-land in 1849, but was restored to Hungary in 1860.

BANAWARA'M, a town of India, in the territory of Mysore, in a fine open country, among the head-waters of the Hugri, 81 miles north-west from Mysore. It is a town of some antiquity. It was taken in 1694, in a night-assault by Chika Deo, Rajah of Mysore. When it had fallen under the dominion of Hyder Ali, the inhabitants were in great part removed to Nagapuri, a new town which Hyder had founded in the vicinity. Previous to this removal, the pop. was about 10,000. The new town proving extremely unhealthy, the survivors of the people of B. were permitted to return to their old habitations.

BA'NBRIDGE, a small town in the west of Down county, Ireland, on a steep slope on the left bank of the Bann, 76 miles north of Dublin. It is a thriving seat of the linen manufacture in all its stages, from the preparation of the soil for the flaxseed to the finishing of the finest linen. Miles of bleaching-greens exist in the vicinity, and numerous factories along the Bann. Pop. (1881) 5609.

BA'NBURY, a small town in the north of Oxfordshire, on the right bank of the Cherwell, 23 miles north of Oxford. There formerly existed here a very strong castle, which was built about 1125, and sustained various sieges during the early English civil wars. At Danesmore, near B., the Yorkists were defeated in 1469. B. is the center of the famous rich red land of Oxford county, among the most fertile in the kingdom. A system of canals connects the town with all parts of England. The vicinity is thickly studded with villages. Numerous remains of the ancient Britons are found in the neighborhood. B. is noted for its manufacture of agricultural implements, and for malt liquors, cheese, and cakes. There are also manufactures of plush, shag, girth, and other webbing. B. returns one member to parliament. Pop. of mun. bor. (1871) 4122, (1881) 3600; of parl. bor. (1871) 11,726, (1881) 12,072.

BANC, legally, is a seat or bench of justice, and in this sense has given rise to the expression of the courts of law at Westminster 'sitting in banc,' or *in banco*—that is, sitting together on the bench of their respective courts, in term-time, and otherwise, as is provided by statute.

BA'NCA, an island north-east of Sumatra, 1° 30′—3° 5′ S. lat., and 105° 10′—106° 53′ E. long., has an area of 6883 square miles. Pop. (1871) 153 Europeans and 41,748 natives and Chinese. Gold, iron ore, silver, lead, and amber are found, and the tin exported to Java for Holland averages 4200 tons.

BA'NCO (It.), a commercial term meaning the standard money in which a bank keeps its accounts, as distinguished from the current money of the place. The distinction was more necessary when the currency consisted, as it often did, of clipped, worn, and foreign coins. These the early banks (Venice, Amsterdam, &c.) received at their intrinsic worth, and credited the depositor in their books with this bank-value. The term was chiefly applied to the money in which the Hamburg bank kept its accounts, before the adoption of the new universal coinage of the German Empire. It was not represented by any coinage. The Hamburg Mark B. (=1*s.* 5½*d.* sterling) was to the current mark (=1*s.* 2½*d.*) as 20 to 16. Sweden had a peculiar bank-money, 8 dollars B. being equal to 3 dollars specie. Genoa had at one time a bank standard, and the present current money being different from that, is still called 'fuori banco,' outside the bank.

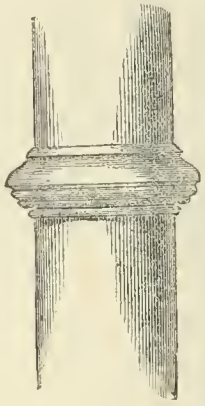
BA'NCROFT, GEORGE, American historian, born 3d October 1800, near Worcester, in Massachusetts, was the son of Dr. Aaron Bancroft, an eminent Unitarian minister. He entered Harvard College at the age of 13, and obtaining a valuable exhibition there, proceeded in 1818 to Göttingen, where he studied history and philology under Heeren, Plank, and Eichhorn, and in 1820 obtained the degree of doctor. At Berlin, he attended the lectures of Hegel, and had frequent intercourse with Schleiermacher, W. von Humboldt, Savigny, Varnhagen von Ense, and other literary men of note. Subsequently, he traveled through Germany, and formed an acquaintance with Goethe and Schlosser. Having visited Paris, London, and Italy, B. returned to America, and after some time spent in tuition, devoted himself to politics. He soon became celebrated as a democratic politician, and was made collector of customs at Boston. He still continued his literary labors, especially in lectures upon German literature, philosophy, &c. When Polk was elected president, in 1845, he appointed B. secretary of the navy. While in this office, he established an observatory at Washington and a naval school at Annapolis. In the autumn of 1846, B. was sent by Polk as ambassador extraordinary and plenipotentiary to England, where he remained till 1849, carefully collecting materials for a *History of America*. He published the result of his labors in his *History of the Revolution in North America* (Boston, 1852). He had already published his *History of the Colonization of the United States of North America* (3 vols., Boston, 1834–1840). The whole of these writings are included in the author's *History of America*, a work of solid excellence, the 10th and last vol. of which appeared in 1874. In 1866, B. delivered an oration in honor of Abraham Lincoln. From 1867 to 1874, he was Minister Plenipotentiary at the court of Berlin. For some years he was a principal contributor to the *North American Review*.

BA'NCROFT, RICHARD, Archbishop of Canterbury, and a bitter opponent of the Puritans, son of John B. and Mary, niece of Hugh Curwyn, Archbishop of Dublin, was born at Farnworth, Lancashire, in September 1544. Educated at Cambridge, he took the degree of B.A. at Christ's College in 1567, and that of M.A. at Jesus' College in 1570. He became rector of Teversham, Cambridgeshire, in 1575, of St. Andrews, Holborn, in 1584, and treasurer of St. Paul's Cathedral in 1585. In the latter year, he was admitted D.D.. By the Lord Chancellor Hatton, to whom he was chaplain, he was presented to the rectory of Cottingham, Northamptonshire. In 1589 he became a prebendary of St. Paul's, in 1592, of Westminster, and in 1594, of Canterbury. Consecrated Bishop of London, May 8, 1597, he attended Queen Elizabeth during her last illness. At the famous Hampton Court Conference under James I., he was one of the chief commissioners on behalf of the Church of England, and took the lead in the disputations. In the convocation of 1603—4, he sat as president. In October 1604, he succeeded Whitgift as Archbishop of Canterbury; and was sworn in one of his majesty's privy council in September 1605, and chancellor of the University of Oxford, 1608. He died November 2, 1610. B. had a high character as a preacher and

statesman; and was a vigilant ruler of the church. He is author of two sermons, one of which, preached at St. Paul's in 1588, contains a furious invective against the Puritans, and of two treatises repecting church order and discipline. B. left his library to his successors in the see of Canterbury for ever.—His nephew, JOHN B., Bishop of Oxford, 1632, died 1640, built the palace of Cuddesden for the bishops of that see. Burned by the parliament troops, 1644, it was rebuilt, 1679.

BAND, or BANDS, a portion of clerical dress, and the only relic of the ancient *amice*, a linen vestment which was used in the ancient church to cover the shoulders and neck of the priest. It also forms a part of the full dress of the bar, the universities, and the leading functionaries in schools of old foundation. At Winchester and some other schools, it is even worn by the scholars themselves. The bands worn by lawyers and other civilians, may be a relic of the wide stiff collar which was a part of the ordinary civilian dress in the reign of James I.

BAND, in Architecture, is the name given to any kind of ornament which is continued horizontally along a wall, or by which a building is encircled. Bands often consist of foliage, quatrefoils, or of simple bricks. *B. of a shaft* is the moulding or suits of mouldings by which the pillars and shafts are encircled in Gothic architecture. Several bands are often placed at equal distances on the body of the shaft, when it is long, in which case they are known as shaft-rings.



Band of a Shaft.

BA'NDA, chief town of a district in Bundelcund, in lat. 25° 28′ N., and long. 80° 23′ E. In 1872, its population was 27,573. It is a great mart for cotton. It is situated on the right bank of the Cane or Keyn, an affluent of the Jumna, being 95 miles to the south-west of Allahabad, 560 to the north-west of Calcutta, and 190 to the south-east of Agra. The district of B. contains 3030 square miles, and (1872) 692,909 inhabitants

BA'NDAGES are used by surgeons to apply pressure on a part, or to retain dressings upon wounds. The most common bandage is a strip of linen, calico, or elastic web, from 3 to 5 or more inches in breadth, rolled longitudinally; hence the name *roller*. There are also B. to suit special purposes, as the four-tailed for the head or knee, which consists of a piece of cloth split up on each side towards and nearly to the center. When applied, the tails are crossed and tied so as to make an extemporaneous night-cap. In applying the roller bandage to a leg, the surgeon first turns it round the foot, then round the ankle; and so by repeated turns, each one of which should overlap about a third of the previous one, till he reaches the calf of the leg, when he must fold at each turn the bandage sharply back on itself, by which manœuvre the bandage will lie flat and smooth on the limb. The operator must remember that the bandage must be applied more tightly at the foot than in the leg, so that it may not impede the course of the blood through the veins. This requires to be practised, as the effect of a bandage is always for good or evil as it is well or ill applied.

Bandage.

BA'NDA ISLES, a portion of the Moluccas, consisting of 12 islands, 6 of which are uninhabited, about 50 miles to the south of Ceram. Pop. (1870) of Banda and Amboyna, 236,737; of the former alone probably about 110,000. Their mean lat. and long. respectively are 4° 30′ S., and 129° 50′ E. Their chief production is the nutmeg, the annual export of that spice being about 1,000,000 lbs., with a corresponding quantity—about one-third—of mace. Like most of the islands in this neighborhood, they belong to the Dutch. They are lofty and volcanic.

BANDAJA'N, a pass over the Himalaya, forming the southern boundary of Kunawar. It is amidst mountains of gneiss, and is covered with perpetual snow. The summit of the pass is 14,854 feet above the sea, and is in N. lat. 31° 23′, E. long. 78° 4′.

BA'NDA ORIE'NTAL, a state of South America. See URUGUAY.

BANDA'NA, a kind of printed handkerchief of Indian origin, now extensively made in Britain, usually of cotton. The cloth is first dyed Turkey red, and then the pattern is made by discharging the color with bleaching liquor in a powerful Bramah press. The pattern to be discharged is cut out on two plates of such metal (lead) as may not be acted on by the liquor, and of the full size of the handkerchief. A dozen or more are put in at once between the plates, and so many of these courses are entered together as fill the press, when the pressure is applied, and the liquor is run in on the uppermost plate, which is grooved on the upper side to receive it, and holed to pass it from plate to plate through all the cloth-folds in the press. The pressure on the cloth to make clean work by preventing the spreading of the liquor, is enormous. The patterns in the real B. style of printing are spots and diamond prints, the best suited for discharging, and even for these a pressure of 500 tons is required to work them clean. See CALICO PRINTING.

BA'NDEL, ERNST VON, an eminent modern sculptor, was born in 1800, in Anspach. While attending the academy at Munich, he prosecuted his studies so diligently that in 1820 he sent to the exhibition a plaster figure of Mars reposing, as large as life, which procured for him considerable reputation. Of various models of this kind done by him, one, a figure of Charity, was executed in marble. This work occupied the artist about ten years. It exhibits great chasteness of design, and a minute carefulness of execution. Among his best portrait busts, in which he excels, are those of Maximilian, king of Bavaria (1832), and of the artists D. Quaglio and Peter Hess. In 1834, he removed to Berlin, where his chief works were a colossal statue of Herman (q. v.), the foundations of which were laid in 1841, but which was not inaugurated till 1875; a life-size statue of Christ; a life-size statue of Hermann's wife; and a bust of the poet Grabbe. For Hanover, where he has chiefly resided of late years, he has executed the statues of Shakspeare and Goldoni for the theater, and other works. For Göttingen, he executed a statue of William IV.

BANDE'LLO, MATTEO, an Italian writer of *novelle* or tales, was born at Castelnuovo in Piedmont about the year 1480. In early life, he became a Dominican monk, in the Convent delle Grazie at Milan, but soon abandoned this vocation for a more free and independent life. His uncle, who had been elected general of the order in 1501, took him to travel with him; and in Rome and Naples, B. devoted himself to the study of belles-lettres. He then returned to Milan, whence he was driven by the Spaniards, as a partisan of France, after the battle of Pavia in 1525. He accompanied Francis I. to France, and was, in 1550, made bishop of Agen by Henry II. He left the care of his diocese to the Bishop of Grasse, in order to be able to devote himself without disturbance to the completion of his tales, which he published in the Italian language in three volumes (Lucca, 1554), to which a fourth was added after his death, which took place in 1561. The tales of B. rank next to those of Boccaccio in Italy. They are distinguished by unaffected simplicity of style, fluency and vividness of narrative, and a harmonious brevity of periods. It must be confessed, however, that they are not unfrequently very impure in tone. B. wrote several other works.

BANDE NOIRE ('Black Band') was the name given, during the first French Revolution, to the societies of capitalists who bought the confiscated buildings which had belonged to the church, emigrants, &c. The opprobrious name was fixed on them on account of their vandalism in the destruction of old relics, works of art, churches, convents, abbeys, episcopal residences, &c., many of which possessed both a scientific and historical interest. It has, however, been alleged, on the other hand, that these societies have frequently done considerable service to the community, in removing old and useless edifices, and that their minute subdivision into lots of the old territorial domains has both favored agriculture and ameliorated the condition of the people.

BA'NDEROLE, a small streamer fixed immediately under the crook, on the top of the staff of a crosier (q. v.), and folding over the staff.—Also an architectural term for the flat inscribed band used in the Renaissance buildings, similar to those now used for mottoes to coats-of-arms.

Banderole.

BA'ND-FISH, or SNA'KE-FISH (*Cepola*), a genus of fishes of the Ribbon-fish (q. v.) family. The body is much elongated and compressed. The bones are little more solid than a mere fibrous net-work, and everything else exhibits a corresponding delicacy, so that specimens are seldom to be obtained in an uninjured state. All the species inhabit quiet depths, and are incapable of contending with waves and currents. Their singular form, and the beauty of their colors, make them objects of great interest. One species, the Red B. (*C. rubescens*), not uncommon in the Mediterranean, is occasionally cast ashore by storms on the British coasts. It is about fifteen inches long. Its brilliant appearance, when seen moving in the water, has suggested the names of Fire-flame and Red-Ribbon, by which it is known at Nice.

BA'NDICOOT (*Perameles*), a genus of marsupial (q. v.) quadrupeds, occupying in the zoology of Australia a place somewha

analogous to that of shrews (q. v.) in Europe. Their dentition is remarkable, as they have ten cutting teeth in the upper jaw, and only six in the lower, the posterior ones of which are two-lobed: in other respects, it nearly resembles that of opossums. They have an elongated head and pointed muzzle; the hind-legs are considerably longer than the fore-legs; the thumb and little toe of the fore-feet are little more than simple tubercles, so that there seem to be only three toes; and there is a fleshy tubercle in place of a thumb on the hind-feet. Their movements are similar to those of hares or rabbits. They live on bulbs, insects, &c., make ravages in potato-fields, and devour corn in granaries. There are several species. The Long-nosed B. (*P. nasuta*) is about a foot and a half in length from the extremity of the nose to the origin of the tail, which is not unlike that of a large rat, but better covered with hair. It is chiefly found in the mountainous parts of New South Wales. *P. Gunnii* is common in Van Diemen's Land.

BA'NDICOOT, BA'NDICOOT RAT, MALABA'R RAT, or PIG-RAT (*Mus giganteus*), the largest known species of rat. The name B. is a corruption of the Telinga *pandikoku*, literally signifying pig-rat. The animal inhabits many parts of India, and is plentiful in Ceylon. It is chiefly found in dry situations, and often in hilly districts. It attains the weight of two or three pounds, and is 24—30 inches long, including the tail, which at the base is 2¼ inches in circumference. The body is thick, and greatly arched, black above, grayish below. Its flesh is a favorite article of food with the coolies of India, and is said to be delicate, and much to resemble young pork. It feeds chiefly on grain and roots, and is very destructive in gardens. 'Its nests, when rifled, are frequently found to contain considerable quantities of rice, stored up against the dry season.'—Sir J. E. Tennent's *Ceylon*.

BANDIE'RA, Attilio and Emilio, two brothers well known for their tragic fate, were descended from a distinguished aristocratic family of Venice, which had once held a place in the red book of the republic. They were lieutenants in the Austrian navy, their father being rear-admiral; but, instead of sharing the pro-Austrian sentiments of their parent, they cherished enthusiastic dreams of the free and united republic of Italy. In the year 1842, they entered into correspondence with Mazzini, whom they regarded as almost a demigod. Their glowing and enthusiastic patriotism breathes in every line of their letters. Both were noble spirits, ready for any sacrifice, but unfortunately impressed with the delusive idea that their native country could be saved by means of a conspiracy. Emilio, the younger, of a stronger bodily frame, but of a lighter disposition, was under the influence of his graver and more thoughtful brother. In the year 1843, they believed that the time was come for a revolution by force of arms; but their premature appeal finding no practical response, they fled to Corfu in March, 1844, where they endured many bitter disappointments and much misery. Hope alone inspired them with life; but at length, misled by false rumors of a rising in Naples, with which it is supposed the Neapolitan police had something to do, they ventured to land with twenty companions at the mouth of the small river Nieto, in Calabria, believing that their appearance would be the signal for a general insurrection. The Neapolitan government expected them; one of their companions, a certain Boccheciampe, had betrayed them. They were attacked by an overwhelming force, and were nearly all taken prisoners at once. One only fell on the spot, and two escaped. Nothing was ever allowed to transpire respecting the trial of these unfortunate men. Attilio and Emilio were shot along with seven of their comrades in the public square of Cosenza, on the 25th July, 1844. They died joyfully, exclaiming 'Viva l'Italia!' The public mind had not then become accustomed to hear of bloody deaths for political causes. A cry of indignation resounded through Europe at this 'kingly revenge,' as it was called in a conservative paper of the day. A year later, their remaining companions were pardoned. The fate of the brothers B. attracted much attention in England, from the circumstance that letters of M. Mazzini, then in London, had been opened in the post-office by authority of government, which was accused of giving such information to the Italian governments as enabled them to entrap the insurgents.

BANDINE'LLI, Baccio, the son of a famous goldsmith of Florence, and one of the best sculptors of his time, was born at Florence in 1487. His first instructions were probably received in the workshop of his father, for in those days goldsmiths wrought from their own designs. He was afterwards a pupil of Rustici, and the friend of Leonardo da Vinci. He was an angry and jealous rival of Michael Angelo, whose grandeur of conception he strove to equal, and who is said to have retaliated his enmity by contempt. It must be admitted, however, that we have only prejudiced sources from which to draw our information regarding him. Benvenuto Cellini, whose language is generally passionate and hyperbolical, is his chief accuser, although Vasari also speaks of his proud and envious disposition. Whatever may have been his moral infirmities, it is impossible to deny that, as a sculptor, he was in his day second only to Michael Angelo. His feuds with his brother-artists do not appear to have injured him in the opinions of persons of distinction. He was patronized by Cosmo de' Medici, Charles V., Francis I., Clement VII., and other powerful friends. Clement even bestowed on him an estate. He died at Florence, 1559—1560.

His best works are bassi-rilievi, among which are those that adorn the choir of the Duomo at Florence. On the high-altar in the same building is to be seen his Corpse of Christ, supported by an angel, with God the Father, over it. His most ambitious work is Hercules with Cacus at his feet. In the Medicean Gallery are his copies of the group of the Laocoon—a masterly imitation of the antique, in which he boasted that he excelled even the ancients themselves. He also executed statues of some of his patrons; all his works exhibit power, vigor, and skilful drawing, but it is alleged, apparently with considerable truth, that 'he was too fond of the terrible graces of composition.'

BA'NDIT, a word originally signifying a 'banished' or outlawed person; then one who, because outlawed, wages war against civilized society; and finally, a highway robber. The banditi, or banditti, formed in Italy in earlier times, as it were, a separate community or guild, who submitted to their own stringent laws, carried on both open and secret war with civilized society, and kept up a certain romantic idea of honor. By means of the severe measures which were adopted in 1820 by the papal government against the banditti and their abettors, their haunts were broken up. Those who still occasionally disquiet the frontiers of Naples are in general people settled on the spot, who regard robbery and murder as equally a branch of their trade with agriculture. Peter the Calabrian, one of the most famous B. chiefs in 1812, assumed the titles of 'Emperor of the Mountains, King of the Woods, and Lord of the Highroads from Florence to Naples.' The government of Ferdinand I. found themselves obliged to conclude treaties with him. The banditti must be distinguished from common robbers, who were called *Malviventi*. In later times, the banditti were joined by adventurers of all kinds, to such an extent, that the Austrian troops who occupied Naples were obliged to make frequent expeditions against them. In Sicily, the banditti are most numerous in the Val Demone. They formerly acquired so much power there, that the Prince of Villafranca, as a piece of policy, declared himself their patron, and treated them with much confidence. In the years 1841—1843, political fugitives united with robbers and adventurers of all kinds in the Abruzzi, Calabria, and Romagna, and since then they have never been entirely extirpated. The revolutions of 1848—1849 added greatly to their numbers, and in several districts of Italy, especially in the States of the Church, between Ferrara and Ancona, they reached an unheard of degree of boldness, notwithstanding the Austrian army of occupation. Under the command of one Bellino (known by the name of 'Il Passatore'), a daring and talented man, who died in March 1851, they kept the country in terror, and even burned several villages to the ground. They also carried on a real guerrilla warfare against the military forces of the country. Recent events in Italy, have, it is said, recalled numbers of these banditti to a more honorable life. See Camorra.

BANDOLEE'R, or BANDALEE'R. Two centuries ago, soldiers' muskets were provided with *matchlocks*, a very slow and ineffective contrivance for firing. The musketeers were furnished with gunpowder in small cylindrical boxes made of wood, tin, or leather, each containing sufficient for one charge. Twelve of these little boxes were fixed to a belt called a *bandoleer*, worn over the left shoulder. In what way these were superseded by a superior arrangement, will be found noticed under Cartridge.

BA'NDOLINE is a mucilaginous substance used for stiffening hair, and keeping it in shape or form. It is much used by ladies in the present prevailing mode of wearing the hair, and by gentlemen, to dress their moustaches. The usual receipt for making the B. sold in the shops is to boil Carrageen (q. v.) or Irish-moss with water till a thick mucilage is obtained, which is afterwards scented with *Eau de Cologne* or other perfumed spirit; a second mode of preparing A. is to soak quince-seeds in cold water for a day or two, then strain, and add perfume; and a third process is to heat gum tragacanth with water, and when the mucilage is obtained, add the scent.

BA'NDON, or BANDONBRIDGE, a town of the county of Cork, Ireland, on the Bandon, 12 miles south-west from Cork, with which it is connected by a railway. The houses are built of stone. There are several good streets, and numerous ecclesiastical and other public buildings. B. was originally peopled by a colony of English Protestants, and was so strictly Protestant, that till about the beginning of the present century, no Roman Catholic would have been allowed to settle in it. More than three-fourths of the population are now Roman Catholics, and there is a Roman Catholic convent. B. was at one time a prosperous manufacturing town, cotton-spinning and weaving being extensively carried on; but these branches of industry have been almost entirely relinquished, and the pop., which was 6131 in 1871, had diminished to 5949 in 1881. It returns

one member to the House of Commons. The country around B. is very beautiful, well wooded, undulating, and pastoral. The river Bandon rises in the Carberry Mountains, and at its mouth forms the harbor of Kinsale. Spenser describes it as 'the pleasant Bandon, crowned by many a wood.' It has a course of 40 miles, for 15 of which it is navigable, to Innishannon, 4 miles below Bandon.

BANDO'NG, a commercial town on the west coast of Java, in the vicinity of the volcano Gunong Guntour, by an eruption of which eighty villages were destroyed in 1822.

BANDS, MILITARY, consist each of a body of skilled musicians, attached to a regiment in the British service. According to military regulations, the only indispensable instruments are drums, fifes, bugles, and trumpets, all of which are employed to give signals on the march or in active service, either for infantry or for cavalry. To supplement this meagre musical establishment, however, the officers of regiments organize, chiefly at their own cost, effective military bands, who use a variety of instruments—such as flutes, clarionets, bassoons, horns, ophicleides, big drums, cymbals, triangles, &c. This arrangement has assumed almost the force of a regulation; for officers above the rank of subaltern are obliged to contribute a sum not exceeding twelve days' pay in the course of a year, and an extra sum when promoted, to the band-fund. The members of these bands are selected from the ranks; but the bandmaster, though in uniform, is often a civilian who is hired for the purpose, and who generally refuses to accompany the regiment abroad, except at an increased rate of remuneration. The musicians, generally, are in an anomalous position; for, whilst serving in the band, their pay, and eventually their pensions, are restricted to those of the private soldier. Good musicians have at all times a tendency to quit the B.; their better prospects as teachers, and players in orchestras and concerts, induce them to obtain release by paying the amount of compensation prescribed by regulation. An attempt made by the Duke of Cambridge in 1856, to relieve the commissioned officers of part of the expense entailed upon them by the present system, failed, except as regards subalterns, and, with that exception, matters remained as they were. In most of the regiments of the line, the band consists of a band-master and about fifteen musicians; but in the choice corps the number is often much larger. The bands plays on parade and at mess, as a part of regular duty. When M. B. play at festivals, concerts, &c., 'by permission of the commanding-officer,' the payment goes to the musicians; and the chance of obtaining these fees is one of the inducements to the men to remain in a service which has very few attractions in relation to the actual amount of pay. The bands of the three regiments of foot-guards—Grenadier, Coldstream, and Scots Fusilier—are very frequently engaged in this way during the London season.

BA'NEBERRY. See ACTÆA.

BANFF (pron. Bamf), the capital of Banffshire, a seaport in the north of the county, on the left bank of the mouth of the Doveran, 45 miles by road, and 50 by rail, north-north-west of Aberdeen. It forms a higher or inland town, and a lower or sea town, on the Moray Firth. On a height between the towns are some remains of a royal castle, on the site of which is now a large house—the 'Castle.' To the east of B. is Duff House, the seat of the Earl of Fife, with a large park. The harbor is liable to be sanded up. A seven-arched bridge over the Doveran unites B. with the seaport of Macduff, half a mile to the east. Its shipping trade is more extensive than that of B. The chief exports are corn, cattle, salmon, and herrings. Pop. in B. (1871) 7439, (1881) 7871; and in Macduff, (1871) 3407; (1881) 3650. In 1880–81, the valued rental of B. was £12,192. B. and Macduff with Elgin, Cullen, Inverury, Kintore, and Peterhead, send one member to parliament. Robert II., in 1372, made B. a royal burgh. Archbishop Sharp of St. Andrews was born here in 1613. Macpherson, a noted robber, was executed here in 1700. Great destruction was wrought by a flood of the Doveran in 1829.

BA'NFFSHIRE, a county in the north-east of Scotland, bounded N. by the Moray Firth; E., S.E., and S. by Aberdeenshire; W., by Elgin and Inverness shires. It stands thirteenth among the Scotch counties in size, and fourteenth in population. Its greatest length is about 68 miles, its greatest breadth about 32—average 12; its extent of sea-coast about 30; estimated area, 686 square miles. The surface, especially in the south and south-east, is mountainous, interspersed with fertile valleys and fine pastures; but the surface near the coast is comparatively level. The chief mountain-ranges, rivers, and strike of the stratified rocks, run from south west to north-east, and the whole county is an extensive slope in the same direction, from the Grampians to the Moray Firth, into which the rivers flow. The coast is rocky, but not high, except to the east of Banff. The highest peaks are the North Cairngorm, 4084 feet; Ben-a-main, 3874; Ben Rinnes, 2763; Corryhabbie, 2569; Knock, 1416. Ben Macdhui, 4296 feet is partly in Banffshire. The chief rivers are the Spey, which bounds a third of the county on the west; and the Doveran, 60 miles long, and mostly included within the county. The predominant rocks are granite, quartz rock, mica-slate, clay-slate, syenitic greenstone, graywacke, graywacke-slate, old red sandstone with fossil fishes, metamorphic limestone, and serpentine. The serpentine near Portsoy has long been famous as the 'Portsoy Marble.' Beryl and rock-crystal occur on Cairngorm. Lead, iron, antimony, and plumbago occur in small quantity. The soil in many parts is very fertile, and highly cultivated.

In 1878, a third of the surface of B. was in crop, the chief crops being oats, turnips, and grass. The breeding of cattle is the chief object of the farmer. In 1881, B. had 8074 horses, 41,952 cattle, 50,733 sheep, and 2954 pigs. The chief manufactures of B. are weaving, bleaching, tanning, distilling, and artifical manures. Glenlivet whisky has long been celebrated. The chief exports are grain, meal, and cattle. There are twelve fishing towns and villages along the coast. The herring-fishery is extensively carried on. The salmon-fisheries of the Spey and Doveran are very valuable, the Spey ranking after the Tweed and Tay as a salmon-river. B. is divided into the districts of Enzie, Boyne, Strathisla, Strathdoveran, Balveny, Glenlivet, and Strathavon. The chief towns and villages are Banff, Macduff, Portsoy, Keith, Cullen, Buckie, Dufftown, and Tomantoul. Pop. in 1871, 62,023; 84.79 per cent. of the children between the ages of 5 and 13 were receiving education. Pop. (1881) 62,736. There are 23 civil parishes in the county, and 81 places of worship (of which 33 belong to the Established Church, and 24 to the Free Church). Valued rental of B. (1880–81) £239,-298. The parliamentary constituency in 1880–81 was 2646. B., along with the counties of Aberdeen and Elgin, enjoys the Dick Bequest (q. v.) for parochial education. Two-thirds of B. belong to four landed proprietors. The county returns one member to parliament, and Banff and Cullen unite with Elgin, Inverury, Kintore, and Peterhead in returning another. B. contains numerous remains of antiquity, the most remarkable being the old churches of Gamrie and Mortlach. The former, built in 1010, and used for public worship till 1830, is called the 'Kirk of Skulls,' the bones of the Norsemen who fell on the neighboring field of Bloody Pots having been built into its walls. Mortlach was for a century the seat of a bishop, but David I., in 1139, incorporated the see with that of Aberdeen.

BANGALO'RE, a fortified town of Mysore, in a district of the same name, situated 70 m. N.E. of Seringapatam, in lat. 12° 58' N., and long. 77° 38' E. It is the chief military station of the British in the territory, and the terminus of the Mysore branch of the Madras Railway. It has a manufacture of silk; but that of cotton and carpets is more important. The pop. of B. was (1872) 142,-513. At B., which is 3000 feet above the sea, the thermometer rose only twice above 90° in six years. During the same period, the lowest temperature was 61°. B. was a favorite residence of Hyder Ali; and in 1791, it was stormed by the British under Lord Cornwallis. Water is good and abundant. B. had 29 joint-stock companies registered for banking or trade in 1876.—The district of B. has an area of 2914 square miles, and a pop. of (1871) 828,-354.

BANGKO'K, the capital of Siam, is situated on the banks of the Meinam, about 20 miles from the mouth of that river, in the Gulf of Siam, and in lat. 13° 38' N., and long. 100° 34' E. The population is about 500,000, about half of whom are Chinese, in whose hands is centered nearly all the trade of B., which is large, as is shown by the commercial returns. The exports in 1871 were 6,132,913 dollars; in 1872, 6,584,390 dollars. The imports in 1871 amounted to 4,509,461 dollars; in 1872, to 5,247,729 dollars. For their rights to trade here, the Chinese pay a poll-tax of about three dollars on entering the kingdom, and a similar sum is collected from them every three years. The payment of this tax exempts them from the half-yearly servitude which all other oriental strangers resident in Siam are required to give. The approach to B. by the Meinam, which can be navigated by ships of from 200 to 300 tons burden, is exceedingly beautiful, the banks being skirted by fine trees full of gay birds. As the town is neared, numerous temples present themselves, and floating-houses become common; and finally, the whole city, with its rich gardens, and shining temples and palaces, bursts full upon the view. A large number of the houses float on rafts, and can be transferred from one place to another at pleasure. There are a few houses in the city built of brick and stone, but the greater part are of wood. There are usually in each house a division for males and one for females. The land-houses are raised upon piles, 6 or 8 feet from the ground, and are reached by rude ladders—the daily flow of the tides and the annual inundations rendering this plan necessary. The floating-houses are made of bamboo-boards, wicker-work, or palm-leaves, and have generally a verandah in front, with a small wing at each end. The circumference of the walls of B., which are 15 feet high and 12 broad, is said to be 6 miles. The internal traffic of B. is chiefly carried on by means of canals, there being only a few passable streets in the whole

city. Horses and carriages are rarely seen except in the neighborhood of the palaces. The chief interest of the kingdom of Siam, according to Sir John Bowring, concentrates itself in Bangkok. B. is the constant residence of the two kings of Siam and their respective courts. The palace of the first king is surrounded by high walls, and is nearly a mile in circumference. It includes temples, public offices, accommodation for some thousands of soldiers, with the necessary equipments, a theater, and rooms for about 3,000 females, 600 of whom are the wives of the king. The sacred white elephant has also a place within the palace. Throughout the interior are distributed the most costly articles in gold, silver, and precious stones.

The palace of the second king, whose functions are not very clearly defined, is nearly as large as that of the first king, but not so ostentatious. See SIAM. The temples of B. are innumerable, and decorated in the most gorgeous style, the Siamese taking a pride in lavishing their wealth on them. Some of them, according to the Catholic bishop Pallegoix, have cost more than 4,000,000 francs (£160,000). In the neighborhood of B. are iron-mines and forests of teak-wood. The chief exports are sugar, pepper, cardamons, ivory, feathers, hides, fine woods, rice, salt, and fish. By the treaty concluded by Sir John Bowring in 1855, the Siamese reserve the right to prohibit the exportation of salt, rice, and fish, in cases of threatened scarcity. The imports are tea, manufactured silks and piece-goods, opium, hardware, machinery, and glass-wares. In 1872, 336 vessels of 132,012 tons entered, and 294 of 136,148 tons cleared the port. See Sir John Bowring's *Siam*.

BA'NGOR, an episcopal city, borough, and seaport town in the north-west of Caernarvonshire, North Wales, on the south-east bank of the Menai Strait, 2½ miles from the Britannia Bridge, and 59½ west of Chester. It consists chiefly of a narrow crooked street, a mile long, stretching south-west through a narrow fertile valley, bounded on the south by steep precipices. The grandeur and beauty of the surrounding scenery has long made it a favorite resort, and the opening of the Chester and Hollyhead Railway, on the great line of communication from London to Dublin, has greatly promoted its prosperity. The town has of late years been greatly improved, and mostly rebuilt. Its chief trade is derived from the great slate-quarries of Llandegai, 6 miles distant, and employing 2000 men. The slates are exported to all parts of the world, and also manufactured at B. into tables, chimney-pieces, &c. Pop. (1881) 8240. B. unites with Caernarvon, Conway, Criccieth, Nevin, and Pwllheli, in sending one member to parliament. B. is a place of great antiquity. In 525, St. Deiniol founded a college here. It was raised to a bishopric in 550, the founder being the first diocesan. The cathedral founded by him was destroyed by the Saxons in 1071, rebuilt in 1102, and again destroyed by fire in 1402. The present edifice, built between 1496 and 1532, is a plain embattled cruciform structure, 214 by 60 feet, with a pinnacled tower 60 feet high. Several Welsh princes and distinguished ecclesiastics are buried here. B. bishopric is the oldest in Wales.

BA'NGOR, a small seaport town in the north-east of the county of Down, Ireland, on the south side of the entrance to Belfast Lough, and 12 miles east-north-east of Belfast, with which it is connected by rail. Passenger steamers also ply daily during the summer months between B. and Belfast. Pop. (1881) 3006. Cattle and provisions are exported. Lead is found at Conlig in the neighborhood. It is a favorite watering-place of the middle classes of Belfast. St. Cungall, in 555, founded Bangor Abbey ('Banchoir,' the 'White Choir,' whence the name Bangor). From this abbey, Alfred selected professors when he founded the university of Oxford. In the 9th c. it had 3000 inmates.

BA'NGOR, a city in the state of Maine, 231 miles north-east of Boston, on the right bank of the Penobscot, about 60 miles from its mouth, and at its confluence with the Kenduskeag, which intersects the city, and affords an extensive supply of water-power. At spring-tides, which here rise 17 feet, the harbor is accessible from the sea for the largest vessels, and as the navigation cannot go higher, B. is one of the largest lumber depots in the world, absorbing and monopolizing the trade of the heavily timbered basins of the Penobscot and its tributaries. About 2000 vessels are annually employed in the trade. B. possesses several churches, a theological seminary, foundries, planing and sawing mills, &c. There are 2 daily and 4 weekly newspapers. Steam-boats run between B. and the adjacent ports of Portland and Boston, and it is a station on the Penobscot and Kennebec Railway. Pop. (1880) 16,857.

BANGO'RIAN CO'NTROVERSY. Dr. Benjamin Hoadley, Bishop of Bangor, in a sermon preached before George I., March 31, 1717, on the text, 'My kingdom is not of this world,' advanced opinions regarding the constitution of the church which excited strong opposition from the zealous advocates of ecclesiastical authority. A controversy ensued, which was carried on with great heat for many years, and resulted in a ponderous collection of pamphlets. See HOADLEY.

BA'NGOR-ISCOE'D (Bangor below the Wood), an inland village, beautifully situated, in a fertile and richly wooded country, on the right bank of the Dee, on the borders of Flint and Denbeigh shires, North Wales, 5 miles south-east of Wrexham. Pop. of township (1871) 574. It was once the seat of one of the largest monasteries in Britain. This monastery was founded before 180 A.D., and contained 2400 monks in the time of St. Augustine, in the end of the 6th c., when they distinguished themselves in resisting the claims of the papal see. Ethelred, king of Northumbria, in 593, devastated the monastery, and massacred 1200 of the monks.

BANIALU'KA, a fortified town of Bosnia, European Turkey, situated on the left bank of the Verbas, with a manufactory of gunpowder and numerous bazaars and public baths. Pop. 8000.

BA'NIAN or BANIA'N (from the Sanscrit *banij*, a merchant), a word used in India to designate a merchant or trader generally. It is more particularly applied to the great merchants in the west of India, especially in the seaport towns of Bombay, Surat, Cambay, &c., who carry on a very extensive trade by means of caravans, with the interior of Asia, even to the borders of Russia and China. Contrary to the general custom of the India people, these merchants travel much, and the establishments and counting-houses of Indian Banians are to be found in almost every commercial town of any notice in Asia. The banians form a class or division of the caste (q. v.) of the Vaisya, adopt a peculiar costume, and are strict in the observance of fasts and in abstaining from the use of flesh.

BA'NIAN DAYS, a sailor's phrase, nearly equivalent to the *jours maigres* of the French. The term denotes the days when no meat is served out to a ship's crew. Banian days have no longer any existence in the royal navy. The term is derived from the practice of the Banian (q. v.) traders.

BA'NIAN-TREE. See BANYAN.

BA'NIM, JOHN, a celebrated Irish novelist, born 1800, whose pictures of manners, in the form of tales, have excited considerable interest in England. His aim was to become for Ireland what Scott had been for Scotland. He has given proof of vigorous intellectual grasp and vivid fancy, in a series of pictures of life, in which he delineates the peculiarities of the Irish character in strong light and shade, and appeals forcibly to the national feeling. His *Tales of the O'Hara Family* (London, 1825) were followed, in 1826, by a second series, which did not disappoint the high expectations excited by the first. Of these, several have been translated into German by Lindau. Next appeared *The Battle of the Boyne*, *The Croppy* (1828), *The Denounced* (1830), *The Smuggler* (1831), *The Mayor of Windgap*, *Father Connell*, &c. In 1837, general sympathy having been attracted towards B.'s privations, occasioned by disease that precluded all literary exertion, a pension of £150 per annum from the civil list was awarded him by government, which was afterwards further increased by £40 for the education of his daughter, an only child. He died in poverty on the 1st August 1842, at Windgap Cottage, near Kilkenny.

B. failed in his attempt to portray the manners and frivolities of the higher classes; but none of his predecessors, such as Edgeworth, Morgan, and Crofton, Croker, have succeeded in depicting so vividly and truly the Irish peasant, with his picturesque peculiarities in his sufferings and errors. Although generally happy in the plot and development of his story, he is too much disposed to dwell on the horrible. His denunciations may be well founded, but they disturb the poetic effect. B. was also not quite free from a somewhat tiresome minuteness of description, and his imitation of Scott is frequently very palpable.

BA'NISHMENT, excepting in the penal sense of Transportation (q. v)., with which it is popularly synonymous, can only now be said to have a legal meaning historically. Formerly, in England, parties who were required to *abjure the realm*—that is, renounce and depart from the country—were, so to speak, *banished;* but the word appears to have a more technical and precise significance in the Scotch law than in the English, and in Scotch law-books, is defined as the punishment of exile from Scotland inflicted on persons convicted of certain offences for which that punishment is provided. But as a punishment, it has either been abolished in that country by express enactment or become obsolete by disuse. See TRANSPORTATION, PENAL SERVITUDE.

BA'NISTER, a corruption of Baluster (q. v.).

BANJERMASSI'N, a large kingdom on the south-east of Borneo, has an area of 5880 square miles, and a pop. of about 150,000 souls, chiefly Mohammedans. Since 1860, it is governed by the Dutch Resident for the south and east of Borneo, who has an assistant at Martapura, where the sultans formerly lived. B. is watered by large rivers and intersected by a chain of mountains, in several parts rising to 3000 feet. Excellent small-arms are manufactured. The products are pepper, wax, edible nests, ratans, benzoin, dragons' blood, coal, iron, diamonds, and gold dust.

B., the capital of the residency, is built on the island Tatas.

about 12 miles from the mouth of the Banjermassin or Barito; pop. 35,000. In 1871, the pop. of the residency numbered 326 Europeans and 847,846 natives. There is a considerable trade in native products, and the imports are piece-goods, gunpowder, rice, sugar, Chinese porcelain, silks, and a few horses from Java.

BANJOEMA'S, a town of Java, 22 miles from the south coast, in S. lat. 7° 33′ 45″, and E. long. 109° 19′ 20″. It is situated at the opening of an extensive and fruitful valley on the left bank of the Serajo. It is well built, and carries on a considerable trade. Pop. 9000. B. is the residence of a Dutch governor, and has a fort and garrison. It is the capital of a province of the same name, which produces coffee, sugar, indigo, rice, tobacco, &c.

BANK, BANKING. A banker lends money at interest, usually for short periods on satisfactory security, and receives money on deposit, for which he sometimes allows interest and sometimes does not, but merely keeps it safely for the depositor. Some banks —notably the Bank of Amsterdam, which during the 17th c., was the great warehouse for bullion in Europe—were simply custodiers of coin and bullion lodged with them, for which they granted receipts transferable from hand to hand, entitling the owners to get back the gold or silver, in coin or bullion as originally deposited. But money lying in such banks was unproductive, and indeed entailed upon the owners considerable charges to pay the necessary expenses of management.

In recent times the competition for money by borrowers has become so keen, and the outlets for lending it safely so numerous, that banks of this class are no longer needed. They have in fact all passed away, and the business of receiving money is now universally combined with that of lending it out. A banker does not hoard all the money deposited with him; he gives the greater portion out on loan. The advantages accruing to society from the operations of banking are thus immensely increased. A banker receives from all around him the sums of money, both small and great, which would otherwise be useless in the coffers of the owners, and lends it to those who can employ it to advantage and could not otherwise obtain it. Capital hitherto lying useless and unproductive becomes through his agency useful and productive. The direct advantages arising from such transactions are considerable. The banker, if the money is allowed to lie with him for some time, will pay the depositor interest upon it, will lend the amount to a borrower who will engage in some business transaction with it and make a profit thereby; and the banker himself will make a profit upon the difference between the interest allowed to the depositor and charged to the borrower. But besides the direct advantages the indirect advantages are not less important. With the money thus lent out, manufacturers can purchase raw material to be worked up, and procure food and clothing for their workmen; and traders can go into the markets and purchase commodities for resale. Commodities are thus more quickly turned to useful purposes, and a stimulus is given to the production of more. But a banker deals not with the money only of others; he uses money belonging to himself. This is his *capital*. Few would be found to deposit money with a person known to possess none of his own. If he should lend deposits to those who fail to repay them—that is, *make bad debts*—he has the means from his capital of replacing the deposits thus lost.

The services that a banker performs as the cash-keeper of his depositors are very great. In the case of persons not themselves in business, it is quite usual for a banker to make all their money-payments, beyond their small daily expenditure, and to receive the money payable to them. The money transactions of such persons are thus contained in their banker's books. This is effected by the depositor giving a cheque or order on his banker for the sums he has to pay; and by handing to him all the *cheques* or orders the depositor receives for sums payable to himself. Suppose a person's income derived from dividends on government stock: he sends a *power of attorney* or authority to his banker to uplift the dividends for him. These are received by the banker as deposits, and are drawn out by the depositor as occasion occurs, by cheques issued by the depositor to those to whom he requires to pay it away. So he may receive money due to him by a cheque given to him by his debtor. This cheque he sends to his banker, who will obtain payment. If both persons deal with the same banker, a simple transfer in his books will carry through the transaction; and if the bankers be different, and each has received, in the course of his business, as is always happening, a cheque on the other, there will be a set-off between them; and two payments will be made as well as two deposits, without trouble to the persons concerned, and without the employment of any money. But this mode of managing one's pecuniary transactions is not confined to the case of those not engaged in business; on the contrary, it is followed on a scale out of all proportion greater in carrying through the money transactions of those in business or trade in the principal industrial countries

Besides thus performing the function of cashiers to their depositors, in consideration of the profit made on their deposits, many banks allow their depositors interest on their deposits. The rate allowed is, of course, always less than that received by the banker. Frequently a depositor bargains with the banker not to draw out his deposit without previous notice, longer or shorter as may be agreed on; and in this case the banker will allow a higher rate of interest than when the deposit is repayable *on call*—that is, at any time, without previous notice. The practice of allowing interest on deposits has prevailed in Scotland since 1729, but in England is of later growth, and not invariable; the rule there being rather to allow interest on fixed deposits only, and to allow no interest on money at call or on current accounts. It has led, of late years, to a great increase in the amount of deposits. Many persons prefer the low rate of interest which banks give, to the higher rate which may be obtained from the individual borrowers, or to the greater return which may be received if they traded on their money.

Occasions are always occurring for withdrawing deposits, as well as making them. Traders and commercial men, for example, day by day, deposit with their bankers the drawings or sums of money which they receive in the course of their business; and, on the other hand, day by day, draw out such sums as they require to pay away in purchases of goods, in wages, rent, and other expenditure. A bank, therefore, while continually receiving deposits, is continually repaying deposits; and the amount uncalled for is subject to a daily fluctuation. At one period of the year, or in a certain condition of trade, the amount of deposits may be high; at another, low. As it is a principle, at the very root of banking, that money deposited shall be returned, either on demand, or punctually at the expiry of a stipulated notice, it follows that banks must always have in their coffers as much of the money deposited with them as there is the least likelihood of being called for by depositors. When business is in its ordinary condition, a bank can, after some experience, approximate pretty nearly to the amount of the greatest demand for a return of deposits throughout the year, and provide accordingly. But sometimes the credit of a bank becomes doubted, either from causes peculiar to itself, or on occasions of a *panic* or general distrust, when all who own money wish to have it in their own possession. In these cases, there is a *run* on the bank for repayment of its deposits, and the amount called for may be far beyond the maximum demanded in ordinary times. If the bank has not retained as much of the deposits in its coffers as meet the demand, it is said to *suspend payment*, and as a general rule, it must wind-up its business; the confidence of the public that it will in future restore its deposits on demand being now destroyed. There are two prime rules in safe banking: the one is, that the bank shall lend its deposits only on undoubted and readily reliable securities, however low the profit; and the other is, that the bank shall retain a sufficient amount of its resources—and this is called the *reserve*—to meet the possible demands of the depositors, even in cases of a run, although there may be no reason to expect one; for when a run comes, it seldom casts its shadow before. But it is evident that the greater the *reserve* of a bank, the less the amount of deposits which it can lend out and draw interest for; hence the temptation which banks lie under of imprudently lending out a too great proportion of their deposits; and it is their yielding to this temptation which almost always precipitates the failures of banks.

The *reserve* of the banking department of the Bank of England is always in coin, or, what is the same thing, in notes against which there is coin lying in what is called the *issue* department of the Bank. In the case of all other banks in this country, the reserve is only partly in coin; sometimes the proportion of coin is very small. A great portion of the reserve is generally in Bank of England notes, equivalent, of course, to coin. These other banks also hold a portion of their reserve, in the shape of government stock, in which they have invested it. In this way, the banks obtain a return on this last portion of their reserve, in the dividends or interest paid by government on the stock—this return being less, indeed, in the usual case, than if the bank had lent out the money in the ordinary course of business, but better than no return at all, as must be when the coin or notes are lying idle. The reason why government stock, in Great Britain, is a safe reserve is, that it is sure to command a purchaser at all times. If there be a run on a bank, it immediately finds a purchaser for the stock, and with the price, whether paid in gold, or in Bank of England notes, the only other legal tender, it meets the demands of its depositors. Sometimes, a bank has its reserve in the form of a deposit at the Bank of England; or, if a provincial bank, with some London bank which has its own reserve there. From the Bank of England being the channel through which, directly or indirectly, payments are made, and moneys received, by other banks, it is more convenient for them to have their reserve lying as a deposit in it, than lying as gold within their own walls. In the case of a demand on their reserve, the banks will draw out their deposits, in notes, or, if gold be in demand, in gold, from the Bank of England. Whether, therefore, the reserve of a bank is invested in government securities, or is deposited in the Bank of England, or

is in Bank of England notes, it is from the coin in that bank that the gold comes in the case of a run. It is apparent from this that it is essential to the stability of all banks in this country, so long as they themselves do not keep a sufficient reserve of coin in their coffers, that the Bank of England shall always be possessed of coin, and never be unable, on demand, to pay its depositors in gold, or to give gold in exchange for all its notes that may be presented to it. It may be added, that while banks gain, through the annual dividends, in keeping their reserve in government stock, they run the risk of a loss in the event of their requiring to sell it in the time of a panic. For at such a time, when many securities and stocks become unsalable, and all of them suffer depreciation in value, government stock itself falls in price, although less so than the others. Banks often invest portions of their reserve in other stocks than government stock. The higher return obtained on these other is, however, outweighed by the greater risk of depreciation in their value, whether continued unsold or thrown into the market for sale in times of panic.

We have hitherto been treating banks as banks of *deposit* and *loan;* but many of these banks, in all countries where banks are known, are also banks of *issue*. Banks of deposit, as has been mentioned, make loans from their capital and deposits. If from capital, the banker has no greater profit by the transaction than if he had lent out his money in any other way, equally safe, and involving the same amount of trouble. If from deposits, the interest he receives, in so far as it exceeds the interest, if any, paid to the depositors, and a ratable proportion of the expense of carrying on the business of the bank, is pure gain to him. But a banker may give the loan from his own notes, and in that case his gain is still greater. A bank-note is simply a written promise by the bank issuing it, to pay to the bearer, on demand, a sum of money —that is, in coin of the realm. Of course, the borrower would not accept a loan from a bank in its own notes, unless he believed that it could redeem its promise of paying in coin, and that the public were of the same opinion; for the moment that a suspicion arises that the promise will not be made good, the note will cease to pass from hand to hand as coin, or to perform all the functions which coin performs. But when the loan is accepted in a bank's own notes, it is evident that the interest which the bank draws for the loan of its promises to pay is pure profit, except the ratable proportion—as in the other cases—of the expense of carrying on its business, and the expense of the paper and printing of the notes with the government stamp-duty. In other words, a bank which can get people to pay to it interest for the loan of its promises to pay, draws the same income—barring the comparatively trifling expense of manufacturing the written promises—as a bank does which has to provide itself with gold for making its loans. The motive which a bank has to extend its issues on loans is therefore apparent, so long, of course, as it is not compulsory on it to retain unemployed in its coffers as much in gold as it issues in notes.

But it does not follow that when a bank makes a loan in its own notes for a definite period, it will really obtain the benefit of the whole of the interest on it for that period; for the borrower does not apply for the notes that he may keep them beside him, but that he may pay them away in making a purchase, or in liquidating a debt, and this, most commonly, on the very day he receives them. If the person to whom the notes are thus paid by the borrower has himself no purchases to pay for, or no payment to make, he may, the moment he gets them, return them to the bank that issued them, to lie there on deposit. If the bank pays interest on deposits, as most banks do, then out of the interest drawn by it on the original loan, it will have to pay interest to the depositor of the notes; in other words, the loan is no longer a loan of its notes, but a loan from its deposits.

Or, the person receiving the notes from the borrower, may immediately present them to the issuing bank for coin, instead of depositing them. Here, too, therefore, the loan that was made in notes is now converted into a loan of coin, that was in reserve from previous deposits, or that was part of the bank's own capital; in which cases, the bank obtains no advantage whatever in having made the loan originally in its notes. It might equally well, so far as profit is concerned, have originally made it in gold from its reserve of deposits or capital. Notes generally find their way back to the bank that issued them through other banks, into which they have been paid as deposits, or for the liquidation of debts due to them. These banks suffer the loss of profit or interest on the amount of the notes thus received by them so long as they keep them; they therefore immediately present them to the issuing bank for gold, to replenish their own reserves, or to lend out; or, what is the same thing, they present them to the issuing bank for government stock, or other securities bearing interest, and which that bank has had to provide from its capital and deposits.

It will now be apparent to the reader that there are two checks which prevent a bank issuing notes to any extent it pleases. In the first place, there must be a demand for its notes by borrowers. It is only to people in good credit, and likely to make a profitable use of them, that a bank will lend its notes, and such people will not take an increase of loans unless trade be increasing, and new opportunities be presenting themselves for profitably employing the notes borrowed. True, banks, when imprudently conducted, or when deceived in the character of their customers, frequently lend their notes to reckless persons, who overtrade with them, and become bankrupt. But banks commit this error, when they do commit it, to a far greater extent by loans of their deposits and capital, than by loans of their notes. In the second place, the immediate return of the notes, chiefly through other banks for gold, or for other portions of the reserve of the issuing bank, is a check to its issuing more notes than it has a reserve to meet. This return of notes through banks is called the *exchange* of notes—the notes issued by a bank being returned to it in exchange for the notes held by it of another bank.

Besides issuing its notes in loans, a bank may issue them in repayment of deposits. In this case, there is the same profit to the bank as in the other case. The bank gets the profit which it makes on the money which was originally deposited or lodged with it, without having to pay interest to the persons who made the deposit or lodgment; the deposit, or money lodged, having now been repaid in its notes. But here, too, these notes are equally liable to be returned to the issuer as when they are issued on loans.

Of all the notes issued, in whatever way, by banks, a certain amount is not returned to them, but is kept in circulation, being what is required by the necessities of the public for use as money, passing from hand to hand. It is of course on this portion that the banks make their profit; and, in consequence of this profit, they are able to afford banking facilities to the public more cheaply than they could otherwise do. The profit is just the interest on the notes in circulation—less the expense of manufacturing the notes, a ratable proportion of the expenses of conducting the banks, and the loss of interest or profit on an unemployed reserve kept from prudence, or by the requirement of law, to meet a return of notes. This interest is paid by the persons who originally borrowed these notes from the banks, and who have not repaid them; or if the banks have repaid deposits with the notes, the interest is paid by those to whom they lent what was originally these deposits. The amount of the bank-notes in circulation varies at different periods of the year: at term-times and quarter-days, when more payments than usual are made, there is a greater quantity of money required by the public than at other times, and the notes in circulation increase in amount. This addition to the circulation is drawn from the banks by depositors or borrowers. After it has served its purpose, this additional quantity gradually returns to the banks as deposits or in repayment of loans. If the credit of an issuing bank is at any time suspected, the holders of notes will present them for gold, just in the same way as its depositors will call for a return of their deposits; and this risk must be provided against by a corresponding increase of its general reserve, on which, of course, it makes no profit. It has been generally imagined that when issuing banks suspend payments on a run, the run is one on the part of their note-holders; but this is only a popular error. In a well-established bank, the amount of its notes in circulation is of little importance compared to its deposits; and though the holders of small sums in notes may be more apt than depositors to take alarm and rush in a panic to the bank for gold for its notes, a small proportion of its depositors suddenly demanding a return of their money in gold, as effectually drains a bank of its reserve, as if its whole circulation were to be at once presented to it for gold.

Banks make their loans chiefly in the form of *discounts;* that is, upon bills of exchange. Commodities in the wholesale market are generally sold on credit. The buyer promises to pay the amount at a certain date to the seller, and his promise is contained in a bill of exchange. The seller transfers it to a bank; which, on the faith of it, advances the amount in loan to him, less *Discount* (q. v.), that is, interest of the money till the bill be due. This is called *discounting*. But banks lend on other securities. A holder of government stock, for example, will obtain a loan on the security of his stock; the banker being entitled to sell it, and repay the loan from the price, if the borrower fail to make a punctual payment. So, also, the holder of stock or shares in any public company, as a railway company; or of a debenture or bond due by such, will, where the company is believed to be in a sound condition, or the security is salable, obtain a loan from a bank. The owners of commodities lying in a public warehouse, may obtain a loan on depositing with the bank the *warrants* or certificates of ownership. Loans, too, are occasionally made for short periods, on the mere note of hand of the borrower, when the banker is satisfied of the ability of the borrower to repay the money. It is seldom in Scotland that banks lend on mortgages over land. Borrowers, in these cases, generally take loans to lie unpaid for a few years; but to have his money locked up in that way does not suit the trade of a banker. Where a banker finds the security which he has received to be insufficient, and repayment of the

loan is not forthcoming, he will, of course, like any other trader, to avoid making a bad debt, take any other security the debtor can give him—such as a manufactory or a mine. Banks have in this way frequently become involved in manufacturing transactions, in their attempts to make more money of the securities than they would have done by an immediate sale of them; they have become manufacturers and miners, and suffered great losses in consequence. And it is not to be supposed that banks always abstain from making loans when the security is known to be doubtful; far from it; banks, like other commercial establishments, have been, on many occasions, recklessly managed. In trying to push business, they have made loans on insufficient security, and banks are under strong temptation, to which they frequently yield, when a trader largely indebted to them is approaching bankruptcy, to sustain his credit by additional advances, in the hope that he may retrieve his affairs, and pay in full both the old and the new advances. The result is often the loss of both. Conduct of this kind has been the ruin of many banking establishments in England, of two or three in Ireland and Scotland, and elsewhere.

Bankers perform another very important function: they *remit* money from one place to another. One illustration will serve to explain how this is managed. A debtor in Edinburgh makes a payment to his creditor in London in this way: he pays the money to a banker in Edinburgh, who for a small charge, called the *exchange*, gives him a draft for the amount on a banker, his correspondent, in London. The debtor transmits the draft to his creditor, who presents it to the London banker, and receives the money from him. No actual transmission of the money, however, takes place, for there are debtors in London requiring to pay money to creditors in Edinburgh, and these debtors effect the payment by giving the money to the London banker, and obtaining his drafts on the Edinburgh banker. The one set of drafts are thus set off against the other. Not only may remittances between two places be thus made without use of money, but the payments in both places may also be made without it. The debtors may pay for the drafts by cheques on the banker who grants them, and the creditors may receive the money by drawing cheques on the banker by whom the drafts are made payable. For another function of banks, see MARGINAL CREDITS.

The large amount of money transactions carried through without the intervention of coin or bank-notes, in a country like England, is inconceivable to those not engaged in business pursuits. The manner in which these transactions may be effected without money, would be at once apprehended, if all persons in the same locality dealt with the same bank, and if all the banks scattered throughout the kingdom were only branches of the same establishment. But in practice, matters are so managed as if this were the case. The cheques, bills, or other drafts which come into the hands of a banker, drawn on (that is, payable by) other bankers are set off and liquidated by drafts, which they have received, drawn on him. The balance or difference only is paid in money. In London, the center of the money-world, there is an establishment called the Clearing-house (q. v.), of which most of the London banks are members. There, at a fixed hour daily, attendance is given by a clerk from each of these banks, who presents all the drafts immediately payable which his bank holds on the others; the balance or difference, on the whole, for or against each bank is ascertained; and the bank which holds a less amount of drafts on others than they hold on it, pays the difference by cheques on the Bank of England. The lowest clearing for an entire week between the 4th October 1877 and 2d October 1878 was £71,120,000, and the highest £133,921,000. The total clearings from October 1877 to October 1878 were £5,066,533,000. There are similar clearing-houses in some provincial towns.

Bank of England.—This bank, the most important in the world, was projected by William Paterson (q. v.) and was incorporated July 27, 1694. It was constituted as a joint stock association, with a capital of £1,200,000, which was lent at interest to the government of William and Mary, at the time in a state of embarrassment. At its very outset, therefore, the Bank of England was a servant of government, and in a lesser or greater degree, it has enjoyed this character through all the stages of its subsequent history. At first, the charter of the Bank was for eleven years only; but in consequence of the great services of the institution to government, its charter has been at various times renewed. The last renewal was in 1844, and the charter of that year still subsists, its terms being subject to modification or revocation by the legislature at pleasure. By the act or charter of 1844, the Bank was divided into two departments—the *issue* and the *banking*. What led to the division was this: it was supposed that, when a foreign drain of gold from us set in, it would, if the currency or circulation in this country had been purely metallic, have produced a contraction of the circulation, and a consequent fall of prices, and, as an ultimate result, the cessation of the drain. It was further supposed that banks could issue their notes to any extent they pleased; that their excessive issues increased the currency, and therefore increased prices, which in their turn led to foreign drains; and that, on the occasions of these drains, the continued issues prevented the natural and desirable contraction of the circulation, and aggravated the commercial convulsions occurring at such periods. The object of the act of 1844 was to prevent issues of notes beyond a certain amount, unless against an equal amount of gold held by the issuing bank, so that the mixed currency of notes and coin might thus expand and contract like a self-acting metallic currency. Experience, however, has shown, that when these foreign drains occur, the gold exported is taken chiefly from the reserves in the Bank of England, being withdrawals of deposits or loans by the Bank; and that the amount of notes in the hands of the public has not been affected by the legislation of 1844. In practice, whenever there are signs of a foreign drain, and the reserve of the Bank is diminishing, the Bank counteracts the tendency to a drain by raising the rate of discount and restricting its loans; the purchasing power of the public is thereby limited, and prices kept down; and, at the same time, gold is attracted to this country for investment. The circulation is in reality not interfered with. It was also intended by the act of 1844 to add to the security of bank-notes by insuring a supply of gold to meet the payment of them at all times. But the solvency of the Bank of England is undoubted; its notes would at any time be taken as gold; and this effect of the act of 1844, and the supplementary act of 1845, has in the case of the notes of other banks been hitherto inappreciable.

In the *issue* department of the Bank of England, its sole business is to give out notes to the public. Before the separation of the departments, the government was due to the Bank £11,015,100. This sum was declared to be now a debt due to the issue department, and for the issues of notes to that amount, no gold requires to be held by it. This was just the same thing as if the Bank had originally lent £11,015,100 of its notes to government, and these notes had found their way into circulation. The Bank was also allowed to issue additional notes on securities—that is, to lend them to a limit which at present amounts to £3,984,900, and this also without holding gold. The amount of notes which may thus be issued, without gold being in reserve against it, is £15,000,000. All notes issued above that amount can be issued only in exchange for gold. At the passing of the act in 1844, the limit of notes to be issued against the government debt and securities was fixed at £14,000,000—past experience having shown that there was not the least risk of there being at any time less than that amount of Bank of England notes in the hands of the public. The addition of the £1,000,000 is an extra issue, authorized by the act, in consequence of certain issuing banks having since ceased to issue. The Bank has to account to government for the net profit of this issue loan of notes of £1,000,000, and the profit the Bank derives from its issue department is the interest received on the £14,000,000 of government debt and securities, which, at 3 per cent., is £420,000 yearly. But out of this the Bank pays to government, for its banking privileges, and in lieu of stamp-duties, £180,000. If we assume the expense of the issue department to be £160,000, the net profit upon it would be £80,000. The Bank also makes a profit upon bullion and foreign coin. These are brought to the Bank for notes; they are worth £3, 17*s.* 10½*d.* per ounce; but the Bank is obliged by its charter to purchase them at £3, 17*s.* 9*d.* The holders prefer taking this price to having their bullion and foreign coin coined, free of charge, at the public mint, as the delay in the coining is equal to a loss of interest of 1½*d.* per ounce. The amount of notes in the hands of the public averages about £25,000,000; but the amount issued by the *issue* departments is greater. The difference is the amount lying in the *banking* department, and represents the reserve of gold of that department; that is to say, the banking department retains only a half or three-fourths of a million of coin, and transfers the bulk of its reserve to the issue department, in exchange for notes. We therefore require to regard the reserve of the banking department as gold, though lying in the shape of notes issued by the other department.

Viewed in its *banking* department, the Bank differs from other banks in having the management of the public debt, and paying the dividends on it; in holding the deposits belonging to government, and in making advances to it when necessary; in aiding in the collection of the public revenue, and in being the bank of other banks. For the management of the public debt, the Bank receives about £247,000, against which there has to be set £124,000 of charges. The remaining profits of the Bank are derived from its use of its deposits, on which it allows no interest, and of its own capital. The capital was originally £1,200,000; in 1816, it reached £14,553,000—the present amount. There is besides a rest of about £3,500,000. In 1877–8 the public deposits varied from £3,422,248 to £19,852,358, and the private from £19,629,343 to £27,321,423; the maximum of deposits, public and private, was £43,047,038.

In 1797, the Bank found itself likely to be obliged to suspend payments, and its notes were declared by law a legal tender, although no longer convertible into coin. This state of matters continued till 1821. The notes during this interval not having been convertible into coin on demand, there was no check upon

the Bank in the amount of its issues; and the currency became depreciated—that is, a £5 note would not exchange for five sovereigns; and every man to whom £5 was due, was thus obliged to accept payment in a £5 note, not worth £5. It is, however, said that the value of gold at the time was enhanced owing to absorption by hoarding and by military-chests, and that the depreciation was more apparent than real. The export of gold following on a rise of prices occasioned by an issue of bank or government notes is unlimited, except by exhaustion, if these notes are not payable in coin on demand, and are issued without any check from without or self-imposed. But as prices estimated in these notes rise, the price of bullion, like other commodities, rises too, and the price of coin which can be converted into bullion, or be used abroad at its previous purchasing power, rises also. Since 1821, the Bank has been oftener than once on the verge of a suspension of payments, owing to foreign drains of gold. The separation of the Bank into two departments is regarded by many as having a tendency to produce a suspension in times of panic, when the reserve is reduced by withdrawals to supply a foreign drain, or to meet an internal run. Before the separation, the Bank, in the case of withdrawals of gold, had the whole amount of gold within the Bank to meet them; but now it loses the command of all the gold in the issue department. It cannot get that gold unless in exchange for notes, but, its reserve being reduced or exhausted, it has none to spare. The restriction of credit consequent upon the approach to an exhaustion of the reserve of the banking department, is so great, that the fear of it occasions a panic; and in 1847, 1857, and 1866, on the possible suspension of payments by the banking department, owing to a reduction of its reserve, being apparent, the government of the day took the responsibility of authorizing the Bank to lend additional notes, not represented by gold, which was an indirect way of getting at the gold in the issue department, where the object of the borrowers was to obtain gold. In 1857, it was found necessary to take the benefit of this authorization.

The Bank of England is situated in the center of London; but it has a branch in the west end, and nine branches in the provinces.

Joint-stock Banks in England and Wales.—In 1878 there were 119 of these banks, of which 52 in the provinces were entitled to issue notes to the amount of £2,164,221 without its being compulsory to hold any gold against them. But as they are prohibited from exceeding their authorized issue, the amount of notes actually in the hands of the public is always somewhat less. The deposits of the 10 Joint-stock Banks in London which may be considered London Banks, and excluding the National Provincial Bank of England, the National Bank, and the Scotch banks, who, although they carry on business in London, have the great bulk of their business in the country, amount to about £80,000,000, and the acceptances granted by them to about £17,000,000. Their paid-up capital is £9,270,000. Under the Companies Acts 1879 and 1880, several of the principal joint-stock banks have become limited liability companies. They usually allow interest upon money deposited to remain for some time.

Private Banks in England and Wales.—Of these there were 248, of which 56 were in London. Of the provincial banks 108 had an authorized issue of £2,295,073.

In the case of all these banks, whether issuing or non-issuing, their profits are chiefly derived from the use of their deposits.

There are also in London, 56 Foreign, Indian, and British colonial joint-stock banks.

Banks in Scotland.—The earliest banking institution in North Britain was the Bank of Scotland, instituted by a charter of incorporation from the Scots parliament in 1695. The original capital was £1,200,000 Scots, or £100,000 sterling. In 1774 the amount of stock was extended to £200,000 sterling; now it is £1,250,000 sterling. In 1727, a new and similar establishment was constituted under the title of the Royal Bank of Scotland, whose advanced capital is now £2,000,000. In 1746, another association was formed, and incorporated by royal charter, with the title of the British Linen Company. From £100,000, its capital has increased to £1,000,000. Besides those three banks, there are in Scotland other seven joint-stock banks, with capitals varying from £1,000,000 to £150,000. There are now no private banks. The amount of deposits is probably about £70,000,000, on which interest is allowed. The authorized issue of notes is £2,676,350, but their actual issue is about double that amount.

The Western Bank, with a capital of £1,500,000, a circulation of above £400,000, having 1300 shareholders, and about 100 branches, suspended payments in 1857, owing to a reckless system of discounting bills. The shareholders, however, being under unlimited liability (see JOINT-STOCK COMPANY), neither the depositors nor the note-holders sustained any loss. In Oct. 1878, the City of Glasgow Bank, with 133 branches, suddenly suspended payments; the liabilities amounting to £12,400,000, and the estimated assets, £6,300,000, leaving a probable deficiency of £6,100,000. It was found that for three years before the stoppage, the states of the bank's affairs, issued annually to the shareholders, had been falsified, and that advances had been made to four firms against utterly inadequate securities, to the enormous sum of nearly £6,000,000. The directors and the manager were tried for and convicted of uttering false balance-sheets, and sentenced to imprisonment. It was arranged to wind up the bank by liquidation; and though the calls made upon the shareholders involved large numbers of them in utter ruin, in four years the liquidation was complete, after a payment of £13,644,856. The Caledonian Bank temporarily suspended payment. In 1882, the seven non-chartered Scottish banks became limited liability companies.

In consequence of allowing interest on deposits, the banks in Scotland may be said to hold the whole capital of the country, minus only the money passing from hand to hand. This system of depositing is aided by branches from the parent banks; and these branches are found in every small town. The entire number of branch-banks in Scotland in 1879 was about 850. At these branch-banks, the agent (usually a respectable person in business) discounts bills within certain limits, issues letters of credit, and pays out notes, and also gives cash on demand for them; though, strictly, the notes of a bank are only payable on demand at the head office. By a strict system of supervision, Scottish branch-banks are well conducted, and are of great service in every department of trade. For one thing, they have powerfully contributed to extinguish burglary and highway robbery, as no one thinks of keeping money, except to a trifling amount, either in his house or about his person. At all the great fairs, bankers attend to receive deposits, and to pay cheques. Forgeries of Scottish bank-notes are now unknown.

The banks in Scotland, like the banks in Ireland, but unlike the provincial banks in England, are allowed to issue notes beyond their fixed issues, on holding gold equal in amount to the extra issue. But as the gold thus retained is, like the other gold in reserve, liable for all the deposits, as well as for the whole circulation of a bank, if it should fail, the security of the establishment is increased only in a small degree by this arrangement, which, apart from the loss of profit to the bank on the gold unemployed, is attended with inconvenience at those seasons when the circulation is extended. In Scotland, and Ireland also, banks can issue one-pound notes; the English banks are not permitted to circulate notes of less value than £5.

Besides employing money in discounting bills, the Scottish banks grant loans of fluctuating amount, called *cash-accounts* or *cash-credits*. By a cash-account is signified a process whereby an individual is entitled to draw out sums as required, to a stipulated amount and by an implied condition to make deposits at his convenience towards the liquidation of the same. On entering into this arrangement, he finds security to the bank that he will repay to the bank, whenever called on, the balance of sums drawn out, less those paid in, with the interest that may be due. These accounts are balanced yearly like current or deposit accounts. The only difference between the latter and a cash-account on the face of them is, that if the credit allowed on the cash-account is being made use of, the balance is in favor of the bank; whereas, on the other kind of accounts, the balance is in favor of the bank's customer.

Banks in Ireland.—There are nine joint-stock banks, having 448 branches and sub-branches. Their authorized issue is £6,354,494; of which £3,738,428 is that of the Bank of Ireland. It is a national bank, lending £2,630,769 of its capital to government. It was established in 1783, with privileges resembling those of the Bank of England. Its capital is £2,769,230, and its rest £1,034,000. The capitals of the other banks vary from £250,000 to £1,500,000, and the total capital of the joint-stock banks in Ireland is £6,809,230. Six are banks of issue. The amount of deposits in the joint-stock banks in Ireland in 1878 was £31,745,000. In 1883, five Irish banks were limited companies. Interest is allowed on money deposited for a stated period, but not on money at call, or as a rule on current accounts. There are also three private banking firms in Dublin.

Foreign and Colonial Banks.—On the continent of Europe, there are both national or incorporated banks and private banks. The national banks are, to a greater or lesser extent, government establishments, managing the public debt and finances, and, unlike the Bank of England, subject to government influence or interference. In India and the British colonies, there are joint-stock banks and private bankers. The joint-stock banks of Australia are establishments of magnitude. The United States of America are overrun with banks. Insufficient capital, reckless management, and the smallness of the reserve kept, have frequently led to the suspension of payments of these banks. At all times, the number of forgeries of bank-notes in the United States is very considerable, and great caution requires to be exercised in accepting notes as payment. See BANKING in AM. SUPP.

BANK-NOTES, MANUFACTURE OF. The chief object in the manufacture of bank-notes is to render forgery impossible, or at least easy of detection. This is sought to be effected by peculi-

arity of paper, design, and printing, or by a combination of these means. See PAPER. The main reliance has been on mechanical design—the writings, the emblems, and the ornaments being so combined as to render forgery difficult. The ink, too, is peculiar (see INK), being the blackest and most indelible of inks. As a further security against forgery, the self-registering machines was contrived by Messrs. Oldham. Copperplate printing was the only printing in use for bank-notes till 1837, when a great improvement was made by Messrs. Perkins and Heath. This was the reproduction of designs by the mill and die by mechanical pressure. The pattern is engraved on a soft steel plate, which is then hardened, to transfer the pattern by pressure to a soft steel roller, on which, of course, the pattern is produced in relief; the roller or mill is then hardened, to reproduce the pattern in the plate from which the printing is to be done; and thus almost any number of plates for all common purposes can be easily produced. No B. of E. notes are issued twice.

This system of siderography continued in use for bank-note printing in the Bank of England till 1855, when electrotype-printing was introduced by Mr. Smee, with the assistance of the mechanical officials (see ELECTROTYPING); and since that time, the notes of the Bank of England have been all produced by surface-printing by the electrotype.

The usual production of notes equals a value of about £24,000,000 per week; it being the policy of the bank to renew the notes before the paper loses that peculiar crispness which distinguishes it from all other paper, and is a safeguard against forgery.

There are seventy or eighty kinds of Bank of England notes, differing in their denominations or values, but similar in the mode of printing. The paper is expressly made for the purpose, by one firm only, and is remarkable for its strength, lightness, and difficulty of imitation. The Bank of Ireland notes are printed on the copperplate plan, not by surface-printing; but the use of delicate mechanism enables this to be done with great accuracy and celerity; the Bank of France notes are produced from plates, the result of photography, electrotyping, and steel-plate printing. Zincography and lithography are employed by some banks; and also *acierage*, a mode of hardening copper electrotypes with a thin surface of steel.

BA'NKRUPTCY. See INSOLVENCY.

BANKS, in Navigation, are elevations of the bottom of the sea; when tolerably smooth at the top, they constitute *shallows*, *shoals*, and *flats;* but when rocky, they become *reefs*, *ridges*, *keys*, &c. Pilots and captains of ships require to be intimately acquainted with the B. along their route; and a chart, if properly prepared, always defines them by means of small dots, if sands, and small crosses, if rocky. In war-time, small vessels often escape capture by running into shallows where larger vessels dare not follow them. The Newfoundland and the Bahama B. are well-known examples of this kind of sea-bottom.

BANKS LAND, an island in the Arctic Ocean, 70 miles to the south-west of Melville Island. It is intersected by the parallel of 74° N., and by the meridian of 116° W.

BANKS, SAVINGS. See SAVINGS-BANKS.

BANKS, SIR JOSEPH, a zealous naturalist, was born, according to some accounts, at Revesby Abbey, in Lincolnshire, according to others, in London, in January, 1743, and died June 19, 1820. He was descended from a family of Swedish origin, which had been settled in England for about 200 years. To this family belongs also John Banks, who made his name known as a writer of tragedies, in the latter half of the 17th c. B. was educated at Eton and Oxford. In 1763 he made a voyage to Newfoundland and Labrador, collecting plants; and from 1768 to 1771, he sailed with Cook round the world in the capacity of naturalist, and wrote the botanical descriptions for the first voyages. In the year 1772 he visited the Hebrides and Iceland, whence he brought back a rich treasure of specimens for his studies in natural history. Before this voyage, Staffa was hardly known beyond its immediate vicinity. It was carefully examined by B., and through him its wonders were made known to the public. In 1777, he was elected President of the Royal Society, an office which he held for 42 years; and in 1781 he was created a baronet. He deserves particular credit for founding and managing the African Association; and the colony of Botany Bay owed its origin mainly to him. Through his efforts, the bread-fruit tree was transferred from Otaheite to the West Indies, and the mango from Bengal, as well as many of the fruits of Ceylon and Persia.

Many naturalists and travelers—Blumenthal, Hornemann, Burckhardt, Mungo Park, and others, were indebted to him for zealous and disinterested assistance in their labors. During the French war, B. did much to alleviate the sufferings of all captive men of science, and used his influence with government to procure the restoration of their papers. Cuvier, in his *éloge* on him before the French Academy of Science, states that no less than ten times had collections, captured by the English, been restored to the Jardin du Roi at Paris through the instrumentality of B. No man of science appealed to him in vain for pecuniary assistance; and his splendid library of natural history was at the service of those who desired to consult it. With the exception of articles in magazines, and contributions to the publications of learned societies, especially to the *Philosophical Transactions*, B. has written nothing but two small works—*A Short Account of the Causes of the Diseases in Corn called Blight, Mildew, and Rust*, which was printed for his friends in 1803, and for the public in 1805; and *Circumstances Relative to Merino Sheep* (London, 1809). He left a valuable library, of which an excellent catalogue was made by his friend Dryander; and a rich collection of specimens in natural history, both of which he bequeathed to the British Museum.

BANKS, THOMAS, an eminent English sculptor, born in Lambeth in December 1735. B. was apprenticed to a landscape gardener and architect, but he soon abandoned these practical arts for the more imaginative one of sculpture. In 1770, B. was a successful candidate for the gold prize of the Royal Academy, established two years before. In 1772, with an allowance of £50 a year from the Academy for three years, he went to Rome to study the masterpieces of art there. After a residence of several years in Rome, during which he exhibited two of his finest works, 'Caractacus Pleading before Claudius,' and 'Psyche and the Butterfly,' and having gained much fame but little profit, he returned to England. Here his refined imaginative style was little appreciated in comparison with the popular but inferior performances of some of his contemporaries; and after two years, he went to Russia, where he was well received by the Empress Catharine, who purchased his Psyche, and gave him a commission for a group called 'Armed Neutrality.' Having executed this, he returned to England, where he completed perhaps his finest work, 'The Mourning Achilles,' now in the British Institution. B. now received several commissions, and was elected a member of the Royal Academy. The monuments of Sir Eyre Coote in Westminster Abbey, and of Captains Burgess and Westcott in St. Paul's Cathedral, were among his last works. He died February 2, 1805. It was in purely imaginative works that B. most excelled; in practical subjects, his introduction of the ideal was incongruous and inartistic, rendering them far less valuable than those of some of his rivals.

BA'NKSIA, a genus of Australian shrubs of the natural order *Proteaceæ* (q. v.), named in honor of Sir Joseph Banks. A few of the species become small trees. They have hard dry leaves, generally white or very pale green beneath, and present a remarkable appearance from the umbellate arrangement of their branches, which bear towards their extremities oblong heads of very numerous flowers. The flowers secrete much honey. Some of the

Banksia littoralis in flower.

Fruit and Leaf of Banksia.

species are now frequent ornaments of green-houses in Britain. They are abundant in all parts of Australia, forming, indeed, a characteristic feature of its vegetation, and are called Honeysuckle trees. *B. grandis*, found at Swan River, exceeds all the rest of the genus in size, attaining a height of 50 feet.

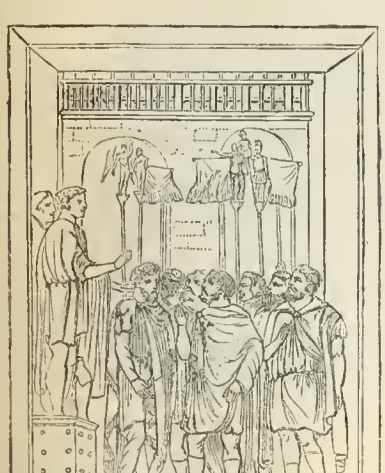
BANN, the name of two rivers in the north-east of Ireland; the one, the Upper B., flowing into, and the other, the Lower B., out of Loch Neagh. The Upper B. rises on the north side of the Mourne Mountains, in the south of Downshire, and runs 25 miles north-north-west through the counties of Down and Armagh, successively in a granite, silurian, trap, and tertiary basin, into the south side of Lough Neagh. It passes Banbridge, Gilford, and Portadown. At the latter place the Newry Canal joins it. The Lower B., strictly the continuation of the Upper, issues from the north-west corner of Lough Neagh, and flows 40 miles north-north-west, through Lough Beg, and dividing the counties of Antrim and Londonderry. It runs past Portglenone and Coleraine, into the Atlantic Ocean 4 miles south-west of Portrush. One mile above Coleraine it falls over a ledge of rock 13 feet high. It bears the surplus waters of Lough Neagh to the ocean, and has important

salmon and eel-fisheries. Vessels of 200 tons can reach Coleraine by the river, 4 miles from the ocean.

BA'NNATYNE CLUB, a literary club deriving its name from George Bannatyne, to whose industry we are indebted for the preservation of much of the Scottish poetry of the 15th and 16th centuries. The B. C. was instituted in Edinburgh in 1823 by Sir Walter Scott, with the assistance chiefly of Mr. David Laing of the Signet Library, Mr. Archibald Constable, and Mr. Thomas Thomson. The object of the institution was to print rare works illustrative of Scottish history, topography, poetry, miscellaneous literature, &c., in a uniform and handsome manner, either at the expense of the club, or as the contributions of individual members. As a general rule, the number of copies of each work printed was limited to the number required for distribution among members, but in some instances a few were printed for sale. The club originally consisted of 31 members only, who paid an annual contribution of five guineas; but, owing to the anxiety of many eminent men to become members, the number was gradually extended to 100, where it was definitely fixed, the same annual payment being still required. Its first president was Sir Walter Scott, who was succeeded by Mr. Thomas Thomson, and Lords Cockburn and Rutherfurd; and its first secretary was Mr. David Laing, who continued to its close to discharge the duties of the office. The club had annual meetings in December, which were of a very convivial character, so far as can be judged from an account of their first meeting published in the *Edinburgh Literary Gazette* of February 1824—afterwards reprinted by the club itself—which suggestively says that the *Bannatyne Garland*, No. 1, a song composed by one of the members, was sung 'to the tune of *Four Bottles more*.' These meetings, however, were given up, and the club itself, which, in 1859, numbered about eighty members, was finally dissolved on 27th February 1861. Since its commencement it numbered among its members many of the most distinguished Scotsmen, and printed 116 works, some valuable as they are rare, and all bringing high prices at sales.

BA'NNER, a piece of cloth attached to a pole, and usually bearing some warlike or heraldic device, or national emblem. In this sense B. is a generic term, including many species, such as standard, ensign, pennon, flag, &c. Banners have been used from the earliest times, and in all countries, for the purpose of directing the movements of troops. We read of them constantly in the Old Testament, as in Numbers ii. 2, 'Every man of the children of Israel shall camp by his standard, and under the ensign of his father's house.' The earliest Roman standard was a bundle of straw fixed to the top of a spear. This was succeeded by figures of animals—the horse, the boar, &c., all of which soon gave place to the eagle, which continued all along to be the chief Roman ensign, and was afterwards assumed by the German, and latterly by the French emperors of the Napoleon dynasty. In addition to the eagle, each Roman cohort had a B., generally a serpent or dragon woven on a square piece of cloth.

The standard of the cavalry was a square piece of cloth expanded on a cross, and it was to this that the term *vexillum* properly applied. Examples of these standards are sculptured on the Arch of Constantine at Rome. The top of the staff was also frequently adorned with a figure of Mars or of Victory, and in later times, with the head of the reigning emperor. After Constantine embraced Christianity, the Cross was substituted for the head of the emperor on the purple B. of Byzantium. Standards were less in use amongst the Greeks than has been usual with war-like nations; but a standard, and sometimes a scarlet flag, was employed as a signal for giving battle. On the rise of Chivalry, in the middle-ages, the ordering of banners, like every other branch of military organization, attained to something like scientific exactitude. From the B.-royal, which bore the national emblems, to the small streamer attached to the lance, with its cross or stripes, there was a regular subordination, each emblem having its place and its meaning. The pennon of the simple knight differed from the square B. of the banneret (q. v.), in being pointed at the ends. In addition to their varieties in size, shape, and color, these banners were distinguished by the emblems which they bore. One of the earliest is the Danish raven, depicted on the standard taken by Alfred, of which Asser mentions the tradition, that 'in every battle, wherever that flag went before them, if they [the Danes] were to gain the victory, a live crow would appear flying on the middle of the flag; but if they were doomed to be defeated, it would hang down motionless.' Nor did the privilege of carrying banners belong to the princes and knights alone, bishops and abbots displayed similar ensigns, which were carried before them in religious processions, and under which their retainers fought in their defence. It was to these that the term 'Gonfalon,' a word as to the origin of which much diversity of opinion exists, was more commonly applied. In place of the heraldic emblems of the knight, the B. of the Church, and of towns and communes, usually bore the effigies of saints. Some banners, however, displayed no ensigns whatever, and were known simply by their color. Of this the *oriflamme*, or plain ruddy flag of St. Denis, was a famous example.



Roman Standards from the Arch of Constantine.

The celebrated Bayeux Tapestry (q. v.) throws considerable light on banners, as well as on other matters connected with the warlike arrangements of the middle ages. Much curious information on this and kindred subjects will be found in Hewitt's *Ancient Armor and Weapons in Europe*. By every warlike people the B. has been regarded as the emblem of national honor, as a palladium for the defence of which the individual warrior was at all times ready to sacrifice his life. From the converse of this feeling, banners and flags taken from the enemy have always been regarded as special trophies of victories, and places of honor in churches and public buildings have consequently been assigned them. As to the flags borne by the ships of different nations, and the arrangements concerning them in peace and war, see FLAG; as to colors of regiments, see COLORS.

The relation which banners bear to other kinds of flags, in their forms and uses will be explained under COLORS, MILITARY; ENSIGN; FLAG; PENDANT; &c.

Banner displayed, is the term used by heralds to describe a B. open and flying.

BA'NNERET, a higher grade of knighthood conferred by the sovereign for some heroic act performed in the field, and so called because the pennon of the knight was then exchanged for the banner—a proceeding which was effected by the very simple means of rending the points from the pennon. The first B. in England is said by Froissart to have been made by King Edward I., and the last time the honor was conferred was by Charles I. after the battle of Edgehill, the recipient being an individual who rejoiced in the familiar name of John Smith. The ceremony of the creation of a Knight-B. must have been very impressive to persons filled with the ideas which were prevalent in the ages of chivalry. The king, or his general, at the head of his army, drawn up in order of battle after a victory, under the royal standard displayed, attended by all the officers and nobility of the court, received the B. elect, who was not necessarily a knight previously, led between two knights of note, or other men famous in arms, carrying his pennon in his hand, the heralds walking before him and proclaiming his valiant achievements, for which he deserved to be made a Knight-B., and to display his banner in the field. The king, or general, then said to him: 'Advance, Banneret!' (*Advances toy Banneret*), and caused the point of his pennon to be torn off. The new knight, with the trumpeters sounding before him, and the nobility and officers bearing him company, was sent back to his tent, where a noble entertainment was provided by the king. Some attempts have been made to revive the title in recent times, as when George III., at a review of the navy at Portsmouth in 1773, conferred it on Admiral Pye and several other officers.

BA'NNOCK, a cake of home-made bread, common in the country parts of Scotland, but now less so than formerly. It is usually composed of pease-meal or of pease and barley meal mixed; prepared without any leaven, it is baked on a circular plate of iron, called a girdle. When made of mixed meal, it is called a mashlum bannock. 'Bannocks of barley-meal' form the theme of a popular Scottish song. A superior kind of B., called a Selkirk B., from the place where it is made, resembles the finer and lighter species of tea-cakes prepared by bakers. The word B. is from the Gaelic *bonach*, a cake. In the west of Scotland, it is pronounced *bunnock*. There is an amusing fairy-tale called *The Story of the Wee* (little) *Bunnock*. The B. is doubtless of great antiquity, being, in fact, the primitive cake, only varied in material, of every country.

BA'NNOCKBURN, a village in the east of Stirlingshire, three miles south-south-east of Stirling, on the Bannock rivulet, which falls, a few miles below this, into the Forth. Near this was fought the great battle of B. on Monday, 24th June 1314. Robert Bruce, with 30,000 Scotch, gained a signal victory over Edward II., with 100,000 English, and secured his throne and the independence of Scotland. The English are said to have lost 30,000, and the Scotch 8000 men. The 'Bore Stone,' on which Bruce is said to have fixed

his standard on that eventful day, is still to be seen on an eminence near the scene of the fight. On the south-east of the field of B., at Sauchie Burn, James III. was defeated in 1488 by his rebellious subjects, and assassinated after the battle in a mill where he had taken refuge. B. is now an important seat of the woollen manufactures, especially those of tartans and carpets. It has long supplied the tartan worn by the Highland regiments. Tanning is carried on to some extent, and the neighboring villages are noted for the manufacture of nails. Coal abounds in the vicinity. Pop. (1881) 2549.

BANNS, or BANS, in the law of England, means a proclamation, or public notification, or summons, in which general sense, however, it may be said to have become obsolete. It is now chiefly if not solely, used in the publication of intended marriages, as to which, see next article.

BANNS or BANS OF MA'RRIAGE. This is one of three alternative preliminary forms now essential to the legal celebration of marriage in England. The other two are marriage by license, and marriage by a registrar's certificate. B. of M., like many of our ecclesiastical regulations, has its origin in the ancient practice of the Roman Catholic Church, which our reformers wisely refrained from abolishing. By the publication of these B. is meant the legal proclamation or notification within the parish, district, or chapelry, and in the proper church or chapel, of the names and descriptions of the persons who intend to be there married; the object being the notoriety of the solemn act, so that all who have objections to the marriage may be enabled to state them in time.

According to the old English canon law, the publication of B. might be made on *holidays;* but a change was made to *Sundays* by the first important Marriage Act, the 26 Geo. II. c. 33; and although that act was afterwards superseded by the 4 Geo. IV. c. 76, the regulation as to Sundays has been since continued. Seven days' notice at least must be given to the clergyman before publication of bans. The other acts in force are the 6 and 7 Will. IV. c. 85, the 1 Vic. c. 22, the 3 and 4 Vic. c. 72, and the 19 and 20 Vic. c. 119. The law, as contained in these acts of parliament, is as follows: By the 4 Geo. IV. c. 76, s. 2, it is enacted that all B. of matrimony shall be published in an audible manner, according to the rubric prefixed to the marriage-service in the *Book of Common Prayer,* upon three Sundays preceding the ceremony, during the time of morning-service, or of evening-service (if on the day of publication there shall be no morning-service) immediately after the second lesson. The rubric referred to is in the following terms: 'I publish the banns of marriage between M. of —— and N. of ——. If any of you know cause or just impediment why these persons should not be joined together in holy matrimony, ye are to declare it. This is the first [second, or third] time of asking.' By the 22d section of the same act, all marriages celebrated without such publication of B., or without license (or now, under the 6 and 7 Will. IV. c. 85, s. 42, without a Registrar's certificate), are declared to be null and void. By the 26th section of the last-mentioned act, the bishop, with consent of the patron and incumbent, may license chapels for the celebration of marriages in populous places; and by the 33d section of the 1 Vic. c. 22, B. may be published in such chapels. By section 9 of the 4 Geo. IV. c. 76, it is provided, that if the marriage be not celebrated within three months after publication of B., the marriage shall not take place until the B. shall have been *re*published on three several Sundays, unless it be a marriage by license, or now, by certificate, which two latter alternatives, however, must also be availed of within the three months. It only remains to be added on the law, as contained in these marriage acts, that by section 8 of the last of them, the 19 and 20 Vic. c. 119, it is provided, that in every case in which one of the parties intending marriage without license shall dwell in Scotland, a certificate of proclamation of B. in Scotland, by the session-clerk or by the registrar of the district or parish in which such proclamation shall have been made, shall, when produced to any person duly authorized under the provisions of this act to solemnize a marriage, be as valid and effectual for authorizing such person to solemnize such marriage as the production of a certificate for marriage of a superintendent register of a district in England would be, in reference to a party resident within such district.

The purpose of the law is to secure public knowledge of intended marriages, and therefore, although the 4 Geo. IV., following in this respect the 26 Geo. II., declares that marriages shall be void without publication of B. (where, of course, that is the chosen preliminary), it is not necessary that such publication should be made in the real baptismal names of both or either of the parties; it is sufficient that the B. be published in the names by which the parties are *known*, or either of them. Nay, it even appears that where the baptismal names have been discovered, having been previously concealed or unknown, it is better, if not necessary, that publication should be made in the names by which the parties are familiarly known in the district, by which, indeed, they may be said to be known to the world. There are numerous cases decided in England from which such doctrine necessarily follows. As the publication of banns invites people to object, if the parent or guardian express dissent, it is the duty of the clergyman, when such objections are offered, to proceed no further; and if he, notwithstanding, marry the parties, he will be liable to severe penalties by the ecclesiastical law, though he will not be liable to an indictment. Again, on the other hand, if he refuse, without cause, to perform the marriage, he is liable to an action. It has also been decided, that a fraudulent knowledge of a wrong name in the publication of B. will not void the marriage, unless the fraud should be on *both* sides.

In Scotland, B. have the same Roman Catholic origin as in England. Indeed, Mr. Erskine, one of the most authoritative Scotch legal writers, gives it as his opinion, that the Scotch borrowed the practice from the decrees of the *Council of Trent;* but a recent able writer (see *Fraser's Domestic Relations*, vol. i. p. 113) considers this opinion erroneous, and shows that B. were first sanctioned in Scotland by councils which were held in that country long before the time of the Council of Trent. After the Reformation in Scotland, the practice of proclaiming B., as the phrase is in that country, was continued. They are described in the Scotch Act 1661, c. 34, 'as a part of the laudable order and constitution of the kirk;' and they have since been mentioned in various acts of parliament applicable to Scotland, such as the 10 Anne, c. 7, and the 4 and 5 Will. IV. c. 28. By the first of these acts, the privilege of publicly celebrating marriage was extended to the Scotch *Episcopalian* clergy, but with the proviso that the B. should be duly published three Lord's Days, not only in the Episcopal churches which the parties frequent, but also in the parish church or churches.

Should the parish minister, however, neglect or refuse to publish the B. of such parties, the act declares that it shall be sufficient to do so in any Episcopal congregation alone. The 4 Will. IV. c. 28, put other dissenting bodies in Scotland in the same position as the Episcopal Church there. There is one other regulation of the Scotch law on this subject which is deserving of notice for popular information—namely, that when both of the parties have their *Domicile* (q. v.) within Scotland, and enter into marriage in England or Ireland, they must have their B. proclaimed in the parish of their domicile in Scotland, otherwise they are liable to the penalities of clandestine marriage. By the Marriage Notice Act, 1878, marriage certificates in Scotland are also issued by the district registrars, after seven days' publication, to persons resident for fifteen days in the district; the fee for registry is 1*s.* 6*d.*

The Scotch law differs from the English in regard to the effect of non-publication of banns. In England, in some cases, the consequence is to render the marriage absolutely void. In Scotland, however, marriage without proclamation of B., is valid; but in such case of the parties, celebrator, and witnesses are liable in the above penalties. See MARRIAGE, SPECIAL LICENSE, REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES.

BANQUE'TTE, in Fortification, is a raised ledge on the step inside the parapet of a rampart, of such a height that musketeers, when standing on it, may be able to fire over the crest of the parapet without too much exposure to the enemy. It is about 4 feet wide, and 4 or 4½ feet below the crest. The musketeers ascend to it from the rampart either by a few steps or by a sloping path.

BANSWA'RRA, a Rajpoot state in the west of Malwa, bordering on Guzerat. It extends from N. lat. 23° 10′ to 23° 48′, and from E. long. 74° 2′ to 74° 41′, and has an area of 1500 sq. miles. The pop. is supposed to be about 150,000. This state was dependent on the empire of Delhi until the ascendancy of the Mahrattas, by whom it was fearfully oppressed. In 1812, the ruler made overtures to the British government, offering to become tributary on condition of protection; and an arrangement to this effect was concluded in 1818.—The capital, also called Banswarra, is on the route from Mhow to Deesa, 123 miles north-west from Mhow. The majority of the inhabitants are Hindus, but the Mussulmans are also pretty numerous. The palace of the Rawul, or chief, is a large, turreted, battlemented building, on a rising ground overlooking the town, near a beautiful tank, overhung with trees.

BANTA'M, a seaport, now decayed, in a residency of the same name, which forms the west end of Java. It is 40 miles to the west of Batavia, being in lat. 6° 2′ S., and long. 106° 11′ E. It was founded by the Dutch in 1602, being their earliest establishment in the island. Pop. of residency, 607,400.

BA'NTAM FOWL, a well-known variety of the common Domestic Fowl (q. v.), originally brought from the East Indies, and supposed to derive its name from Bantam, in Java. It is remarkable for small size, being only about a pound in weight, and for a disposition more courageous and pugnacious than even that of a game-cock. A bantam-cock will drive to a respectful distance great dunghill-cocks five times its weight, and has been described as 'a beautiful example of a great soul in a little body.' There are several subvarieties of the bantam. Most of them have the legs much feathered. The flesh and eggs are good, although the eggs are of course small; and the bantam lays well in winter.

BANTENG (*Bos Banteng* or *B. Sondaicus*), a species of Ox (q. v.), a native of Java and Borneo, which, in color, shape, horns, and want of dewlap bears some resemblance to the Gaur (q. v.) of India, 'but in the skeleton of the gaur, the sacrum consists of 5 vertebræ, and the tail of 19, while in the skeleton of the B., the sacrum consists of but 4 vertebræ, and the tail of 18.' The B. is black, with white legs. The hair is short and sleek, the limbs slender. The muzzle is sharp. The back rises into a high arch immediately behind the neck. The B. inhabits forests, and has been generally described as untamable.

BANTING SYSTEM. See OBESITY.

BA'NTRY, a seaport town in the south-west of Cork county, Ireland, in a cove opposite Whiddy Isle, at the head of B. Bay, and 44 miles west-south-west of Cork. The two chief streets converge into an open space towards the sea, and mountains 933 feet high, rise behind the town. The chief trade is the export of agricultural produce. A little fishing is carried on. In last century, there was an extensive pilchard-fishery here; but the pilchard has now deserted the coast. Many tourists resort to B. in summer. Pop. (1871) 2830; (1881) 2632.

BA'NTRY BAY, a deep inlet in the south-west extremity of Ireland, between Crow Point and Sheep's Head Point, in Cork county. It is 25 miles long, running east-north-east, with a breadth of 3 to 5 miles. It is one of the finest harbors in Europe, affording safe and commodious anchorage for ships of all sizes. Near the entrance on the north side is a fine large sheltered harbor, formed by Bear Island, with a safe passage on both sides. At the head of the bay are two harbors: the one to the south, or the landlocked roadstead of B. harbor, is formed by Whiddy Isle, opposite B. town; the other to the north, or Glengariff harbor, is also sheltered by an island, but is small, and narrow at the entrance. The coast around B. B. is rocky and high, consisting of Devonian strata, and exhibiting some of the finest scenery in the kingdom. On the north side, 17 miles west of B. town, is the great cataract of Hungry Hill, where three lakes, at the heights of 1011, 1126, and 1360 feet above the sea, discharge their waters, by almost continuous cascades, into Adrigoole Creek. Near the opening of B. B. a skirmish took place, in 1689, between a small English fleet under Admiral Herbert (afterwards Lord Torrington), and the French fleet, which conveyed James II. to Kinsale. Several ships of the French invading expedition under General Hoche anchored here in 1796.

BANX'RING (*Tupaia*), a genus of insectivorous quadrupeds, remarkably differing from the other *insectivora* (q. v.) in their habits, as they climb trees with the agility of lemurs or squirrels. They are also remarkable for their very elongated muzzle. They have soft glistening fur, and a long bushy tail. The few species known are all natives of the Indian archipelago.

BA'NYA (NAGY), or NEU'STADT, a town of Hungary, province Szathmar, with a royal mint, and productive gold and silver mines. Pop. (1880) 8632.

BA'NYAN, or BA'NIAN (*Ficus Indica*), a tree, native of India, remarkable for its vast rooting branches. It is a species of FIG (q. v.); has ovate, heart-shaped, entire leaves, about five or six inches long; and produces a fruit of a rich scarlet color, not larger than a cherry, growing in pairs from the axils of the leaves. The

Banyan-Tree.

branches send shoots downwards, which, when they have rooted, become stems, the tree in this manner spreading over a great surface, and enduring for many ages. One has been described as having no fewer than 350 stems, equal to large oaks, and more than 3000 smaller ones, covering a space sufficient to contain 7000 persons.

The branches are usually covered with monkeys, birds, and enormous bats. The monkeys eat both the fruit and leaves. The vegetation of the B. seldom begins on the ground. The seeds are deposited by birds in the crowns of palms, and send down roots which embrace and eventually kill the palm. As the B. gets old, it breaks up into separate masses, the original trunk decaying, and the props becoming separate trunks of the different portions. The wood of the B. is light, porous, and of no value. The bark is regarded by the Hindoo physicians as a powerful tonic, and is administered in diabetes. The white glutinous juice is used to relieve tooth-ache, and also as an application to the soles of the feet when inflamed. Bird-lime is also made from it. Gum-lac is obtained in abundance from the B.-tree. The B.-tree is beautifully described by Southey in his poem *The Curse of Kehama*.

BANYULS-SUR-MER, a town of France in the Pyrénées Orientales, with a fishing-port on the Mediterranean. The celebrated wines of Grenache and Rancio are produced in this district. Near the town are four old towers, one of which marks the division between France and Spain. B. was the immediate scene of many encounters between the French republicans and the Spaniards during the first French Revolution. Pop. (1876) 2277.

BANYUWA'NGY, or BANJOUVA'NGY, an important seaport town and military post belonging to the Dutch, on the E. coast of Java, capital of district of same name, which has a pop. of 45,000.

BA'OBAB, See ADANSONIA.

BAPAUME, a fortified town of France, department of Pas-de-Calais. A portion of the allied troops advanced to this place after compelling the French to abandon their fortified position, and to retreat behind the Scarpe, in August 1793. Pop. (1876) 3190.

BA'PHOMET is the name of a mysterious symbol, which was in use among the Templars. According to the oldest and most probable interpretation, the word is a corruption of Mahomet, to whose faith the members of the order were accused of having a leaning. The symbols consisted of a small human figure cut out of stone, having two heads, male and female, with the rest of the body purely feminine. It was environed with serpents, and astronomical attributes, and furnished with inscriptions for the most part in Arabic. Specimens are to be found in the archæological collections of Vienna and Weimar. Hammer, however, in his *Fundgruben des Orients*, derives B. from Gr. *baphè*, baptism; and *metis*, council or wisdom. He charges the knights with a depraved Gnosticism, and makes the word signify the baptism of wisdom—the baptism of fire; in short, the Gnostic baptism—a species of spiritual illumination, which, however, was interpreted sensually by later Gnostics, such as the Ophites (an Egyptian sect of the 11th c.), to whose licentious practices he declares them to have been addicted. But this explanation is generally discredited.

BA'PTISM (Gr. *bapto*, to dip or wash, or to stain with a liquid), one of the sacraments (q. v.) of the Christian Church, deriving its name from the outward rite of washing with water, which forms an essential part of it. B. is almost universally acknowledged among Christians as a sacrament, and is referred to the authority of Christ himself, whose express commandment is recorded in the gospels (Mat. xxviii. 19; Mark. xvi. 16). B. is frequently mentioned in the New Testament as a divine ordinance.

The name and the rite were not, however, altogether new when the ordinance was instituted by Christ. Religious meanings were early attached to washings with water, both by heathens and Jews; they were among the ordinances of the Jewish law; and it is not necessary to go beyond that law to find the origin of the custom of washing or *baptizing* proselytes upon their admission into the Jewish Church. Washing with water was requisite for the removal of ceremonial uncleanness, and every proselyte must have been regarded as, prior to his admission into the Jewish Church, ceremonially unclean. John the Baptist baptized not proselytes upon their renouncing heathenism and entering the Jewish Church, but those who, by birth and descent, were members of it, to indicate the necessity of a purification of the soul from sin—a spiritual, and not a mere outward change.

One of the most important of the controversies which have agitated the Christian Church as to B., is that concerning the proper subjects of B., whether adults only who profess faith in Christ are to be baptized, or if this ordinance is to be administered to their infants also. See BAPTISTS, and BAPTISM, INFANT. The B. of adults was certainly more frequent in the apostolic age than it has ordinarily been where the B. of infants has prevailed; for which an obvious cause presents itself in the fact, that the first members of churches were converts from Judaism or from heathenism. It is, however, generally held by those who advocate the B. of infants, that it was the practice of the apostles and of the church of the apostolic age to baptize the infants of Christians; which, on the other hand, is as stoutly denied, and infant B. is alleged to have crept in along with other corruptions. For neither opinion can any positive historical proof be adduced, the arguments on both sides being purely inferential.

It is admitted, on all hands, that at an early period in the history of the church, B. was administered to infants, although, according to Neander, even after 'it had been set forth as an apostolic institution, its introduction into the general practice of the church was but slow.' He finds 'the first trace' of it in Irenæus. It was opposed by Tertullian about the end of the 2d c.; and was advocated by Cyprian, and acknowledged as an apostolic institution in the North African Church and in the Alexandrian and Syro-Persian Churches in the 3d c.; but it was not until the 5th c. that it became fully established as the general practice of the Christian Church. It has unquestionably continued to be the general practice from that period to the present day; feebly opposed by some of the sects of the middle ages, and more vigorously by some of those who have adopted the general principles of the Reformation. See BAPTISTS.

Both the practice of infant B., and the neglect of it in the early ages of the church, were connected with particular views of religious doctrine, and of the nature and purpose of B. itself. The prevalence of the Augustinian doctrine of original sin is generally regarded as a principal cause of the prevalence of infant B.; but Pelagius, whilst opposing that doctrine, maintained the necessity of infant B. apparently upon the ground that the kingdom of heaven can be attained by human beings only through God's grace. No little influence in favor of infant B. must be ascribed to the growing belief of the absolute necessity of B. to salvation, and of a sort of mysterious efficacy in the rite itself. It is certain, on the other hand, that the belief in the forgiveness of sins in B. led to a practice of deferring it as long as possible, that all sins might be blotted out at once; thus the Emperor Constantine the Great was baptized only a short time before his death. The approach of a war or pestilence caused many to rush forward in haste to be baptized, who had previously delayed.

Two modes of B. are practised; by immersion or dipping, and by aspersion or sprinkling, concerning which there has been much controversy in the early period of the church's history, as well as in recent times. Affusion, or pouring, the common practice of the Church of Rome, may be regarded as essentially the same with sprinkling. The advocates of sprinkling universally admit the validity of B. administered in the other mode, but the advocates of dipping generally refuse to acknowledge that B. by sprinkling can be true Christian baptism. The opponents of infant B., almost without exception, insist upon immersion; whilst aspersion or affusion of water is general, except in the Eastern churches, wherever the B. of infants prevails. The argument upon which Baptists depend most of all is from the word B., and the verb *baptizo*, to baptize, which also, in classic Greek, signifies to immerse. On the other side, it is contended that a strict limitation to this sense does not well accord with its character as a 'frequentative' form of *bapto;* and instances are adduced from the New Testament itself, in which the signification cannot easily be attached either to the noun or to the verb, as 1 Cor. x. 2, where Paul says that the Israelites were 'baptized unto Moses in the cloud and in the sea;' and Heb. ix. 10, Mark vii. 4, and Luke xi. 38, where both verb and noun are employed concerning the *washings* of the Jews, and the noun even of their washing of 'cups, and pots, brazen vessels, and of tables.'—To the argument in favor of immersion, derived from the phrases employed when B. is mentioned in Scripture, as when we are told (Mat. iii. 6) that John the Baptist baptized 'in Jordan,' that our Lord after his B. (Mat. iii. 16) 'went up out of the water,' that Philip and the Ethiopian eunuch (Acts viii. 38) 'went down both into the water;' it is replied that all the passages of this description; even if their meaning were certainly as precise and full as Baptists suppose it to be, are insufficient to sustain the weight of the conclusion as to the necessity of a particular mode of B.; that, however, it is far from being clear that these passages must be interpreted or the meaning of the Greek prepositions so strictly defined as the argument requires; and further, that there are instances mentioned in Scripture which afford a presumptive argument in favor of another mode of B., as where we are told of great numbers added to the church in one day; whilst we have nowhere any intimation of converts being led to any pond or river to be baptized. To the argument drawn from the language of Paul in Rom. vi. 4, Col. ii. 12 (see BAPTISTS), it is replied that it depends upon a fanciful interpretation of these texts.—According to most of the advocates of B. by sprinkling, the great error of their oppenents is that of attaching too much importance to the question of the mode of baptism.

It is, however, indisputable that in the primitive church the ordinary mode of B. was immersion, in order to which *Baptisteries* (q. v.) began to be erected in the 3d, perhaps in the 2d c., and the sexes were usually baptized apart. But B. was administered to sick persons by sprinking; although doubts as to the complete efficacy of this *clinic* (sick) B. were evidently prevalent in the time of Cyprian (middle of 3d c.). B. by sprinkling gradually became more prevalent; but the dispute concerning the mode of B. became one of the irreconcilable differences between the Eastern and Western Churches, the former generally adhering to the practice of immersion, whilst the latter adopted mere pouring of water on the head, or sprinkling on the face, which practice has generally prevailed since the 13th c.; but not universally, for it was the ordinary practice in England, before the Reformation to immerse infants, and the *fonts* (q. v.) in the churches were made large enough for this purpose. This continued to be the practice till the reign of Elizabeth; and the change which then took place is ascribed to the English divines who had sought refuge in Geneva, and other places of the continent, during the reign of Mary. To this day the rubric of the Church of England requires, that if the godfathers and godmothers 'shall certify him that the child may well endure it,' the officiating priest 'shall dip it in the water discreetly and warily;' and it is only 'if they shall certify that the child is weak,' that 'it shall suffice to pour water upon it,' which, however, or sprinkling, is now the ordinary practice.

B. was accompanied, from an early period in the history of the church, with various forms and ceremonies, besides the simple rite of washing with water and the pronouncing the formula which declares it to be 'in the name of the Father, and of the Son, and of the Holy Ghost.' These ceremonies are almost all retained in the Church of Rome, and also generally in the oriental churches, but have been entirely or almost entirely laid aside by Protestants. The Church of England retains the sign of the cross made upon the forehead after B., but the other Protestant churches in Britain reject it. It was an ancient custom that the *catechumens*, as candidates for B. were called whilst receiving instruction with a view to that sacrament, when they were to be baptized, publicly made a profession of their faith and a renunciation of the devil and all his works. The profession of faith is still retained by Protestant churches as the formal ground of the administration of B.; the renunciation of the devil and his works is required by the Church of England of the person baptized, if an adult, or of the *sponsors* or 'sureties' of a child.—Sponsors (q. v.) were early admitted to answer for those who could not answer for themselves, and particularly for infants. The belief in the absolute necessity of B. to salvation led even to B. of the dead among the Montanists in Africa, in which sponsorship was also introduced. Presbyterian and Independent churches generally reject all sponsorship, and regard the profession made by parents as simply a profession of their own faith, which entitles their infants to baptism.

The ancient practice of exoreism (q. v.) immediately before B. has been rejected as superstitious by almost all Protestant churches; as have also that of immersing three times (*trine immersion*), or sprinkling three times, with reference to the three persons of the Godhead—that of breathing upon the baptized person, 'to signify the expulsion of the devil,' and to symbolize the gift of the Holy Spirit—that of anointing with oil (*chrism*, q. v.), to symbolize the same gift, or to indicate that the baptised person is ready, as a wrestler in the ancient games, to fight the good fight of faith—that of giving him milk and honey, in token of his spiritual youth, and of his reception of spiritual gifts and graces—that of putting a little salt into his mouth, to signify the wisdom and taste for heavenly things proper to a Christian—that of touching his nostrils and ears with spittle, to signify that his ears are to be ever open to truth, and that he should ever feel the sweet odor of truth and virtue—and that of clothing him after B. with a white robe (the *chrysome*), in token of the innocence of soul which by B. he was supposed to have acquired. The white robe and the anointing with oil were retained in the Church of England for a short time after the Reformation.—The giving of a name in B. (see the article NAMES) is no essential part of it, but is a custom apparently derived from that of the Jews in circumcision (Luke i. 59—63).—The Church of Rome prefers the use of holy-water (q. v.) in B., but regards any water as fit for the purpose in case of necessity.—According to an ancient usage, long obsolete, the ordinary administration of B. was limited to the great festivals of Easter and Whitsuntide.—Whether B. may be administered in private, has been much debated, both in ancient and modern times. The administration of B. in private houses, and not in the presence of a congregation, was one of the things earnestly contended against by the Presbyterians in Scotland in the first half of the 17th c.; their opposition being grounded, not only upon hostility to what they deemed usurpation of authority, but upon the danger of superstitious views of baptism. And apparently upon this latter ground, B. in private houses is also discouraged, even while it is allowed, if there is 'great cause and necessity,' by the Church of England; yet it has become very frequent both in the Church of England and among the Presbyterians of Scotland.

Some of the most important questions concerning B. will be most appropriately noticed in the article SACRAMENT, particularly those relating to its place in the Christian system and among the means of grace. The opinions early became prevalent, that forgiveness of sins is obtained in B., and spiritual life begun, and that it is indispensably necessary to salvation—exception being only made, if any was made at all, of the case of believers, adult

persons, who desiring B., were prevented from being baptized, and particularly of those who suffered martyrdom, which was generally held to be equivalent to baptism. The Church of Rome still owns, as supplying the place of B. by water, these two—B. by desire, and B. by blood—i. e., in martyrdom.—According to the general doctrine of the Protestant churches, B. is 'a sign and seal' of the covenant of grace, representing as a sign the blessings of the covenant, and as a seal, confirming the covenant. As a sign, it is generally held to represent in its rite of washing, the removal both of guilt and corruption, by the blood and by the Spirit of Christ, and so to relate equally to pardon and regeneration, although some have limited its symbolic reference to regeneration alone. One of the most important points disputed concerning B., is that of baptismal regeneration. See REGENERATION.

Some early Christian sects appear to have rejected B., on grounds somewhat similar to those on which it is rejected by Quakers (q. v.) at the present day, who explain the passages which relate to it symbolically, and insist that a spiritual B. is the only real B. of Christians.—The Socinians also in modern times have maintained that B. is not an ordinance of permanent obligation, but a merely symbolical rite of little importance.

Much controversy has taken place concerning *Lay Baptism*. Wherever there is a recognized ministry in the church, there is a general agreement in referring the ordinary administration of B. to those who hold this office. It might be expected that the more strongly the necessity of the transmission of *holy orders* by apostolical succession is asserted, the more strongly also would exclusiveness be manifested with regard to the right of the *clergy* to administer B. But this tendency is counteracted by the belief in the necessity of B., or at least of its great importance to the salvation of infants; so that from an early period lay B. was allowed, although not without a struggle, in cases of apprehended danger; and in the Church of Rome, this principle is logically carried out to the fullest extent, and even women are authorized to administer B. in cases of necessity. On the same ground, lay B. was at first permitted in the Protestant Church of England; but the prevalence of other views led to a kind of formal restriction of the right of administering it to 'lawful ministers,' although in practice the validity of lay B. is still generally recognized.

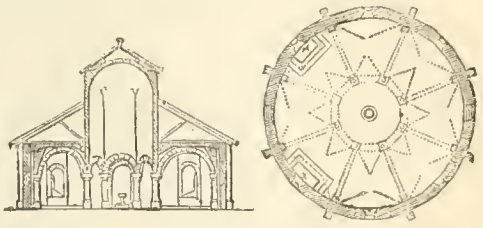
Another question much agitated in the church from early times, is that concerning the validity of B. by heretics. The opinion ultimately prevailed, that B. by heretics is valid, except in the case of those who do not baptize in the name of the three Persons of the Godhead. This continues to be the almost universal opinion. Few Protestant theologians hesitate to acknowledge the validity of B. administered in the Church of Rome.

The *B. of bells* is a custom supposed to have been introduced about the 10th c., and still retained in the Church of Rome. The term *benediction* is sometimes substituted for B.; but the rite itself is very similar to that of B., and is accompanied with many similar ceremonies—'a sort of exorcism,' sprinkling with holy water, anointing 'with the oil of catechumens' and 'with chrism,' a formula of consecration 'in the name of the Father, Son, and Holy Ghost,' and sometimes also, if not always, the giving of a name to the bell consecrated, and even a kind of sponsorship as by godfathers and godmothers in baptism. This custom has no doubt greatly fostered the notion of an efficacy in the ringing of bells for protection in storms, and for other benefits; indeed, it is expressly avowed that 'the bells are blessed, to turn off storms and tempests from the faithful.'

BAPTISM, INFANT. The chief arguments in favor of infant B. are based upon the proposition that the church is one throughout all changes of dispensation. From this it is argued that as infants were, so they still must be included in the visible church. It is maintained that in all covenants which God has made with men, their children have been included; that the covenant with Abraham was a renewed revelation of the covenant of grace, the temporal promises made to him being connected with the greatest spiritual promises; that circumcision was a seal of the covenant with respect to these, in which the children of Christians have the same interest that Jewish children had; and that B. is a seal of the covenant now as circumcision was, the things to which it has immediate reference being also blessings which children are capable of. It is contended that the arguments in favor of infant salvation derive additional strength from that view of the place of infants in the church according to which they are entitled to baptism. The passages which connect B. with faith are regarded as exclusively relating to adults, like the passages which connect salvation with faith and repentance. In reply to the argument that there is no express command for infant B., it is argued that the state of the case rather demands of those who oppose it the production of an express command against it, without which the general command must be held to include it; the words and actions of our Saviour (Mark x. 14) with respect to children are quoted as confirming the opinion that the place of infants in the church is precisely what it was under the Jewish dispensation; and it is contended that it would have been a very great restriction of privilege in the new dispensation if infants had been excluded from a place which they held before, as entitled to a seal of the covenant, whereas it is evident that the new dispensation is characterized not by restriction but by enlargement of privilege.—Those who hold the doctrine of infant B. are styled Pædobaptists.

The Roman Catholic and Lutheran Churches regard the B. of infants as admitting them into the church, and making them members of Christ's body. The Reformed (q. v.) Churches hold that the children of Christians are included in the visible church from their birth, and therefore entitled to baptism. These are the natural starting-points of very different systems.

BA'PTISTERY (Gr. *baptisterion*, a large vase or basin), the name given sometimes to a separate building, sometimes to the portion of the church itself in which the ceremony of baptism was performed. In the latter case, the B. was merely the enclosure containing the font, to be seen in most English churches. According to the earlier arrangements of the Christian Church, however, the B. seems usually to have been a building standing detached from, though in the immediate vicinity of the church to which it appertained. Baptisteries, at first, were either hexagonal or octagonal, but afterwards became polygonal, and even circular. The B. of St. Giovanni in Fonte, at Rome, commonly known as the B. of Constantine, is octagonal, whilst the church of St. Constantia, which was originally a B., is circular.



Section and Plan of Baptistery at Asti.

The celebrated B. of Florence is an octagonal structure, measuring about one hundred feet in diameter. It stands detached from, but in the immediate vicinity of the cathedral. It is built of black and white marble, in the style which Giotto is said to have introduced, and which is still peculiar to Florence. Internally, a gallery which runs nearly round the whole building, is supported by sixteen large granite columns, and the vaulted roof is decorated with mosaics by Andrea Tafi, the pupil of Cimabue. But the magnificent bronze doors, with their beautiful bas-reliefs, are the most remarkable feature of this famous baptistery. The most celebrated of the three doors was executed by Lorenzo Ghiberti, the earliest being the work of Andrea of Pisa. Fifty years were required for their completion; and it is remarkable that the contracts for their execution are still preserved. Next in importance, and of even greater size, is the B. of Pisa. It is circular in form, the diameter measuring 116 feet. Externally, it is divided into three stories, the two under ones being surrounded by columns, of which the upper are smaller and more numerous than the under. The building is raised from the ground on three steps, and terminates in a pear-shaped dome, which is famous for its echo, the sides acting as whispering-galleries. The largest B. ever erected is supposed to have been that of St. Sophia, at Constantinople, which was so spacious as to have served on one occasion for the residence of the emperor Basilicus.

BAPTISTS (sometimes called *Antipædobaptists*, as opposed to *Pædobaptists*, or those who advocate infant Baptism*). This denomination of Christians refuse to acknowledge any great name as founder of their sect. They trace their origin to the primitive church itself, and refer to the Acts of the Apostles and their Epistles as affording, in their opinion, incontestable evidence that their leading tenets had the sanction of inspiration. When Christianity became corrupted by the rise of Antichrist, they point to the maintenance of their scripture practice among the Cathari and Albigenses and other sects of the middle ages, who, in the midst of surrounding darkness, continued to hold fast the apostolic testimony. They sprung into notice in England under Henry VIII. and Elizabeth. They were persecuted under both reigns, but they received freedom to meet for worship from James II., and complete religious liberty under William III. Ever since, they have diffused their principles extensively in Great Britain and North America; many of their ministers have done good service to the cause of science and literature, and, both as preachers and writers, have taken a position of eminence in society.

* The Baptists of Great Britain and America reject the name of Anabaptists, as expressing only an accidental circumstance of their tenets—viz., the rebaptizing of converts from other sects, who happen to have been baptized in infancy, and also as associating them with the scandals of the German Anabaptists (q. v.) of the 16th c., from whom they claim to be historically distinct. From the same feeling, the modern sect in Germany and Holland style themselves *Taufgesinnte*.

The B. hold the plenary inspiration and supreme authority of the Holy Scriptures as a revelation from God; the equal deity of the Son and the Holy Spirit in the unity of the ever blessed Trinity. But, as a condensed view of opinions cannot be expected in this work, it may be as well to state that the denomination are distinguished by almost all the shades of belief which exist in other bodies. They have among them Calvinists both *hyper* and moderate, also high and low Arminians, diverging off in every variety of shade from a common center. The great body of them in Britain and America hold the doctrine of Calvinism in a modified form; that is to say, they maintain the *sufficiency* of the Atonement for *all men*, the limitation for which some have pleaded, they consider, lies in its *application* to the sinner by the sovereign grace of God through faith. They maintain the necessity of regeneration and holiness of life as essentialto true religion, and that 'without holiness no man shall see the Lord;' and their conduct, in general, will bear a comparison with any class of their co-religionists.

Particular B., so called because holding that Christ died for an elect number, and *General* B., who maintain that he died for all men, constitute the two leading sects into which the body is divided. *English* B., in their church order and government, are the same as Congregationalists, the rite of baptism excepted. *Scotch* B., properly so called, insist on a plurality of pastors in every church, and the exercise of mutual exhortation by the members in their public assemblies. There are Baptist churches in England, however, who are *Scotch* in their order, and English B. in Scotland who are *English* in theirs. Seventh-day B., we believe, are to be found almost wholly in America, who observe not the first day of the week, but the seventh, as a day of rest. There are, besides these, great divisions, various small associations of B. scattered over Great Britain, America, and the continent of Europe, whose opinions cannot be gathered up into systematic arrangement, and who would not approve of being identified with any of the sectarian designations here set down.

The particular tenet which characterizes B. among their fellow-Christians is, that baptism is an ordinance the validity of which depends on an intelligent faith on the part of the recipient. Their views on the matter of baptism may be reduced to two heads—the *subjects* and *mode* of baptism. The subjects of the baptismal rite they hold to be believers in the Lord Jesus Christ. They ground their faith in this matter on the following positions—namely: 1st, The Lord in his commission to his apostles associates teaching with baptism, and *limits* the administration of the rite to *the taught*. 2d, The Acts of the Apostles shows how they understood their Master, for they baptized none but believers, or such as appeared to be so. 3d, That the kingdom of Christ as it appears in this world is restricted to credibly converted persons, as is shown in his discourse with Nicodemus: 'Except a man be born again, he cannot see the kingdom of God;' and his subsequent statements on to the hour when he emitted his memorable confession before Pilate, 'My kingdom is not of this world,' uniformly proves that its subjects and institutes form a distinct and separate community from the Jewish theocracy, which embraced parents and children in nonage in one commonwealth. 4th, They maintain that the ordinance, as explained in the New Testament, always points to a moral and spiritual change, apart from which it were indeed a meaningless ceremony.

As respects the *mode*, the B. hold that only immersion in water *is* baptism. They argue, that the original term *baptizo* conveys this meaning, and no other; that nothing less can possibly answer to the apostle's explanation in Rom. vi. 4, 5, and Col. ii. 12, 'buried with him in baptism, wherein also ye are risen with him;' that the many allusions in the epistles to the churches manifestly bear out this interpretation; and finally, that the fact of John baptizing at a spot selected for the purpose '*because* there was *much water* there,' is perfectly conclusive.

Their form of church-government is congregational. They maintain that the only order of officers remaining to the church, since inspiration ceased, are pastors (otherwise called elders and bishops), deacons, and evangelists; that the number of official persons in each of the apostolic churches cannot be ascertained from the record, but must of necessity have depended—and always must depend—on circumstances; that each church is possessed of the power of self-government under its exalted head, Jesus Christ, subject to no foreign tribunal or court of review; that discipline is to be exercised by the rulers in presence, and with the consent of all the members, and parties received or excluded at their voice.

The B. are divided among themselves regarding communion—one portion receiving conscientious Paedobaptists to the Lord's table and membership; the other refusing this privilege to any but Baptists. The churches of the former are called open communionists; the latter, strict communionists.

Next to the Moravians, the B. were earliest in the field of missions. They have been honored to plant Christian churches in many parts of continental India, in Ceylon, in the Bahamas, the West Indies, Africa, and China. No mission band has arisen in any denomination, within the century, who have surpassed the agents of the Baptist Missionary Society in ardent zeal, patient perserverance, and invincible fortitude, in carrying out their Lord's commission to preach the gospel to every creature. The names of Carey, Marshman, Ward, and Knibb will be had in grateful remembrance by all succeeding generations; and their footsteps are now being trod by a long list of Christian missionaries of all evangelical persuasions, who are 'the messengers of the churches and the glory of Christ.'

This section of the Christian church was probably less zealous than their brethern, at one time, in preparing their ministers for their work by a sound course of study in theology and general literature; but this reproach has been long rolled away. They have schools of learning inferior to none for training young men of piety for pastorial duties, presided over by men of great ability. At Bristol, Rawdon (near Leeds), Regent's Park (London), Pontypool, Haverfordwest, and Nottingham, there exist seminaries of learning which are entitled to give certificates qualifying for matriculation at the university of London; and many of the students have already taken degrees and honors there. There are also the Pastor's College, in connection with the Tabernacle, London, and theological institutions at Edinburgh, Manchester, and Llangollen.

In the *Baptist Handbook* for 1881, the returns of Baptist churches and members are as follows: British, 2587 churches, 276,348 members; colonial, 1089 churches, 105,803 members; foreign, 24,829 churches, 2,090,937 members; total, 28,505 churches, 2,473,088 members. The United States possessed, in 1880, 23,908 churches and 2,024,224 members. England, in 1880, had 1929 churches and chapels, with 199,828 members; Wales, 540, with 66,043 members; Scotland, 88, with 9234 members; Ireland, 30, with 1251 members. See BAPTISTS in AM. SUPP.

BAPTISTS, CAMPBELLITE. See DISCIPLES OF CHRIST in AM. SUPP.

BAR is any elongated piece of wood, metal, or other solid substance. In the iron manufacture, B. is a rod, either round or square shafted. The round ones are made by drawing the iron red-hot through a bore or hole in a plate, and the square ones by passing it likewise red-hot through a roller-mill between two rollers counter-grooved, with their triangular-grooved faces forming the square opening for the passage of the iron. Railway and knee iron are made in the same manner. See IRON.

BAR, in Hydrography, is a bank opposite the mouth of a river, which obstructs or *bars* the entrance of vessels. The B. is formed where the rush of the stream is arrested by the water of the sea, as the mud and sand suspended in the river-water are thus allowed to be deposited. It is thus that deltas are formed at the mouths of rivers. The navigation of many streams (as the Danube) is kept open only by constant dredging or other artificial means.

BAR, in Music, is a line drawn across the stave, to divide the music into small portions of equal duration; each of these small portions is itself called a *bar*.

BAR, or BARR, in Heraldry, one of those more important figures or charges in heraldry which are known as *ordinaries*. By the heralds of this country, the ordinaries, or, as, by way of eminence, they are called, the 'honorable ordinaries,' are commonly reckoned as ten in number, the sub-ordinaries, or minor charges, being greatly more numerous. The B., like the Fess (q. v.), is formed by two horizonal lines passing over the shield, but it differs from it in size, the fess occupying a third, the B. only a fifth part of the shield. There is this further difference between these two ordinaries, that the fess is confined to the center, while the B. may be born in several parts of the shield. There is a diminutive of the B. called the Closet, which is half a B.; and again of the closet, called the Barrulet, which is half a closet, or the fourth part of a bar.—BARGEMEL is a double bar, from the French *jumeau* f *jumelle*, a twin.

Bar.

BAR, in Law. This word has several legal meanings; thus, it is the term used to signify an enclosure or fixed place in a court of justice where lawyers may plead, or perhaps more correctly, where they can address their advocacy on behalf of their clients. A veiled-off space within the Houses of Parliament is similarly called the B. See PLEADING. The dock, or enclosed space where persons accused of felonies and other offences stand or sit during their trial, is called the B.; hence the expression, 'prisoner at the bar.' This word is likewise applied to the gate or rail thrown across a turnpike road for the levying of the toll-duties. It has also a general meaning in legal procedure, signifying something by way of stoppage or prevention. There is also a trial at B., that is, a trial before the judges of a particular court, who sit together for that purpose *in banc* (q. v.). See BAR OF DOWER, PLEA, TRIAL AT BAR, TOLL, FELONY, TREASON, BARRISTERS, ADVOCATE.

BAR OF DOWER. Dower, the estate or provision which, by the law of England, a widow is entitled to out of the lands and

tenements of her deceased husband, may be barred or defeated by her elopement, her divorce on the ground of her own adultery, the treason of her husband, and other disabilities, and by detaining the title-deeds or evidences of the estate from the heir until she restores them. A woman might also, while fines and recoveries were in force, be barred by these assurances, as she now may by the new method of conveyance appointed by the statute 3 and 4 Will. IV. c. 74, in substitution for a fine or recovery, in the case of a married woman. And another method of barring dower is by jointure, as regulated by the statute 27 Henry VIII. c. 10,—Stephen's *Commentaries*, vol. i., p. 273. See DOWER, JOINTURE, WIDOW, and FINE OF LANDS.

The term corresponding to Dower in Scotch laws is TERCE (q. v.), which may also be barred or excluded in various ways; as, for instance, by the widow's express discharge or renunciation, by the deeds of the husband affecting his real estate, by the husband's conviction for treason, by the wife's express acceptance of a different provision in lieu of the terce, and by her divorce on the ground of adultery.

BAR, PLEAS IN. See PLEADING and PLEA.

BAR, TOLL. See TOLL.

BAR, TRIAL AT. See TRIAL AT BAR

BARABA', a steppe of Siberia, extending between the rivers Obe and Irtish, and occupying more than 100,000 square miles, and covered with salt lakes and marshes. It was colonized by the Russians in 1767, who have since cultivated parts of it.

BARACO'A, a seaport town on the north-east coast of Cuba, belonging to the Spaniards. Lat. 20° 22′ N., long. 74° 30′ W. In its vicinity is a remarkable mountain called the Anvil of Baracoa.

BARAGUAY D'HILLIERS, LOUIS, a distinguished general of the French empire, was born in Paris in 1764. After serving under Custine and Menou, he received an appointment in the army of Italy from Napoleon, and was a sharer in all the success of the campaigns of 1796—7. He was made a general of division; and in virtue of Napoleon's treaty with the Venetian Republic in May 16, 1797, commandant of Venice. B. accompanied the expedition to Egypt; and afterwards successively held appointments in the armies of the Rhine, and the Tyrol, and in Catalonia. He headed a division in the Russian campaign of 1812; but on the retreat, he incurred the displeasure of Napoleon. He was sent as governor to Berlin, where he soon after died of grief and exhaustion.

BARAGUAY D'HILLIERS, ACHILLE, a French general, the son of the preceding, was born in Paris on the 6th of September 1795. He rose rapidly through the inferior military grades, and obtained, in 1832, the appointment of governor in the military school of St. Cyr, where he suppressed a republican conspiracy that threatened to break out in the institution. After he had served with various success in more than one campaign in Algeria, he was promoted to the rank of lieutenant-general, on the 6th of August 1843; and in 1847, he was made inspector-general of infantry. After the revolution of February 1848, he was chosen a member of the National Assembly, in which he joined the party of reaction, and was in favor of the restriction of the press. In the beginning of November 1849, he went to Rome, as commander-in-chief of the French army sent to sustain the authority of the pope. He returned in 1850; and in January 1851 obtained the command of the army of Paris, in the place of Changarnier. B. concurred in the policy of the *coup d'état* of December 1851, and was made a member of the Consultative Commission. During the Crimean war, he received the command of the French expeditionary corps of the Baltic, and co-operated with the British fleet in the capture of Bomarsund. He was afterwards made a Marshal of France, and commanded in the Italian war of 1859. In 1871 he was made president of the court appointed to investigate the conduct of the generals who surrendered fortresses during the late war. He died 6th June 1878.

BA'RAS KHOTU'N, or BARS KHOTA'N, a ruined city on the banks of the Kherlon, one of the head-streams of the Amur, in the Mongol country. Some suppose it to have been built by the Emperor Kublai; others, that it was erected by Toghon Timur in the 14th c., after the expulsion of the Mongols from China. The remains of the mud-walls show that the city had been 5 miles in circumference.

BARB, the designation of a noble breed of horses cultivated by the Moors of Barbary, and introduced by them into Spain. Barbs are less remarkable for their beauty and symmetry, than for their speed, endurance, abstinence, and gentle temper.

BA'RBACAN. See BARBICAN.

BARBACE'NA, a city of Brazil, in the province of Minas Geraes, 150 miles north-west from Rio de Janeiro. It is situated on the top of two hills in the Sierra Mantiqueira, and at an elevation of about 3500 feet above the sea, so that, although within the tropics, it enjoys a mild climate. The streets are broad and straight, the principal ones paved and provided with footpaths. The houses are low, and have gardens behind. The inhabitants are chiefly engaged in gold-mining and in exporting coffee and cotton to Rio de Janeiro. B. is the center of a productive district, the pop. of which is 12,000.

BARBA'DOES, the most easterly of the Caribbees, and the residence of the governor-general of the British Windward Islands. See ANTILLES. The lat. and long. of its capital, Bridgetown, are 13° 4′ N., and 59° 37′ W. Its area is about 166 square miles, or 106,240 acres—the unprecedented proportion of 100,000 being under cultivation. Besides the capital, B. contains 3 other towns, all more or less in a state of decay—Jamestown, Speights-town, and Oistin. B. affords no harbors, being almost encircled by coral-reefs, which here and there extend as much as 3 miles to seaward. Inside of the coral-reefs, the coast, excepting at two points, presents long lines of sandy beach—one of the most remarkable being Carlisle Bay with its exposed roadstead, on which Bridgetown stands. Setting aside occasional attacks of yellow fever, the climate is healthy. In 1844, the fall of rain was 72 inches; and the temperature is said to have ranged only between 76¾° and 83½° F. Shocks of earthquake are sometimes felt, and thunder-storms are frequent and severe. But hurricanes are the grand scourge of Barbadoes. In 1780, one of them destroyed 4326 persons and property to the value of £1,320,564 sterling; and in 1831, another destroyed 1591 persons, and property to the value of £1,602,800 sterling. Of the former of these, the violence appears to have surpassed all belief—the winds and the waves between them having carried a 12-pounder gun a distance of 140 yards.

In 1833, the commencement of the apprenticeship, under the imperial act of emancipation, the population was 102,231; by 1881 it had increased to 171,889, being an average of 1035 inhabitants to every square mile. The trade and the revenue bear a similar testimony to the benefits of emancipation. Between 1833 and 1882, the revenue had increased from £20,975 to £136,298; the imports, from £481,610 to more than £1,000,000; the exports, from £408,363 to above £1,000,000 (sugar, £824,000); tonnage entered and cleared annually is some 400,000 tons. Being universally cultivated in regular plantations, the island affords no room for the squatting of negroes on unreclaimed lands, as in Jamaica and other West-India possessions. On this account, if from no other cause, the negro population have been compelled to labor diligently for hire, and are generally in a condition most creditable to their industry and prudence, contrasting favorably with some of the lower classes among the whites. Altogether, however, the Barbadians are a shrewd and clever people. B. is the see of a bishop. It contains also many well-endowed seminaries—Codrington College, in particular, having a revenue of £3000 a year. It was first colonized by the English in 1625, having previously been depopulated by the Spaniards. The peace of B. was seriously disturbed in 1876, by riots occasioned by the proposed confederation of the Windward Islands, in which several lives were lost, and great damage done to property.

BARBA'DOES CHERRY, the name given in the West Indies to the fruit of two small trees, *Malpighia urens*, and *M. glabra*, which are cultivated for its sake. Clusters of fruit are produced from the axils of the leaves. The fruit of *M. urens* is small, that of *M. glabra* is like a Mayduke cherry in size and appearance, but inferior in flavor. Each fruit contains three triangular seeds. The leaves of *M. urens* have stinging hairs on the under-side. See MALPIGHIACEÆ.

BARBA'DOES GOO'SEBERRY (*Pereskia aculeata*), a pleasant West Indian fruit, produced by a plant of the natural order *Cacteæ* (q. v.) with a round stem, thick flat alternate leaves, and large strong spines. The fruit has expectorant properties.

BARBA'DOES LEG, which seems to be identical with the *Elephantiasis of the Arabs*, is a disease which is characterized by hypertrophy of the skin and of the subcutaneous areolar tissue. Notwithstanding its name, it may affect the arm, female breast, &c. It begins with acute febrile symptoms, and inflammation of the superficial lymphatic vessels. The part swells and becomes uneasy from tension, the glands being especially large and hard. The skin varies in appearance, being sometimes white and shining, and in other cases of a dark color, and studded with projecting veins. The swelling is sometimes very great, and quite hard. In some parts of the body, skin which would naturally weigh less than a couple of ounces, is thus converted into a tumor weighing from 100 to 150 pounds. The disease is endemic in the tropics; and in the cases which we see in this country, it always appears that the disease commenced in a hot country.

Iodine is recommended by some doctors, and well-regulated pressure by others. The leg has been amputated, in consequence of the annoyance caused by its great weight; but this should be regarded as an ultimate resource, and litigation of the femoral artery, which often causes great subsidence of the swelling, should be first tried.

BA'RBARA, Saint, who suffered martyrdom at Nicomedia, in Bithynia, about 236, or, according to other accounts, at Heliopolis, in Egypt, about 306, was of good birth, and well educated by her father, Dioscorus. To avoid disturbance in her studies he had a tower built for her, where she spent her youth in the deepest solitude. While in this retirement, she was led, through Origen, as is said, to embrace Christianity. Her father, a fanatic heathen, learning his daughter's conversion, and failing to induce her to renounce Christ, delivered her up to the governor, Martianus, to be dealt with by the law. Martianus, struck with the intelligence and beauty of the maiden, attempted first by arguments to make her relinquish Christianity, and when that failed, had recourse to the most exquisite tortures. At last, the blinded father offered himself to strike off his daughter's head. Scarcely was the deed done, when he was struck with lightning. Hence St. B. is to this day prayed to in storms. For the same reason, she is the patron saint of artillery, and her image was at one time frequently placed on arsenals, powder-magazines, &c. The powder-room in a French ship of war is to this day called Sainte-Barbe. St. B.'s day is the 4th December.

BARBA'REA. See Cress.

BARBA'RIAN (Gr. *barbaros*), among the Greeks, as early as the time of Homer, signified one who could not speak the Greek language; and this restricted signification was not wholly obsolete even in the age of Plato, for the latter divides the entire human race into *Hellenes* and *Barbaroi*. The origin of the word is unknown, if it be not artificially formed, on the principle of imitation, to represent a meaningless babble of sound, such as the Greeks conceived all foreign languages to be. It first began to acquire its secondary and invidious signification at the period of the Persian wars. The Greeks, who always exhibited a proud consciousness of their superior intellect and privileges, employed the term to designate the character of their enemies. It then meant whatever was opposed to Greek civilization, freedom, or intelligence; but it could not yet have attained the degraded sense in which it is now used, for the Romans in the time of Plautus accepted the appellation, and called themselves *Barbaroi*. Subsequently, when Rome, under Augustus, became the mistress of the world, the word was applied to all the Germanic and Scythian tribes with whom she came into contact. In modern times, B. signifies savage, uncivilized, or ignorant.

BARBARO'SSA. See Frederick I.

BARBARO'SSA, Aroodje or Harudj and Khair Eddin, two brothers, renegade Greeks, natives of Mitylene, who, as Turkish corsairs, were the terror of the Mediterranean, during the first half of the 16th c. They made themselves masters of Algeria (q. v.) and Tunis, and brought these countries under the sovereignty of the Turkish sultan.

BARBAROUX, Charles, one of the most distinguished and energetic of the Girondists, was born at Marseille in 1767. The new ideas of equality and fraternity found in B. a warm advocate, and he did much to promote their spread. He was elected the special delegate of Marseille, to attend the Constituent Assembly at Paris. There he opposed the court, and took part with the minister, Roland, then out of favor. After the events of the 10th of August, he returned to his native town, where he was received with enthusiasm, and was soon after chosen delegate to the Convention. In the Convention, he adhered to the Girondists, and belonged to the party who, at the trial of the king, voted for an appeal to the people. As B. boldly opposed the party of Marat and Robespierre, and even directly accused the latter of aiming at the dictatorship, he was, in May 1793, proscribed as a royalist and an enemy of the republic. He wandered about the country, hiding himself as he best could, for thirteen months, when he was taken, and perished at Bordeaux by the guillotine, June 25, 1794. B. understood the revolutionary crisis much better than the most of his party. Had the Girondists generally possessed anything like his energy and sagacity, the Jacobins must have succumbed, and much bloodshed and horror would have been spared to France and the world.

BA'RBARY, an extensive region in Northern Africa, comprising the countries known in modern times under the names of Barca, Tripoli Proper, Fezzan, Tunis, Algeria, and Marocco, together with the half-independent province of Sus; and in ancient times under those of *Mauritania*, *Numidia*, *Africa Propria*, and *Cyrenaica*. It stretches from Egypt to the Atlantic Ocean, and from the Mediterranean to the Desert of Sahara, or between long. 10° W. and 25° E., and lat. 25°—37° N. The north-west of this region is divided by the Atlas Mountains into two parts: the northern comprising Marocco, Algeria, and Tunis; the southern, a half-desert region, called Belud-el-Jerid, the country of dates. Though pertaining geographically to Africa, B. is not specially African in any of its characteristics; but in climate, flora, fauna, and geological configuration, belongs to that great region which forms the basin of the Mediterranean. It is watered by many small streams, which either flow into the Mediterranean or into the salt-lakes on the edge of the Desert, according as they rise on the northern or southern slopes of the Atlas Mountains. A large portion of the country is capable of cultivation, and sandy or rocky tracts are rare, except on the southern margin. During the times of the Carthaginians, Greeks, and Romans, it was richly fertile, and all the natural conditions of its ancient productiveness still remain.—For an account of the climate, geology, productions, &c., see the various countries.

Among the people, besides the French and other Europeans, seven distinct races may be enumerated: Berbers (or Kabyles), Moors, Beduins, Jews, Turks, Kuluglis, and Negroes. The Berbers and Beduins inhabit the open country, while the Moors, on the other hand, reside in the towns. Most of the Berber tribes are either wholly free, or subject to the mere nominal jurisdiction of native chiefs, kaids, judges, &c. The Beduins luxuriate in equal liberty. Jews had settled here in ancient times, but the greater number of that race immigrated when the Moors were expelled from Spain. The Turks entered B. in the 16th c. They form the dominant race in Tripoli and Tunis, but never established themselves permanently in Marocco. Their sway in Algeria was brought to an end by the French. The Kuluglis (the children of Turks by native mothers) are excluded from the possession of all the paternal rights and privileges. The negroes are not natives of B., but are brought thither as slaves, principally from Sudan and Guinea. They are for the most part domestic slaves. The population, exclusive of Jews and Christians, is about 11,000,000, all Mohammedans. Arabic is the language of commerce and intercourse, and in Marocco, the language of government, and the mother-tongue of Beduins, Moors, and even Jews; but in Tunis and Tripoli, where, as we have said, the Turks are still dominant, the language of government is Turkish. The Berbers Proper, or Kabyles, especially in the highlands, to which they have been driven by foreign conquerors, use a peculiar speech among themselves.

In the oldest historical times we find the Mauri (the ancestors of the modern Moors) mentioned as residing in the north-west of B., the Numidians in the interior and eastern parts, and the Phœnician colonies on the coasts. These last people formed settlements and founded cities—among them Utica, Hippo, Hadrumetum, Leptis, and afterwards Carthage, about 1000 B.C. It does not appear that they ever penetrated far into the interior. Confining themselves to the coast between the Great Syrtis and the Straits of Gibraltar, they maintained commerce with the people of the interior and the seaports of the Mediterranean. In the 7th c. B.C., the Greeks founded Cyrene, considerably to the east of Carthage, and colonized the plateau of Barca, now styled Jebel-el-Achdar by the Arabs. While the Phœnician colonies held sway on the coast, the Mauri and the Numidians were divided into several independent tribes, and, like their neighbors the Gætuli, were wholly uncivilized. After the second Punic war, the Romans extended their sway over Carthaginian Africa, which became a Roman province at the close of the third Punic war, when the city of Carthage was sacked and destroyed.

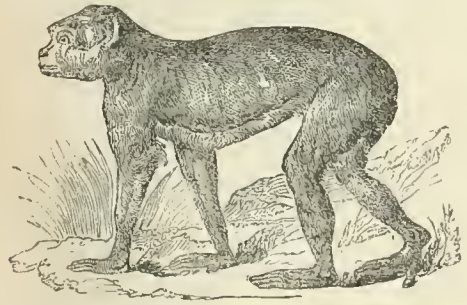
Numidia was 'annexed' after the victory over Jugurtha, and Mauritania after the defeat of King Juba, the ally of Pompey's party. The son of Juba, bearing the same name, was allowed to reign as a nominal sovereign by Augustus; but Mauritania was, in fact, a Roman province. Thus, the Romans had acquired a territory in Africa extending from the Great Syrtis to the Atlantic (corresponding to the modern states of B.), which formed some of the largest and most flourishing provinces of their vast empire. Everywhere they built large towns, whose extensive ruins are still to be seen scattered over the whole land, even to the verge of the Desert; as, for instance, those at El-Haman, in the regency of Tunis, at Sava, Musulupium, and especially the splendid city of ruins, Lambasa, not far from the Desert of Sahara. The Romans had, in general, only two legions, numbering 24,000 men, in their African provinces; nevertheless, their authority was uncontested, and they were enabled to undertake important works, such as the cisterns and aqueducts at Rusicada, Hippo, and Cirta, and the temples and amphitheaters of Calama and Anuna, which clearly show that the inhabitants enjoyed the benefits of a safe and powerful civilization.

Under Constantine, North Africa was divided into the several provinces, Mauritania-Tingitana, Mauritania-Cæsariensis (on the east of the former), Mauritania-Sitifensis, Numidia, Zeugitania, Byzacium, Cyrenaica, and the Regio Syrtica. At the division of the empire, the whole of these provinces, with the exception of the last, fell to the share of the Western Empire. About this time, Christianity was promulgated in Africa, and with such success, that in the three Mauritanias there were more than 160 dioceses. As Roman power declined in Europe, the consequences were severely felt in the African provinces. Religious disturbances, native revolts, and the ambitious aspirations of the Roman governors after independence, loosened the political bands which

bound the provinces together, and made them an easy prey to the Vandals, who landed in Africa, in 429 A.D., under the ferocious Genseric, and in an incredibly short space of time overran the country, which they savagely misgoverned until 533, when they were defeated by Justinian's great general, Belisarius. Meanwhile the Numidians and the Mauri had made themselves masters of the interior and of the coast of Mauritania-Tingitana, and the Greek-Roman territories were restricted to the neighborhood of Carthage and some points on the coast.

The whole country of B. was thus made an easy prey for the Arabs, and in 647, Abdallah-ben-Said, with 40,000 fanatical Mohammedans from Egypt, defeated and slew the Greek prefect, Gregorius, at Tripoli. He did not, however, follow up his victories; but in 665—670 A.D., the Arabian general, Akbah, conquered the coast-towns of Tripoli, founded Cairo, and extended his sway almost to the Desert. Hassan, the general of the Calif Abd-el-Malek, in 692, stormed, plundered, and destroyed the new Carthage, and, in fact, annihilated the Greek-Roman dominion in Africa. In the course of less than a century, the greater part of the native tribes were converted forcibly to the faith of Islam. In 789, the western provinces separated themselves from the others, and Edris-ben-Abdallah founded there the dynasty of the Edrisites. After 800, when the governor, Ibrahim-ben-Aglab, declared himself independent, and founded the dynasty of the Aglabites, Africa was lost to the califs. From this time down to 1269, the changes of dynasty in B. were so frequent, that we cannot here describe them in detail. The results were, that independent states arose in Algeria, Oran, Bugia, Tenez, &c. About this time, also, began the reaction of the Christian world against Mohammedanism in North Africa and Spain. St. Louis undertook an expedition against Tunis. The Moors were, by and by, expelled from Spain, and settled themselves on the coast of Northern Africa, there to begin that course of piracy by which they became odious to Europe, first as a fierce retaliation against their Christian persecutors, but ultimately as a barbarous profession. As early as the time of Ferdinand the Catholic, the Spaniards sought to check their insolent ravages, and landed in Africa on several occasions, capturing the ports of Ceuta, Melilla, Oran, Bugia, the island before Algiers, and Tripoli. The Portuguese landed on the coast of Morocco, where at first they had great success; but they were ultimately compelled to leave the country. After various changes of fortune, Algiers, Tunis, and Tripoli were brought under the government of the sultan. Since 1830, however, the first of these (see ALGERIA) has been under French sway, while for many years the other two have been only nominally dependent on the Turkish ruler. A similar fate, at a much earlier period, befell the western part of B., where the successors of the Arabian Sherif, Mula-Mehemed, overthrew the kings of Maroeco and Fez, and established the Sherif dynasty, which rules to the present day over these lands.—Shaw's *Travels and Observations relative to several Parts of B.*; Mauroy, *Du Commerce des Peuples de l'Afrique Septentrionale* (Par. 1845).

BA'RBARY APE, PI'GMY APE, or MA'GOT, a small species of ape or tailless monkey, interesting as the only one of the monkey-race which is found in Europe. The only European locality, however, in which it occurs is the Rock of Gibraltar, and it is said to have been originally brought from the north of Africa. It inhabits the precipitous sides of the Rock, inaccessible to human



Barbary Ape.

foot, and enjoys a certain measure of protection from firearms in return for the amusement afforded by its manners. It is gregarious, and large numbers are often seen together, the females carrying their young upon their backs. In some parts of the north of Africa, the B. A. is extremely abundant, inhabiting rocky mountains and woods. It displays great agility in passing from tree to tree, and its bands often plunder gardens, one of their number keeping careful watch. It feeds on fruits, roots, &c.; and its fondness for eggs is supposed to have given rise to the ancient story of the battle of the pigmies and the cranes. It is of a greenish-gray color, paler underneath; and in size resembles a large cat. The characters agree with those of the genus *Macacus* (Wanderoo Monkey, q. v., &c.), except that the tail is reduced to a mere tubercle. The muzzle is somewhat elongated, although not nearly so much as in the baboons, with which this ape has sometimes been classed, and the facial angle is much higher than in them. The face is almost naked, and somewhat wrinkled. The ears are in form not unlike human ears. The eyes are round, reddish, and of great vivacity. The B. A. is one of the monkeys most frequently to be seen in captivity, at least in Britain; and possessing a considerable degree of intelligence, is capable of being trained to many tricks. In order to do this, however, it must be taken young, as the older ones are often sullen and mischievous. It usually walks on four feet, although it can be trained to stand or walk, in a more awkward manner, on two. It is filthy in its habits.

BARBASTE'LLE. See BAT.

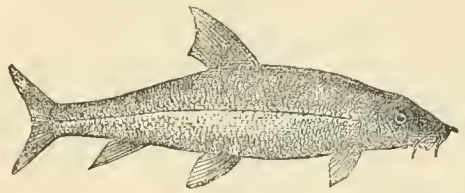
BARBA'STRO, a walled town of Spain, in the province of Aragon. It is situated on the Vero, has a cathedral with some paintings by Antonio Galeeran. Pop. (1877) 8000.

BA'RBAULD, ANNA LETITIA, an English authoress, was born at Kibworth-Harcourt, in Leicestershire—where her father, the Rev. John Aikin, a dissenting clergyman, kept an academy—on the 20th June 1743. Her private education, the religious influence of her home, and secluded life in the country, were well fitted to develop early her natural taste for poetry; but it was not until 1773 that she was induced to give her effusions to the public, who appreciated them so highly that four editions were called for during the year. Encouraged by this, she the same year, conjointly with her brother, published *Miscellaneous Pieces in Prose* (Lond. 1773), which also passed through many editions. In the following year, the poetess married the Rev. Rochemont Barbauld, a dissenting minister at Palgrave, in Suffolk, in which village the newly married pair opened a boarding-school for boys. The literary fame and the assiduity of Mrs. B. soon made it celebrated. During the ten years Mrs. B. was engaged in the duties of tuition here, she published *Early Lessons for Children*, and *Hymns in Prose*, works which have been often reprinted in England for youthful readers, and translated into several languages. Her *Devotional Pieces* was also published during this period. In 1792, she commenced with the brother previously mentioned—who wrote the most of them—the well-known series, *Evenings at Home*, which were completed in three years. In 1795 she edited Akenside's *Pleasures of Imagination*, and Collins's *Odes*, prefixing to each a critical essay. In 1804 she began to edit a selection from the *Spectator, Guardian, Tatler*, &c.; and in 1810 published a collection of the British Novelists, the task of editing which she had undertaken to divert her mind from the loss she had sustained two years previously in the death of her husband. *The Female Spectator* (Lond. 1811) contains a selection from her writings. Her last poetical effort was an ode, entitled *Eighteen Hundred and Eleven* (Lond. 1812.) All her compositions are characterized by simplicity of feeling, an easy, flowing style, and pure and elevated sentiment, and give token of a mind well versed in classical literature. She lived in quiet retirement till her death, which happened on the 9th March 1825. The life of Mrs. B. has been written by Lucy Aikin, also known as an authoress, and prefixed to the collection of the *Works of A. L. Barbauld* (2 vols., Lond. 1825). The same lady also published from the posthumous papers of the authoress, *A Legacy for Young Ladies* (Lond. 1826).

BA'RBED AND CRE'STED, heraldic terms, by which the comb and gills of a cock are designated, when it is necessary to particularize them as being of a different tincture from the body. The common English term is *Wattled and Combed*, gules, or whatever else the tincture may be.

BA'RBEL (*Barbus*), a genus of fishes of the family of the *Cyprinidæ* (q. v.), differing from *Cyprinus* (Carp, Gold-fish, &c.) in the short dorsal and anal fins, in having one of the rays of the dorsal fin strong and serrated, and the mouth furnished with four soft barbules (whence the name B., from Lat. *barba*, a beard), two near the point of the snout, and one at each angle of the mouth. The upper jaw also extends considerably beyond the lower. The species are numerous. Like the other Cyprinidæ, they are all inhabitants of fresh water, and generally of muddy ponds and rivers, where they seek food by ploughing up the mud with their snouts, like swine, and are said often to seize the small fishes which come to share with them the worms and insects of the mud. They also feed upon the leaves and roots of acquatic plants.—The Common B. (*B. vulgaris*) is abundant in many of the rivers of the temperate parts of Europe. It is the only species found in Britain, and only in some of the still and deep rivers of England. It is very abundant in the Thames, frequenting the weedy parts of the river in shoals in summer, and seeking the deeper water in winter, becoming so torpid during cold weather, that the fishermen sometimes take it with the hand, or by pushing it with a pole into a small net fastened to an iron hoop. It grows

to a large size, sometimes 3 feet in length, and 15 to 18 pounds in weight; it is rather of a long shape, in section nearly circular; the general color of the head and upper part of the body, greenish brown, becoming yellowish green on the sides, the belly white, the tail somewhat forked, and of a deep purple color. It affords sport to anglers, but is a very coarse fish, and little used for food except



Barbel.

by the poor, who often boil bacon with it to give it a relish. The larger barbels are esteemed the best. The roe has poisonous qualities, although its effects are disagreeable rather than permanently injurious.

Another species, called the Binny, or B., of the Nile, is very abundant in that river; attains a very great size, 70 lbs. or upwards; is much esteemed for food; and is taken by hooks bated with dates steeped in honey. A number of baited hooks, each attached to a separate strong line, are enclosed in a mass of clay, flour, dates, &c., which is sunk in the river, and to which, as it begins to dissolve, the binnies are attracted; when boring into it with their snouts, and devouring the dates, they are caught. The fish being generally hooked by the projecting upper jaw, is allowed to remain in the water, the line being fastened on shore, and is taken out when wanted for immediate use.

BA'RBEL, ANGLING FOR. The B. is a ground-feeding fish, grubbing on the bottom for his sustenance. The baits principally used to capture him are worms and maggots, greaves, and cheese; and the means of angling for him are chiefly with a dead-line, called a ledger, or with float-tackle. The ledger is a perforated leaden bullet; through this the line runs freely. To prevent its slipping down on the hook, a large shot or other substance is fastened on the line, about a yard above the hook. The hook (about No. 5 or 6 in size) is baited either with a lob-worm or greaves, and the lead is cast into the water, and remains motionless on the bottom. When a fish bites, the angler feels the tug, and strikes smartly; as the fins of the B. are large, and his muscles powerful, he frequently offers considerable resistance. The rod used for ledger-fishing is short and stiff. In float-fishing for B., the tackle is finer, and the hook smaller. A cork-float suited to the depth and rapidity of the river is used, and it is fixed at such a height upon the line that the bait just touches the bottom. The instant the float disappears, the angler strikes, but not so forcibly as in ledger-fishing. Previous to angling for B., it is desirable to bait the place to be fished, for the purpose of drawing the fish together. This is accomplished by chopping up and casting into the water from 500 to 1000 lob-worms, and it should be done 18 or 20 hours before fishing. In float-fishing for B., the float should be allowed to travel down a considerable distance of water, at least 30 or 40 yards, in order that no spot where a portion of the worms may have lodged should be missed. This is sometimes done by the use of a float called a slider, which is not fixed on the line, but by the management of the angler, accommodates itself to the depth of the water. In this fishing, the bait trails along the ground, and the rod should be at least 14 or 15 feet in length, and the line very light and fine. B. will sometimes take a spinning bait, and are often caught by the angler while trout-fishing; but this is by no means a certain method of angling for them. The B. may be said to be gregarious; it spawns in May or June, choosing some gentle shallow for that purpose, but soon recovers its strength again. About the end of July, the B. seeks the deep rapid streams, and may be seen vigorously springing from the water in his endeavors to rid himself of the parasitical insects which attach themselves to him during his quiescence. Here he remains the greater part of the summer and autumn. Frosty weather renders the B. torpid, and he takes shelter under some large stone or weed, where he can lie up during the winter. Although the B. is by no means an estimable fish for the table, it is much used by the Jews in their fasts and festivals.

BA'RBER (Lat. *barba*, the beard), a shaver of the beard, and who ordinarily includes hair-cutting in his profession. Barbers are of great antiquity, if not for the shaving of the beard, at least for shaving a portion of the head. The office of the B. is referred to by the prophet Ezekiel: 'And thou, son of man, take thee a barber's razor, and cause it to pass upon thine head and upon thy beard.'—Ezek. v. 1. In all oriental countries, including China, the shaving the whole or part of the head contiues to be performed by barbers. In every part of the world, the professional B. and hair-dresser is celebrated for his garrulity and general obliging qualities, such being required by those who place themselves in his hands. The amusing character of the B. in one of the tales in the *Arabian Nights Entertainments*, and also of the B. in Rossini's opera of *Figaro*, will readily occur to recollection. As will be seen from the succeeding article, barbers at one time acted as a kind of surgeons, and accordingly occupied a higher social position than they now enjoy. Latterly, on account of the simple mode of trimming the hair, and of the prevalence of private shaving, the business of the B. in England has greatly declined, and his services are chiefly confined to the humbler classes. In the United States, the business of the B. is almost exclusively in the hands of the colored population. Anciently, one of the utensils of the B. was a brass basin, with a semicircular gap in one side to compass a man's throat, by which means, in applying the lather to the face, the clothes were not soiled. Readers will recollect that Don Quixote crazily assumed a barber's basin as a helmet. At the end of a pole, the brass basin is still hung out as a sign at the door of the B. in Great Britain, France, and other countries.

BA'RBER-SU'RGEONS. In former times, as stated in the foregoing article, barbers acted as a kind of surgeons, or at least phlebotomists, and such appears to have been the case in all countries. Till this day, on the pole on which the barber's basin is suspended, there is represented a twisted or spiral ribbon, which symbolizes the winding of a ribbon round the arm previous to blood-letting. In London, Edinburgh, and elsewhere, the B. formed corporations with certain privileges. The surgical duties of these bodies now pertain to the corporations of surgeons. The existence of B. as professors of the healing art, in England can be traced as far back as the reign of Edward IV. in 1461, when they were first incorporated; and from thence till the reign of Henry VIII., when they were united with the surgeons, until the time of George II., when the B. ceased to be anything but barbers, as we now understand the term.

In the latter reign, an act was passed, the 18 Geo. II. c. 15, from the preamble of which we learn that not till then had the discovery been made that the business or trade of a barber was 'foreign to, and independent of, the practice of surgery;' and it therefore proceeds to dissolve the connection between the two bodies, and to remit the B. to the more humble functions they now perform. But this is done with an express saving of all their privileges as a company or corporation, and as such they exist to the present day. See an interesting account of them in Knight's *History of London*, vol. iii. pp. 177—192, which concludes with the following curious extract from the list of officers to Heriot's Hospital in the statutes of that charity compiled in 1627: 'One chirurgeon barber *who shall cut and pole the hair of all the scholars of the hospital;* and *also* look to the *cure* of all those within the hospital who *anyway* shall stand in need of his *art*.' And see the Report of the Royal Commissioners appointed to inquire into the corporations of London, and printed in 1837, in which all particulars relating to the government and working of this company at the present day are given. The report states, that the company exists 'for using and exercising the art and mystery of barbers, which includes hair-dressers within the suburbs and liberties of the city;' and it concludes as follows: 'The company possess extensive powers for the regulation of the trade, but in practice none are exercised except the power of compelling all persons using the trade or business of barber (which, as before mentioned, includes hair-dressers) within the city to become free of the company.' The barbers still retain their ancient hall—which they possessed before the surgeons were disunited from them—in Monkwell Street, Cripplegate in the city of London. See APOTHECARIES, SURGEONS, TRADE CORPORATIONS.

BARBERI'NO-DI-MUGE'LLO, a Town of Tuscany on the Siere, 15 miles north of Florence, with a population of 5000, engaged in the manufacture of straw-hats. The royal villa of Caffegiolo, the ancient residence of the Medicis, stands in the environs.—B. DI VAL-D'ELSA, a village in the same district, with a beautiful situation on the ridge between the valleys of the Pesa and Elsa, and celebrated as the place where Pope Urban VIII. was born. One of the palaces of the Barberini is here.

BA'RBERRY (*Bérberis*), a genus of plants, of the natural order *Berberideæ* (q. v.). All the species, which are numerous, and found in temperate climates in most parts of the world except Australia, are shrubs with yellow flowers, having a calyx of six leaves, a corolla of six petals, and six stamens, which, when touched at the base, display a considerable degree of irritability, starting up from their ordinary positions of reclining upon the petals, and closing up on the pistil, apparently a provision to secure fecundation. The fruit is a berry with two or three seeds. Not a few of the species are evergreen. They are divided into two sub-genera, sometimes ranked as genera; those with simple leaves forming the sub-genus *Berberis*, and those with pinnate leaves the sub-genus *Mahonia*, or Ashleaved B.—The Common B (*B. vulgaris*) is a

native of most of the temperate parts of Europe, Asia, and North America. It produces its flowers and fruit in pendulous racemes; has obovate, slightly serrate, deciduous leaves; and numerous straight three-forked spines. It is a very ornamental shrub, especially when covered with fruit. Its berries are of an elongate oval form; when ripe, generally of a bright red color, more rarely whitish, yellow, or almost black. They contain free malic acid. The fruit of the ordinary varieties is too acid to be eaten, but makes exeellent preserves and jelly. Malic acid (q. v.) is pretty extensively prepared from it in France. A yellow fungus, *Æcidium Berberidis*, is very general upon the under-side of the leaves of the B.; and a notion prevails that it produces *rust* in corn, which is erroneous, the rust (q. v.) of corn being a totally different fungus, which, like this, is apt to appear in humid weather.

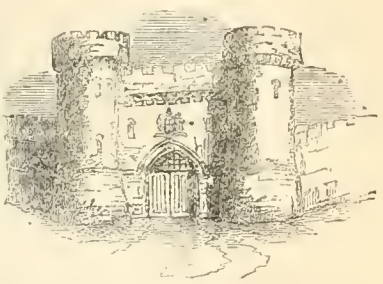
Common Barberry (*Berberis vulgaris*): *a*, a flower: *b*, ripe fruit.

The prevalence of this notion, however, appears to have prevented the general employment of the B. as a hedge-plant, for which it is admirably adapted, hedges made of it being easily kept free from gaps, and becoming more and more impervious by new shoots thrown up from the root. The yellow root of the B. is used for dyeing yellow, and especially the inner bark of it, and also of the stem and branches. The bark is capable of being employed for tanning leather. In like manner, *B. glauca*, *B. ilicifolia*, *B. tomentosa*, and *B. lutea* are used for dyeing in Chili and Peru; *B. tinctoria* by the inhabitants of the Neilgherry Hills, and *B. aristata* in Nepaul; and a strong similarity of properties appears to pervade the whole genus. *B. Lycium*, a native of the north of India, is characterized by great astringency, and an extract prepared from it is valuable in ophthalmia. Most of the species are more or less spiny, and some of the evergreen species might be very ornamentally employed for hedge-plants; as *B. dulcis*, now frequent in shrubberies in Britain. This species, sometimes called the Sweet B., is a native of the south-west coast of America. Its leaves much resemble those of the common B.; it has solitary flowers on rather long stalks, and globose black berries about the size of a common black currant. The fruit is produced very copiously in Britain, is quite sweet when fully ripe, and makes excellent jelly. When unripe and very acid, it is used for tarts. Pleasant fruits are produced also by *B. aristata* and *B. Asiatica*, the berries of both of which are dried in Nepaul, after the manner of raisins; *B. concinna*, also a Himalayan species; *B. microphylla*, found in the southern parts of South America; and *B. trifoliata*, found in Mexico. Those of some of the other species are either disagreeable or insipid, which is particularly the case with most of the ash-leaved barberries, natives of North America and the north of India.—Numerous species of B., both from the Himalaya and South America, are daily becoming more frequent in Britain as ornamental shrubs.

BA'RBET (*Bucco*), a genus of birds generally placed by ornithologists in the family of the *Picidæ*, or Woodpeckers (q. v.), but regarded as the type of a very distinct sub-family, exhibiting points of resemblance to the cuckoos. They have a large conical beak, surrounded with tufts of bristles directed forwards—a characteristic from which the name B. is derived (Lat. *barba*, a beard). They prey on insects, and some of them also on young birds; some of them are at least partially frugivorous. They inhabit warm parts both of the eastern and western hemispheres, and most of them are birds of gay plumage. The Linnæan genus has been subdivided, and includes, besides the true barbets, the Barbacous (*Monasa*), South American birds—the Barbicans (*Pogonias*) of Africa and India—the American Puff-birds (*Tomatia*), &c. The Puff-birds are remarkable for erecting their plumage till they resemble a round ball. Being birds of short wing, both they and the true barbets wait for their prey, generally sitting with great patience on some withered branch till it comes near them, when they suddenly dart upon it. They often choose positions close to human habitations, and show little fear.

BARBE'TTE, an earthen terrace inside the parapet of a rampart, serving as a platform for heavy guns; it has such an elevation that the guns may be fired over the crest of the parapet instead of through the embrasures, to give them a freer scope by swivelling round into different directions.

BA'RBICAN (Ital. *barbacáne*), a projecting watch-tower, or other advanced work, before the gate of a castle or fortified town. The term B. was more specially applied to the outwork intended to defend the drawbridge, which in modern fortifications is called the *tête du pont*. 'To begin from without, the first member of an ancient castle was the B., a watch-tower, for the purpose of descrying an enemy at a greater distance' (Grose's *Antiquities of England and Wales*), and, to the same effect, Camden, speaking of Bedford Castle, says it was taken by four assaults; in the first was taken the B.; in the second the *outer* balia. See BAILEY. See also Parker's *Glossary of Architecture*. There are a few perfect barbicans remaining in England, as at Alnwick and Warwick; but the best examples of it, as of the other parts of the fortification of the middle ages, are probably to be seen in the town of Carcassone (q. v.). A very curious and minute account of the siege of Carcassone in 1240, in the form of a report to Queen Blanche by the seneschal who defended it, preserved in the archives of France, has been published in Hewitt's *Ancient Armor* (p. 355 *et seq.*), in which the uses of the B. are fully illustrated. The street called Barbican in London, near Aldersgate Street, marks the site of such a work, in front of one of the gates of the old city.


Barbican.

BA'RBITON, or BA'RBITOS, a stringed instrument of the ancient Greeks, made of ivory, in the form of a lyre, with seven strings, and said to have been invented by Anacreon.

BARBOU, the name of a celebrated French family of printers, the descendants of John B. of Lyon, who lived in the 16th c. From his press issued the beautiful edition of the works of Clement Marot in 1539. His son, Hugh B., removed from Lyon to Limoges, where, among other works, his celebrated edition of *Cicero's Letters to Atticus* appeared in 1580. Joseph Gerard B., a descendant of the same family—who in the beginning of the 18th c. settled in Paris—continued in 1755 the series of Latin classics in duodecimo—rivals to the Elzevirs of an earlier date—which had been begun in 1743 by Coustelier, at the instigation of the learned Lenglet Dufresnoy. This series of classics, which is much prized for its elegance and correctness, was purchased, along with the rest of the business, by Delalain, from the heirs of Hugh B., who died in 1809. There is a complete set of the B. classics in the Royal Library of the British Museum.

BA'RBOUR, JOHN, an eminent Scottish poet of the 14th c., regarding whom history has not much to record beyond the production of the national epic, entitled *The Bruce*. Nothing is known of his parentage, and of his birth it can only be conjectured to have been about 1320. The ascertained facts of his life are few. We are informed only that in his own age he was accounted a man of great learning and worth; that he was Archdeacon of Aberdeen as early at least as 1357, and held that office till his death in 1395; that in 1357, he traveled into England, accompanied by three scholars, for the purpose of studying at Oxford; that he repeated his visit to England for the same purpose in 1364; that in 1365, he obtained a passport 'to travel through England with six companions on horseback towards St. Denis and other sacred places;' that in 1368, he again received permission to travel through England with two servants and two horses, on his way for scholarly purposes to France; that in 1373 he was Clerk of Audit of the household of King Robert II., and one of the auditors of Exchequer; that in 1375 his great poem was more than half finished; that in 1377, he had a gratuity of ten pounds from King Robert II.; that in 1378, he received from the same prince a perpetual annuity of twenty shillings, which in 1380 he bequeathed to the dean and chapter of Aberdeen, under the condition that they should sing a yearly mass for the rest of his soul; that in 1381 he had a gift from the crown of the ward of a minor, whose estate lay within the parish of which he was rector; that in 1383, and again in 1385, he was one of the auditors of Exchequer; that in 1388, King Robert II. granted him a pension of ten pounds a year; and that he died between Martinmas 1394 and Whitsunday 1395, probably on the 13th March of the year last named, his anniversary in the cathedral of Aberdeen being celebrated on that day until the Reformation. Besides *The Bruce*, B. wrote other two poems, *The Brute*, now lost, in which he recounted the origin and history of the royal house of Stuart, and *The Book of Legends of the Saints*, recently discovered in Cambridge University Library. *The Bruce*

is distinguished by great purity and clearness of style, the language and versification contrasting advantageously with those of any contemporary English poet, not excepting even Chaucer. His imagery is not rich, but he is seldom other than lively, simple, and energetic. He has depicted, in rough but faithful outline, the life, manners, and deeds of a truly heroic time, and given to his country the first poem in her literature, and the earliest history of her best and greatest king.—*The Bruce* was first printed by Dr. Jamieson in 1820; and edited by Cosmo Innes, for the Spalding Club, in 1856. The Early English Text Society also published an edition edited by Rev. W. W. Skeat.

BARBU'DA, one of the British Caribbees, lying 30 miles to the north of Antigua. Of its north end, the lat. and long. are 17° 33 N., and 61° 43' W. Its area is estimated at 75 square miles, and the number of its inhabitants in 1871 was 813. The proportional density, therefore, of population is only about $\frac{1}{10}$ of that of Barbadoes (q.v.). In fact, the island, small as it is, has never been cleared for cultivation, the greater part of the interior being a dense forest interspersed with patches of savanna. The agriculture, such as it is, is confined to the rearing of stock and the growing of provisions. B. is of coral formation, and is beset with reefs. It has a roadstead, but no harbor.

BA'RBY, a walled town of Prussian Saxony, on the left bank of the Elbe, 15 miles south-east of Magdeburg. It is well built, and has an old castle. Pop. (1880) 5540, chiefly engaged in the manufacture of woollens and linens.

BA'RCA, a country in the north of Africa, in lat. 26°—33° N., and long. 20°—25° E., between the Great Syrtis (now called the Gulf of Sidra) and Egypt. It forms the eastern division of Tripoli, having the rest of that dominion on the W., the Mediterranean Sea on the N., the Libyan Desert on the S., and it is separated from Egypt on the E. by no definite line, but by a number of roving independent tribes. It nearly corresponds with the ancient Cyrenaica (q.v.). Population variously estimated from 300,000 to 1,000,000. The climate is healthy and agreeable in the more elevated parts, which reach a height of about 1200 feet, and in those exposed to the sea-breeze. There are none but small streams, but the narrow terrace-like tracts of country are extremely fertile, realizing all that is said of the ancient Cyrenaica. Rice, dates, olives, saffron, &c., are produced in plenty. The pastures are excellent; the horses still celebrated, as in ancient times. But the good soil extends over only about a fourth of B.: the east exhibits only naked rocks and loose sand. Many ruins in the north-western parts attest a former state of cultivation much superior to the present. So early as the time of Cyrus, B. became a state, which proved dangerous to the neighboring state of Cyrene; but within a single century it sank, and became subject to Egypt. In the Roman period, its inhabitants were noted for their predatory incursions. It was afterwards a province of the Greek empire, and had declared itself independent when the Arabs invaded and conquered it in 641. The present inhabitants consist of Arabs and Berbers, who profess the Mohammedan religion, and are subject to the Pacha of Tripoli, to whom each of the beys pays an annual tribute.

BARCARO'LLE, a species of song peculiar to the gondoliers of Venice. The name is applied to musical compositions for voice or pianoforte of a similar character.

BARCELO'NA, the most important manufacturing city in Spain, in the province of the same name, is beautifully situated on the Mediterranean between the mouths of the Llobregat and the Besos, in the midst of a district as luxuriant as a garden. It is walled, and possessed of a citadel, which, however, is effectually commanded by the fortress of Montjouy on the south-west. B., like Edinburgh, is divided into two parts—the old town and the new by the *Rambla* (river-bed), which has been planted with flowering shrubs, and formed into a beautiful promenade. The streets of the old town, forming the north-west division, are crooked, narrow, and ill paved. Those of the new are much more spacious and regular. There is a large suburb to the east of the town, where the seafaring portion of the population chiefly reside. In 1864, the population was 190,000; in 1868 it had been reduced (mainly by cholera) to 167,095; in 1878 it was 249,106. B. is the see of a bishop. It has a university, and colleges and schools for general and special educational purposes; public libraries, in one of which there is a splendid collection of MSS.; several hospitals and other charitable institutions; the finest theater in Spain; and numerous ancient and elegant churches, with a cathedral which, begun in 1298, is not yet completed. B. manufactures silk, woollens, cotton, lace, hats, firearms, &c., which form its principal exports. It imports raw cotton, coffee, cocoa, sugar, and other colonial produce; also Baltic timber, salt-fish, hides, iron, wax, &c. Next to Cadiz, it is the most important port in Spain. In 1872, between 700 and 800 foreign vessels, with a tonnage of 360,090 tons, discharged their cargoes in the port. The harbor was extended and its entrance improved in 1875. The imports in 1874 amounted to £1,943,310, and the exports to about £300,000. B. is a place of great antiquity, and associated with many historical events. Local tradition fixes the date of its foundation four hundred years before the Romans; and it is said to have been refounded by Amilcar Barca, the father of Hannibal, from whom its ancient name, Barcino, was derived. An important city under the Romans, Goths, and Moors, B. in 878 became an independent sovereignty, under a Christian chief of its own, whose descendants continued to govern it, and to hold the title of Counts of Barcelona until the 12th c., when its ruler adopted the title of King of Aragon, to which kingdom it was annexed. During the middle ages B. became a flourishing seaport, rivalled in the Mediterranean by Genoa only. To its commercial code, framed in the 13th c., much deference was paid by the whole of Europe; and it was at this time, says Ford in his *Handbook of Spain*, 'a city of commerce, conquest, and courtiers; of taste, learning, and luxury; and the Athens of the troubadour.'

Columbus was received here in 1493 by Ferdinand and Isabella, after his discovery of America. In 1640, it appealed to France against the tyranny of Philip IV.; but it turned against that country in the war of the Spanish Succession, and adhered to Austria. In 1705, the fortress of Montjouy was surprised and captured by Lord Peterborough, and the city surrendered shortly afterwards. In 1714, after a most heroic defence, it was stormed by the Duke of Berwick, and given over to fire and sword. Napoleon perfidiously obtained possession of it in 1808; and with one or two reverses, and in the face of great difficulties, it was held by the French until the treaty of peace concluded in Paris in 1814. For thirteen years, B. remained quiet under the iron rule of España; but in 1827 its old turbulent spirit returned, and it rose in favor of Don Carlos. Since that time, B. has generally supported the government. But a Progressist rebellion in 1856 caused much bloodshed, and in 1874 the Federalists raised an insurrection here. —The province of B. has an area of 2950 square miles, and a population of (1878) 835,306.

BARCELLO'NA AND PO'ZZO DI GO'TTO, two towns of Sicily, in the province of Messina, standing close together, so as really to form one town, the two parts of which are separated by a small stream, the Finme di Castro Reale, supposed to be the Longanus of antiquity. Pop. of the two towns, 14,471. The chief street is a long street of mean houses of a single story. B. is situated in a broad plain, between the mountains and the sea, abounding in corn, wine, oil, and fruit. It is 22 miles west-south-west from Messina.

BA'RCLAY, ALEXANDER, a poet and prose writer, born about the end of the 15th c., whether in England or Scotland is not certain. He studied at Oxford, and then obtained, through his patron, Bishop Cornish, an appointment as one of the priests or prebendaries of St. Mary Ottery, in Devonshire. He afterwards became a monk of the Benedictine monastery of Ely, where he continued until its suppression in 1539. He died in June 1552, six weeks after he had been presented to the rectory of All-Hallows, London. His claim to notice rests chiefly upon his famous poem, *The Shyp of Folys of the Worlde*—partly a translation, and partly an imitation of the German *Narrenschiff* by Brandt—printed by Pynson in 1509, and since often reprinted (best edition by T. H. Jamieson, 1874). It is interesting as showing the manners and customs of the times satirized. He published several works besides; among others, *The Myrrour of Good Manners*, *The Castell of Labour*, *The Egloges*, the first eclogues that appeared in the English language; and also made a translation of Sallust's *History of the Jugurthine War*. In his lifetime, he was admired for his wit and eloquence, and his writings exhibit a refinement not common in that age.

BA'RCLAY, JOHN, a clever poet and satirist was born about 1582, at Pont-à-Mousson in Lorraine, where his father, William B., a Scotsman, who died in 1605, had held the office of Professor of Law. He studied in the Jesuit College of that place; and the distinguished talents which he early displayed, caused the Jesuits to try to induce him to enter their order. On account of his rejection of their proposals, he, as well as his father, suffered much persecution. He accompanied his father to England in 1603, where he soon attracted the attention of James I., to whom he dedicated one of his works, *Euphormionis Satyricon* (Lond. 1603), a politico-satirical romance, chiefly directed against the Jesuits. Next appeared his *Conspiratio Anglicana* (Lond. 1605), and his *Icon Animarum* (Lond. 1614). In 1615, he left England and went to Rome, where he died August 12, 1621. In the same year his celebrated work *Argênis* appeared in Paris (Paris, 1621). It was written in Latin, and has been translated into several languages. There are no fewer than three translations into English; the last appeared 1772. It is a political allegory, containing clever allusions to the state of Europe, more particularly of France, during the time of the League. *Argênis* was admired both by Cowper and D'Israeli.

BARCLAY, JOHN, M.D., lecturer on anatomy in Edinburgh, and eminent for his attainments both in human and comparative anatomy, in physiology, and in other branches of natural science, was born December 10, 1758, at Cairn, near Drummaquhance, in Perthshire, Scotland, and was educated at the parish school of Muthil, and afterwards at the university of St. Andrews. He studied for the ministry of the Church of Scotland, and was licensed as a preacher, but afterwards devoted himself to the profession of medicine, and particularly to the study of anatomy. He obtained the degree of M.D. from the University of Edinburgh in 1796. After spending a year in London, he became a private lecturer on Human and Comparative Anatomy in Edinburgh. He published in 1803, *A New Anatomical Nomenclature;* and in 1808, a treatise on the *Muscular Motions of the Human Body*. In 1812, appeared his *Description of the Arteries of the Human Body*, a work of vast labor and accurate observation. In 1825, not long before his death, he published *An Inquiry into the Opinions, Ancient and Modern, concerning Life and Organization*. He died at Edinburgh on the 21st August 1826, leaving to the Royal College of Surgeons in Edinburgh his admirable anatomical collection, for the reception of which a suitable and splendid hall was erected.

BA'RCLAY, ROBERT, the celebrated apologist of the Quakers, was born on December 23, 1648, at Gordonstown in Morayshire, Scotland. His father was the son of David Barclay of Mathers, the representative of an old Scoto-Norman family, which traced itself through fifteen intervening generations to Walter de Berkeley, who acquired a settlement in Scotland about the middle of the 12th c.; his mother was the daughter of Sir Robert Gordon, the premier baronet of Nova Scotia, and historian of the House of Sutherland. Young B. received the rudiments of learning in his native country, and was afterwards sent to the Scotch College at Paris, of which his uncle was rector. Here he made rapid progress in his studies, and excited the admiration of his preceptors, as well as of his relative, who offered to make him his heir, if he would remain in France, and formally adopt the Roman Catholic religion, to the ceremonies of which he had been habituated during his residence there. This, however, B. refused to do; and in compliance with the wish which his mother had expressed on her deathbed, he returned home in 1664. Though only sixteen, B. was an excellent scholar, and could speak in the Latin language with wonderful fluency and correctness. In 1667, he embraced the principles of the Society of Friends, for reasons more highly respected in our day than in his. He states in his *Treatise on Universal Love*, that his 'first education fell among the strictest sort of Calvinists,' those of his country 'surpassing in the heat of zeal not only Geneva, from whence they derive their pedigree, but all the other so-called reformed churches;' that shortly afterwards his transition to France had thrown him among the opposite 'sect of papists,' whom, after a time, he found to be no less deficient in charity than the other; and that, consequently, he had refrained from joining any, though he had listened to several. The ultimate effect of this was to liberalize his mind, by convincing him of the folly and wickedness of religious strife. In both Calvinists and Catholics, he found an absence of 'the principles of love,' 'a straitness of doctrine,' and a 'practice of persecution,' which offended his idea of Christianity, as well as his gentle and generous nature. He therefore allied himself gladly to this new sect, whose distinguishing feature was its charity and pure simplicity of Christian life, and soon became one of its most devoted adherents and its ablest advocate.

In the course of his life, he made several excursions into England, Holland, and Germany, earnestly propagating his peaceful views wherever he went, and occasionally enjoying the companionship of William Penn. His first publication was *Truth Cleared of Calumnies*. It appeared in 1670, and was intended as a refutation of the charges—many of them notoriously false—made against the new sect. In 1673 appeared *A Catechism and Confession of Faith*, the answers to the questions being—to avoid theological dogmatism—in the words of Scripture. This was followed by *The Anarchy of the Ranters*, &c. In 1675, he published his *magnum opus*, elaborately entitled *An Apology for the True Christian Divinity, as the same is held forth and Preached by the People called in scorn Quakers: Being a full Explanation*, &c. It contains a statement and defence of fifteen religious propositions peculiar to the Friends. The leading doctrine which runs through the whole book is, that divine truth is made known to us not by logical investigation, but by intuition or immediate revelation; and that the faculty, if it can be technically defined, by which such intuition is rendered possible, is the 'internal light,' the source of which is God, or, more properly, Christ, 'who is the light that lighteth every man that cometh into the world.' The identity of this doctrine with that held by Mr. Maurice and others of the Broad Church in the present day has been more than once remarked. In 1677 appeared his *Treatise on Universal Love*. It was the first of that long series of noble and gentle remonstrances against the criminality of war that has so honorably distinguished the Society of Friends. It was addressed to the ambassadors of the several princes of Europe, met at Nimeguen. In 1686, he published his last work, which was a defence of the doctrine of 'immediate revelation.' He died at Ury, in Kincardineshire, October 3, 1690. His estate remained in the possession of his descendants till 1854, its owner at that time being Captain Barclay, the famous pedestrian. 'The Apologist's Study,' which remained much as he left it, was long an object of pilgrimage with members of the Society of Friends: it was destroyed a few years ago, when the old house of Ury was pulled down.

BA'RCLAY DE TO'LLY, MICHAEL, PRINCE, one of the most distinguished Russian generals, was descended from a branch of the same Scotch family to which the two preceding—Barclay the poet, and the apologist of the Quakers—belonged, some of whom had settled in Mecklenburg and Livonia. He was the youngest of three brothers, and was born in 1759, in Livonia, where his father, Gottlieb B. de T.—at one time a member of the town-council of Riga—possessed an estate. Having been adopted by General van Vermoulen, B. de T. entered a regiment of Russian cuirassiers, at first with the rank of sergeant. He fought with great bravery in the Turkish war of 1788—1789; in the campaign against Sweden in 1790; and in those against Poland in 1792 and 1794. In the year 1806, at Pultusk, as major-general, he commanded Benningsen's advanced-guard. He lost an arm at the battle of Eylau. Although much hated by the Russian national party, because regarded by them as a German, he was appointed minister of war by the Emperor Alexander in 1810—an office which he held till 1813. In 1812, he was made commander-in-chief of the army of the west. His retreat to Smolensko, and the loss of the battle fought there on the 17th of August, raised the hatred of the Russian national party to a greater height than ever, and he was obliged to yield the chief command to Kutusow. It has been maintained by many, that B. de T. was the originator of the Russian system of defence in 1812. He had indeed advised a retreat to the interior, and recommended the avoidance of a battle; but the system of defence, as a whole, originated with General Pfuel, who had left the Prussian service, and constantly accompanied the Emperor Alexander from the year 1807, without holding any distinct official appointment. At Moskwa, B. de T. commanded the right wing. After the death of Kutusow, he again obtained the chief command of the army, which he held at the battle of Bautzen, and retained till the truce. He afterwards commanded the Russian army in Bohemia, and took part in the battles of Dresden, Culm, and Leipsic. He was commander-in-chief of the Russian army in France, and in consequence of this was made a prince and a field-marshal. He died in 1818 at Insterburg, on his way to the Bohemian baths. Two or three years before his death, the estate of Tolly or Towie, in Aberdeenshire, the old inheritance of his family, was for sale, and he was pressed to buy it, but refused, on the ground that his family had been so long expatriated that Scotland was now to them a strange country.

BARCLAY AND PERKINS' BREWERY, one of the largest establishments of the kind in the world, is situated in Park Street, Southwark, London, the buildings covering upwards of ten acres. The brewery was founded by Dr. Johnson's friend, Henry Thrale, who, in 1773, according to a statement made by the doctor on his Hebridean tour, was paying as much as £20,000 annually to the Excise. After Thrale's death, it was sold by the executors to Barclay (a descendant of the author of the *Apology for the Quakers*) and Perkins, who had been Thrale's chief clerk, for £135,000. So far back as the year 1841, when described in Dodd's *Visits to Factories*, this great establishment had 24 malt-bins, each as large as a three-storied house; a brewing-room nearly as large as Westminster Hall; 10 coppers averaging 120,000 gallons capacity each; 4 fermenting vessels of 1500 barrels capacity each; a cooling-floor of 1000 square yards area; 300 yeast-working vessels of 300 gallons capacity each; and 150 store-vats, one large enough to contain 100,000 gallons. The operations consumed 2000 quarters of malt and 600,000 gallons of water weekly; while the carting of the beer employed 200 horses and drays. These quantities must have greatly increased since; for although there has been a vast increase of population since 1841 in the metropolis, the number of porter breweries (of which those of Barclay and Perkins, and Truman and Hanbury, are the chief) remains nearly uniform.

BAR-CO'CHBA, SIMON, the leader of the Jews in their great insurrection against the Romans, under the Emperor Hadrian, from 131—135 A.D. Three times had the oppressed Jews revolted without success, from 115 to 118; and in 130, soon after Hadrian's return from Syria, a new rebellion broke out, for which they had been secretly preparing. At the head of it was one Simon, who assumed the name of Bar-cochba, i. e., 'Son of the Star,' pretending that the prophecy was to be fulfilled in him, 'There shall come a Star out of Jacob' (Numb. XXIV. 17). He fought at first with great success against the Romans, and even obliged them to evacuate Jerusalem, where he was proclaimed king, and caused

coins to be struck with his name. The war spread over all the country of Palestine, and fifty towns, besides many villages and hamlets, came into the possession of the Jews. But on the arrival of Hadrian's general, Julius Severus, Jerusalem was retaken; and in August 135, Bether, the very last strong fortress held by the Jews, was stormed by the Romans. B. fell on the day of this bloody conquest. During the war, hundreds of thousands of Jews were destroyed, many were executed, and very cruel edicts were subsequently issued against them. From this last struggle dates the final dispersion of the Jews over the face of the earth. The Holy City was razed to the ground, and rebuilt under another name. The Jews still retain in their liturgy hymns which they chant in mournful memory of this tragic event. For particular history of the struggle, see Münter's *Der Jüdische Krieg unter den Kaisern Trajan und Hadrian* (Altona, 1821).

BARD, the name, known to the Romans since 200 B. C., by which the Gauls and other Celtic peoples (British, Welsh, Irish, and Scotch) designated their minstrels. Like the Scôps of the Anglo-Saxons, and the Skalds of Scandinavia, the bards celebrated the deeds of gods and heroes at religious solemnities, and the festivities of princes and nobles, accompanying their recitations with the harp or chrotta (Ir. *cruit* and *clarseach*); they excited the armies to bravery, preceded them into the fight, and formed the heralds of princes, and the mediators of peace. The institution early disappeared among the Gauls, but lingered long in Wales, Ireland, and Scotland. The bards formed a hereditary order, and exercised a decided national influence. The minstrels among the Celts, as among the Germans, were the organ of the people, and the channel of all historical tradition. It is supposed that in Wales, about 940 A.D., their privileges were defined and fixed by the laws which bear the name of King Howell Dha; and in 1078 the whole order is said to have been reformed and regulated anew by Gryffith ap Conan. At Caerwys, Aberfraw, and Mathraval, there were held from time to time great competitions in minstrelsy, called Eisteddfods, at which the judges were appointed by the prince. When Wales was conquered by Edward I. (1284), the bards lost their privileges, and were, according to tradition, persecuted and put to death; but succeeding princes countenanced the institution, and Eisteddfods were repeatedly held under royal commission down to the reign of Elizabeth. Since then, exertions for the revival of national Welsh poetry and the bardic profession have been made by several societies; the Gwyneddigion, founded in 1770; the Cambrian, in 1818; and more recently, the Metropolitan Cambrian Institution. To these societies, and the patriotism of individuals, we owe collections of the relics of the lays of the Welsh bards, none of which, it should be added, can be traced to MSS. of an older date than the 12th c. The most interesting of those relics are those of Liwarc'h-Henn, Aneurin, and Taliesin. See Jones's *Relics of the Welsh Bards* (1794); Owen's *Myvyrian Archæology of Wales* (3 vols., 1801—1807); *Poèms des Bardes Bretons du vie Siecle, par T. H. de la Villemarqué* (Paris, 1850), &c. See WELSH LANGUAGE AND LITERATURE.

In Ireland, the bards are believed to have been a hereditary guild, divided into three classes: the Filedha, who sung in the service of religion, and in war, and were the counsellors and heralds of princes; the Braitheamhain, who recited or chanted the laws; the Seanachaidhe, who were chroniclers and genealogists to princes and nobles. Their ample privileges and endowments of land gave them an exorbitant influence, which both princes and people had sometimes to rise against and curb. The great skill of the Irish bards on the harp was acknowledged everywhere. After the conquest of Ireland by Henry II., the profession began to sink. Still many of the chiefs maintained bards in their families, whose songs and legends kept up the national feeling. This occasioned several measures of the English rulers against the Irish bards; Elizabeth ordered the bards that were captured to be hanged, as the instigators of rebellion. Turlogh O'Carolan, born 1670, died 1737, is reckoned the last Irish bard; his poems were translated into English by Furlory. Other lays of the bards have been translated by Miss Brooke, *Relics of Irish Poetry* (Dub. 1789), and Hardiman, *Irish Minstrelsy* (Dub. 1831).

The bardism of Scotland may be conjectured to have been similar to that of Ireland; but nothing is certainly known of the subject beyond the fact, that there were poets or bards, of different degrees, in the Highlands down to the 17th c.

The name of B. was unknown among the Germanic nations; though a corrupt reading in some MSS. of the *Germania* of Tacitus (*barditus* for *baritus*, the 'war-cry') led Klopstock and others to write wild religious and war songs, which they called 'Bardits,' under the notion that they were restoring a branch of the national literature. This Ossianic aberration soon came to an end.

BARD, a fortress and village of Piedmont, situated on the left bank of the Doire, about 23 miles south-south-west of Aosta. When the French crossed the St. Bernard in 1800, the fortress of B. offered a resistance to their further advance into Italy, which might have proved effectual had the Austrian garrison been sufficiently on the alert. The French failed to take the fortress by storm, but they succeeded in dragging their artillery under and past the guns of the fort during the night, and were far on the road to Ivrea before the Austrian commander was aware that they had passed. B. was taken a short time after by the French, and razed, but it has since been restored. Pop. about 550.

BARDESA'NES (properly, Bar-Deisan), the founder of a Gnostic sect, was a native of Edessa, in Mesopotamia, and flourished towards the end of the 2d c. He stood high in favor with the monarch Abgar-bar-Maanu, but little is known regarding him. It is stated that he held a disputation with the philosopher Apollonius, who appeared in Edessa in 165 A.D., in the suite of L. Antonius Verus. He was first a disciple of Valentinus, whose heresy he afterwards abjured, and wrote against it, and also against other heresies; but ultimately he relapsed into partial agreement with his old master. His *Gnosis* was not purely dualistic. He did not consider evil the eternal coefficient of good, but merely the result of a temporary reaction of matter on spirit. Yet, inexplicable enough, he maintained the devil to be a self-existent, independent being. He denied the doctrine of the resurrection of the body, and in conformity with such a conviction, asserted that Christ's body was not real, but only an illusive image brought down from heaven. He diffused his opinions through the medium of hymns, of which he is reckoned the first writer in Syria. These hymns, fragments of which are still extant, exhibit a rich and pure fancy. His followers were called *Bardesanists*. They never formally separated themselves from the orthodox church, though they continued to exist as late as the 5th c. See Hahn's *B. Gnosticus Syrorum primus Hymnologus* (Leip. 1819).

BA'RDI, a small town of Italy, on the left bank of the Ceno, 31 miles west-south-west from Parma, in the province of Piacenza. The town is commanded by a castle, situated on a hill, erected in the 9th century. In the vicinity are noble forests of chestnut, beech, and oak. B. was formerly the capital of the duchy of Bardi.

BARDOLI'NO, a town of Northern Italy, with a harbor on Lake Garda, and about 14 miles west from the fortress of Verona. The battle of Rivoli was fought in its vicinity in January 1797.

BA'REFOOTED (Lat. *discalceati*, i. e., shoeless), an appellation given to certain monks and nuns who abstain from wearing any covering on the feet, either entirely (as the Alcantarines, who originated at Placentia, in Spain, in 1540, but who are chiefly found at present in the kingdom of Naples), or for a specified period of the year (as the nuns of our Lady of Calvary); or who, instead of shoes, wear merely sandals, i. e., soles of wood, leather, rope, or straw fastened by thongs. They do not constitute a separate order in the Roman Catholic Church, but are to be found as a higher grade of asceticism with more or less severity of observance, among most of the orders, Carmelites, Franciscans, Augustines, Eremites, Capuchins, &c. They are, however, steadily ignored by the more dignified Dominicans, though the latter are themselves mendicant friars. The origin of this form of religious austerity is to be traced generally to the custom which prevailed among the Jews and Romans of putting off their shoes on the occurrence of public calamities, that in this condition of mourning and humiliation they might implore the divine Being for deliverance; but perhaps more particularly to the command which Christ gave his disciples (Matt. x. 10; Luke x. 4).

BARÈGES, a small watering-place in France, situated in the Pyrenees, about 18 miles from Bagnères de Bigorre. The mineral water for which it is celebrated contains principally sulphuret of sodium, with portions of carbonate, muriate, and sulphate of soda, nitrogen, and sulphuretted hydrogen. Its efficacy in the cure of wounds, rheumatism, stiffness of joints, and scrofulous complaints is said to be very remarkable. See Murray's *Hand-Book to France*.

BARE'GES, mixed tissues adapted for women's dresses, called in France *Crêpe de Barèges*. The name is derived from the place noticed in the above article; in reality, however, B. were never made in that little watering place, the seat of the manufacture being at Bagnères de Bigorre. B. are usually a mixture of silk and worsted; an inferior kind being composed of cotton and worsted. They vary in color, and are sometimes light in tint, with printed patterns. All are of a slight fabric for summer wear. The best are still manufactured in France.

BA'REGINE. Many Algæ are found growing in mineral springs, especially those of a sulphuric nature. The product of their growth is a mucus-like substance somewhat resembling the white or glair of an egg. This deposit is particularly abundant in the hot springs at Barèges, whence the name of baregine. It imparts a flesh-broth flavor and odor to the water, which is prized, and is sometimes imitated by adding animal gelatine to the sulphur-baths where B. is deficient.

BAREI'LLY, the chief city of a district of the same name in Rohilcund, British India—a district which, with an area of 2982

square miles, contains (1872) 1,507,139 inhabitants, and which is bounded on the E. by Oude and Nepaul. The city itself, with a pop. of 102,982 (1872), is in lat. 28° 23′ N., and long. 79° 28′ E., being 788 m. N.W. of Calcutta, and 152 m. E. of Delhi. It is pleasantly situated in a well-wooded country on the left bank of the Jooa, an affluent of the western Ramunga. Besides a brisk and lucrative commerce, it has considerable manufactures, more particularly in the article of ornamental chairs and tables. It is the seat of a college attended by more than 300 students. B. became a name of notoriety in the great mutiny of 1857. On the 31st of May, the city was a scene of rapine and bloodshed. The native garrison, without any European troops to overawe them, rose against their officers, and seized the public treasure. They murdered every European who had not the means of escaping. But fortunately, from a suspicion of the outbreak, the ladies and children of the Company's servants, both civil and military, had previously been sent off in safety. B. was recovered by Sir Colin Campbell, afterwards Lord Clyde, in May 1858.

BARE POLES. A ship with all her sails furled, either scudding before the wind or lying-to from stress of weather, is said to be 'under bare poles.'

BARÈRE DE VIEUZAC, BERTRAND, a member of the French National Convention, born at Tarbes, 10th September 1755. He became an advocate in the court at Toulouse. After acting as a deputy in the National Assembly, the department of the Hautes-Pyrénées elected him to the National Convention in 1792. He is said to have been naturally in favor of moderate measures, but he was easily overawed by the influence of the party of the Mountain, with whom he generally acted, and whom he supported by his eloquence, which was so flowery and poetical in style that he came to be designated the Anacreon of the guillotine. He was president of the Convention when the sentence was passed upon Louis XVI. He rejected the appeal to the people, and gave his vote with these words: 'The law is for death, and I am here only as the organ of the law.' His natural mildness warring with the instinct of self-preservation, made him alternately a supporter of merciful measures and an advocate of the guillotine, and his whole public conduct betokens a man much more selfish than patriotic or humane. After the death of Robespierre, in which he had concurred, B. nevertheless proposed the continuation of the Revolutionary Tribunal, for which he was denounced by Lecointre, and afterwards impeached and sentenced to transportation; his sentence, however, was not carried into effect, and he partook of the general amnesty of the 18th Brumaire. He was elected as a deputy to the Chamber in 1815, during the Hundred Days. After the second restoration, he was banished from France, and went to Brussels, where he devoted himself to literary work till the revolution of July permitted his return. In the year 1832, he was once more elected as a deputy by the department of the Hautes-Pyrénées; his election, however, was annulled, on account of errors of form, whereupon the government called him to be a member of the administration of that department, which office he continued to hold till 1840. He died on 14th January 1841. He bestowed upon the younger Carnot his *Mémoires*, which have been published (2 vols., Par. 1842). His many other political and historical writings are of no importance.

BARE'TTI, JOSEPH, an Italian writer, born at Turin, 1716. He was intended for the law, but devoted himself to literature. In 1751, he established himself as a teacher of Italian in London, where, in 1757, he published the *Italian Library*, giving an account of the most eminent Italian authors and their works. He was about this time appointed secretary for the foreign correspondence of the Royal Academy. In 1762, he published an account of his travels through Portugal, Spain, and the south of France to Italy in *Lettere Famigliari*, which, with additions and a new title, were afterwards republished in England. B. now lived some time in Italy, and published at Venice a journal called the *Literary Scourge*, which brought upon him many prosecutions. On his return to England, he published, among other works, an Italian grammar, and an Italian and English dictionary, which have since gone through many editions. One evening, he became involved in a street-brawl in London, and stabbed with his penknife a man, who died soon after. B. was tried for murder, made his own defence, and was acquitted—Dr. Johnson, Burke, and Garrick testifying to the excellence of his character. He died in 1789 in London.

BARFLEUR, a seaport town of France, in the Department of La Manche, about 15 miles east of Cherbourg. It is now a place of little importance, but it is noteworthy as being the port from whence, according to report, William the Conqueror set out on his invasion of England. In the 13th and 14th centuries, B. was twice pillaged by the English.

BA'RGA, or BARGA DE GARFAGNANA, a town of Italy, in the province of Lucca, 25 miles north-north-east from Pisa, near the left bank of the Serchio. B. has a fine collegiate church, and is celebrated for its gunpowder manufactories. The sides of the neighboring mountains are covered with noble chestnut forests.

BA'RGAIN AND SALE, in the law of England, is a mode of conveyance whereby property, real and personal, may be assigned or transferred for valuable consideration. It finds a chief place, however, in law-books in connection with the conveyance of *real* estate In regard to personal estate, *assignment* (q.v.) appears to be the more appropriate, as it is in the more usual term. B. and S., then may be described as a conveyance, in the way of a real contract, by means of which property in lands and tenements, whether that property be in possession, remainder, or reversion, is conveyed from one person to another. In its terms it consists of a B. and S. by the seller to the intended vendee for money; and by the statute of frauds, 29 Chas. II. c. 3, it must be in *writing;* and by the statute of enrolments, the 27 Hen. VIII. c. 16, it cannot pass a freehold, unless it be by *indenture enrolled* within six months after its date, or with a *custos rotulorum* of the county. But hereditaments lying within any city or town corporate, the officers of which have authority to make enrolment of deeds, are excepted from this statute. A B. and S. for a term of years, however, will be effectual without enrolment. But see LEASE and RELEASE.

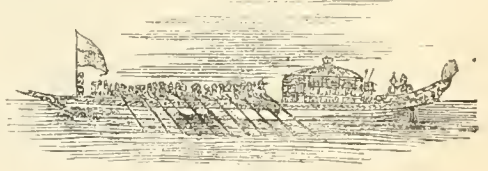
No particular form of words is essential to the validity of a B. and S.; 'bargain and sell' are the words of transfer ordinarily used. But other words will have the same effect, and the distinctive character of the conveyance is determined by the consideration on which it is founded. This consideration, however, is held to be a mere matter of form, and sufficiently complied with if the conveyance purport to be so founded. To this end, any trivial sum may be inserted in the conveyance, though the consideration which really passes between the parties be of larger amount; or even though it be, in fact, not of a pecuniary nature. It is also immaterial whether the sum so inserted be actually paid or not.—Stephen's *Commentaries*, vol. i., pp. 535—537. See CUSTOS ROTULORUM, POSSESSION OF PROPERTY, REMAINDER, REVERSION, INDENTURE, LEASE and RELEASE.

There is no such title to land or other real estate in the Scotch law, but in that system there may be a *bargain* as to land, the evidence of which must be in writing, the Scotch law in this respect agreeing with the regulations of the English statute of frauds above referred to. The term bargain is also used by Scotch lawyers to signify a contract or agreement for the sale of personal or movable property, and to such a bargain the intervention of writing is not necessary, but it may be proved by witnesses.

BA'RGA PASS, in the Himalaya, in N. lat. 31° 16′, E. long. 78° 19′, the highest part of it about 15,000 feet above the sea.

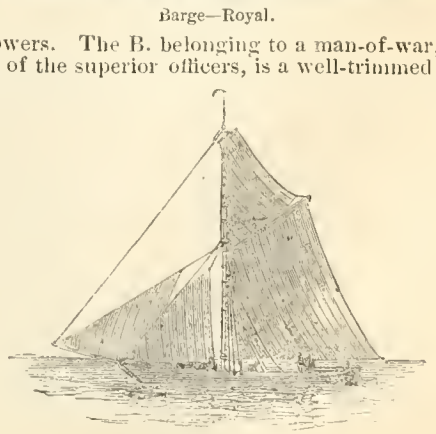
BARGE, an ancient town of Piedmont, in the province of Cuneo, 30 miles south-west of Turin. Pop. (1871) 2429, who are engaged in the manufacture of fire-arms and the quarrying of slate. A brisk general trade is also carried on.

BARGE. Various forms of vessel receive this appellation. The Admiralty and city of London barges, used on ceremonial occasions, are elegantly fitted out, and supplied with accommodation



Barge—Royal.

for many rowers. The B. belonging to a man-of-war, for the occasional use of the superior officers, is a well-trimmed though not

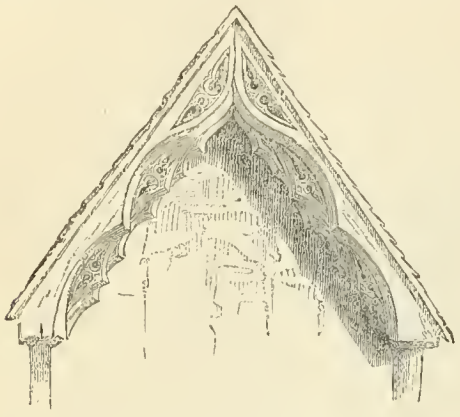


Barge—Common.

showy boat, light enough to be easily hoisted in and out of the ship. On our rivers and canals, a B. is a clumsy, flat-bottomed

vessel of burden, employed either in conveying goods from one town or quay to another, or to aid in bringing stores to and from ships. There are several kinds of this last-named craft—namely, coal-barges, sand-barges, west-country barges, &c. For the chief points of difference between barges and other boats, see BOAT.

BA'RGE-BOARD. Where the roof, in Gothic houses, extends over the wall, the gable is generally furnished with a board,



Barge-board.

which either covers the rafter, or occupies the place of a rafter itself. These barge-boards were often very richly ornamented, particularly in the 14th and 15th centuries. The accompanying illustration is copied from Parker's *Glossary of Architecture*.

BA'RI (ancient *Barium*), a city in the kingdom of Italy, capital of a province of the same name, is situated on a peninsula in the Adriatic, in lat. 41° 8′ N., and long. 16° 53′ E., and about 140 miles N.N.E. from Naples. Pop. (1881) 58,266. It is strongly fortified, and defended by a massive old castle of Norman origin, nearly a mile in circumference. The city is divided into the old town and the new. The streets, with some few exceptions, are confined and gloomy. B., which is the see of an archbishop, has manufactories of cotton, silk, linen, soap, &c., and carries on an active export trade in oil, corn, and fruit with Trieste and Dalmatia Its harbor does not admit of the entrance of large vessels; but its quay and roadstead are good. It has some fine ecclesiastical structures, the most notable of which is the priory of St. Nicholas, a noble specimen of the Lombard style of architecture, founded in 1087, and liberally endowed by the brothers Guiscard. Within the walls of this building, Urban II., in 1098, held a council of Greek and Latin bishops, with the view of settling the difference between the two churches; and Roger II. was here crowned king of Sicily. The priory contains some interesting monuments and relics, the most remarkable of which is the tomb of Bona Sforza, queen of Poland, who died in the castle in 1557. B. is one of the cities believed to have been founded by Iapyx, son of Daedalus. Its coins show it to have been a place of considerable note among the Greeks as early as the 3d c. B.C. The Romans appear to have held it in but little repute; but it rose in esteem when, in the 10th c., it fell into the hands of the Greek emperors, who made it the capital of Apulia, and the residence of a viceroy. It was twice taken in the 11th c. by the Normans, who added to its strength and importance.—The province of B. contains 2280 square miles, and a population of (1881) 678,968.

BARIGA'ZZO, a village of the province of Modena, remarkable for the streams of fire several feet high which issue out of the soil in the vicinity, and continue to burn for days without intermission.

BARI'LLA, an impure carbonate of soda, procured from plants which grow in salt-marshes or other places near the sea, and which forms a considerable article of commerce, being used in the manufacture of soap and of glass, and for other purposes in the arts. The greatest quantities of B. are produced in Spain and the Balearic Islands; but the Canary Islands, Italy, and France, also contribute a part. It is procured by burning the plants, much in the same way that sea-weeds are burned upon the coasts of Scotland to procure kelp. The Spanish B. is most esteemed, especially that produced near Alicante, which is chiefly obtained from the *Salsola sativa*, a plant of the natural order *Chenopodiaceæ*. This plant is there cultivated in grounds close by the sea, embanked on the side nearest it, and furnished with floodgates, through which the salt water is occasionally admitted. It is cut in September, dried in small heaps, and then burned in a hole in the ground. Other species of *Salsola* (Salt-wort), as *S. Tragus* and *S. Kali* (the latter, a common native of the shores of Britain), are also burned for B., although they yield it in a smaller quantity than *S. sativa*. B. is made in France from *Salicornia herbacea* or *annua* (Glass-wort), another of the *Chenopodiaceæ*, plentiful also in salt-marshes on the shores of Britain and other parts of Europe. The manufacture of B. has greatly declined, from the fact that soda can now be made artificially from common salt. See SALT-WORT.

BA'RING. The firm of Baring Brothers is one of the greatest commercial houses in the world. Its founder was John B., a German, who settled in a small business in Exeter, England, in the first half of the 18th c. Two of his sons, Francis and John, established in London in 1770 the now existing house.

FRANCIS became a director of the East India Company, and being a stanch supporter of Pitt, was created a baronet by that minister in 1793. He took an active part in the discussions relative to the Bank Restriction Act of 1797.

SIR THOMAS B., eldest son of the above, born June 12, 1772, succeeded his father in the baronetcy. He appears to have taken no active part in the business of the firm, being chiefly remarkable as an admirer and encourager of art. His magnificent collection of paintings was dispersed by public sale after his death in April 1848.

ALEXANDER B., brother of the above. See LORD ASHBURTON.

SIR FRANCIS THORNHILL B., son of Sir Thomas, whom he succeeded, was born in 1790, was educated at Oxford, where in 1817 he took a double first class. He entered Parliament as M.P. for Portsmouth in 1826. Under successive Whig governments, he was a Lord of the Treasury, Secretary to the Treasury, Chancellor of the Exchequer, and First Lord of the Admiralty. He was more noted for his business aptitude than as a politician. He was created Baron Northbrook in 1866, and died the same year. His son, the present Lord Northbrook, was Governor-general of India from 1872 to 1876.

THOMAS B., brother of the first Lord Northbrook, born in 1800, devoted himself early to commercial pursuits, and also to politics, taking the opposite side to his brother. He was, however, much more widely known as a partner of the firm of B. Brothers than as a politician. He died in November 1873.

The firm is engaged to a large extent in the negotiation of national loans, in exchange and money broking, in the produce-trade, home and colonial, and in importation and exportation from and to foreign countries.

BARI'TAH (*Barita*), a genus of large Australian birds, placed by some ornithologists in the family of Shrikes (q. v.), (*Laniadæ*), and by others in that of Crows (q. v.), (*Corvidæ*). The bill is large, conical, scarcely curved, the base of it extending remarkably backward on the forehead. The best known species is the Piping Crow, or Piping Grakle, or Jar-ra-war-nang of N. S. Wales (*B. Tibicen*). It preys on small birds, is gregarious, has a melodious voice, is easily tamed, soon learns to whistle tunes, and exhibits a great power of mimicking the voices of other birds.

BA'RIUM (sym. Ba; eq. 68·5, in new system 137) is the metal present in heavy spar (sulphate of baryta) and baryta. It was regarded as a white metal, until the researches of Dr. Matthiessen demonstrated that it possesses a yellow color. As yet, the metal B. has not been obtained in mass, but only as a powder. It decomposes water readily at ordinary temperatures, and exposed to the air, quickly combines with oxygen, forming the *oxide of B* (BaO), or BARYTA. The latter substance is an earth resembling ordinary caustic lime, and may otherwise be prepared by adding finely divided black oxide of copper (CuO) to a solution of sulphuret of B. (BaS), when the sulphuret of copper (CuS) is thrown down, and the baryta (BaO) is left in solution. On evaporation, the water of solution passes off as steam, and leaves the solid earthy-looking substance, baryta. A third mode of preparing baryta is to heat strongly the nitrate of baryta ($BaONO_6$), when the nitric acid (NO_6) flies off, and leaves the baryta (BaO). The *sulphuret of B.* (BaS) is obtained when the sulphate of baryta ($BaOSO_3$) in powder is mixed with finely-pulverized coal, and the whole being placed in a crucible, is raised to a red heat in a furnace. The result is, that 4 atoms of the carbon (C) of the coal carry off the 4 atoms of oxygen in the sulphate of baryta as carbonic oxide (CO), whilst the B. united solely with sulphur is left behind as the sulphuret of B. (BaS). The *chloride of B.* is prepared by adding hydrochloric acid (HCl) to a solution of the sulphuret of B. (BaS), when hydrosulphuric acid (HS) escapes, and chloride of B. remains behind, and on evaporation of the liquid, is obtained in crystals.

BARK. See BARQUE.

BARK (*cortex*), in phanerogamous or flowering plants, is the external covering of the stem. It is composed of layers of cellular tissue, whilst the woody stem, to which it forms a sort of sheath, is vascular. In endogenous plants (palms, &c.), there is not, in general, a very marked line of separation between the B. and the vessels or vascular bundles of the stem, so that these plants are generally, but incorrectly, said to have no bark. It is in exoge-

nous plants, and especially in perennial woody stems, that the development of B. is most perfect, and the distinction between wood and B. most marked. The outermost layer of the B. of exogenous plants is the *epidermis* (q. v.), which, however, is in general only to be seen in annual stems, and the youngest parts of woody stems; peeling off as the stem becomes older along with the outer layers of the true bark. Beneath the epidermis is the true B., of which the outer layer is called *epiphlœum* (Gr. outer bark), and consists of cells, usually rectangular and flattened, with thick walls. The inner layer of the true B. is called the *mesophlœum* (Gr. middle bark), and is generally formed of a cellular tissue of roundish cells with thin walls. These layers are sometimes very distinctly separated from one another, and sometimes pass gradually into one another; sometimes there is merely a continuous cellular tissue. Within the true B. is a very distinct layer, the inner B., *liber* (Lat.) or *endophlœum* (Gr. inner bark), also frequently called Bast, which is composed of bundles of woody fibre or vascular tissue mixed with cellular tissue. The layer of Cambium (q. v.) is often regarded as belonging to the inner B., but rather belongs to the vascular part of the stem. In the inner B. are sometimes found cells containing a milky juice, as in the *Apocynaceæ*, or vessels for a milky juice, as in the common fig. The combined strength and flexibility of the fibres of the inner B. render it in many cases useful for various purposes. See FIBRE and BAST. In the true B., the peculiar juices and most characteristic substances elaborated by the plant are very generally found, for which reason that part is often of the greatest importance in medicine and the arts. The B. of many trees abounds in *tannin* or *Tannic Acid* (q.v.).

The B. of a stem or branch of not more than one year old exhibits only a cellular integument or epidermis with an interior lining of woody fibre—the inner B.; but new layers are added from year to year, the B. as well as the woody stem being increased from the cambium, the mucilaginous layer which is interposed between them, and which particularly abounds in spring, when the separation of the B. from the stem is most easy. The annual layers, however, cannot long be distinctly recognized in the B. as in the wood; and in the older portions of woody stems, the outermost parts of the B. become desiccated and lifeless, and are in general gradually thrown off. On this account, those mosses, lichens, and other plants which attach themselves only to the outermost layer of the B. of trees, and derive their nourishment from it, cannot be regarded as true parasites, as they are in no degree supported by the juices of the stem, but only consume and remove external matter already destitute of life. The B. of some trees is remarkable for the thickness which it acquires, as that of the cork-tree, in which the *epiphlœum* is formed of many layers of cells. The outer parts of thick barks very often crack, to admit of the expansion of the stem within; in the lace-bark tree of the West Indies, the fibres of the inner B. become partially separated as it is distended, forming lozenge-shaped meshes arranged with beautiful regularity.

The connection between the cellular tissue of the B. and that of the pith in the center of the tree is continually maintained by means, in exogenous stems of the medullary rays. See EXOGENOUS PLANTS and PITH. The B. is a protection to the young and tender wood; it appears also to exercise functions analogous to those of the leaves, which, when young, it resembles in its color, and which are regarded as dilatations of it, so that it has been called the 'universal leaf' of a plant.

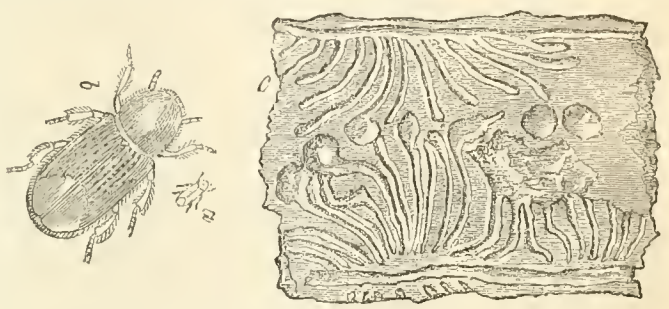
BARK, in Medicine, &c. The principal barks used in medicine will be found noticed in separate articles. See ANDIRA (*Cabbaye B., Surinam B.*); ANGOSTURA B.; CARIBBEE B. (*Jamaica B., St. Lucia B., Piton B.*); CASCARILLA (*Cascarilla B., Eleutheria B.*); CINCHONA (*Cinchona B., Peruvian B., Jesuits' B.*, China, Cascarilla, *Arica B., Calasaya B., Carabaya B., Huamalies B., Huanuco B., Juen B., Loxa B., Maracaibo B., Ash B., Crown B., Silver B., Yellow B., Tan B.*, &c.), CLOVE B.; COPALCHE B.; CULILAWAN B.; WINTER'S BARK.—When B. is mentioned without any prefix, it is always Cinchona, otherwise called Peruvian or Jesuits' B., which is intended.

The barks used for dyeing, tanning, and other purposes in the arts, being generally named from the trees which produce them, particular references here are unnecessary.

BARK, FOR TANNING. The B. of many trees is capable of being used for tanning (q. v.), but those kinds of B. are preferred which particularly abound in tannic acid. Oak B. is principally used in Britain, and throughout Europe; also in North America, although that of America is obtained from species of oak different from the European; in Spain the inner layer of the B. of the cork oak, or cork-tree, is employed, and it is to some extent imported into Britain for the use of tanners. The B. of the chestnut is also much esteemed. Larch B. and willow B. are used in preparing some kinds of leather. The B. of the birch and that of the alder are also employed; birch B. being, however, more esteemed for steeping fishermen's nets and cordage, to preserve them from rotting, than for the preparation of leather. Different species of *Acacia* (q. v.) and of *Eucalyptus* (q. v.) furnish barks used for tanning in Australia, some of which have, to a small extent, become articles of commerce.

The *barking* of trees can be accomplished with facility only in spring, when the sap has begun to circulate. The tree being felled, the rough external lifeless parts of the B. are removed as useless, by means of a sharp instrument called a *scraper;* the smaller branches are cut into lengths of about two feet, and their B. is loosened by beating with a mallet, and easily taken off—as boys at the same season make plane-tree whistles; the B. of the trunk and main branches is cut through by a chisel-like instrument, called a *barking-iron*, into similar lengths, each of which is divided longitudinally, and finally stripped off by the aid of mallets, chisels, &c. The B. is sometimes dried in sheds, being placed on narrow shelves or frames in such a way that there may be a very free circulation of air about it; sometimes in the open air, when it is very generally made to rest in a sloping position against trunks of trees placed horizontally at a little distance from the ground the larger pieces of B. being placed so as to protect the smaller both from sun and rain. Great care is necessary in the drying of B., as it is much spoiled if allowed to get mouldy, and is liable to suffer injury from rain or from the exposure of its inner surface to the sun.—Oak and birch B. are usually about equal in their price, which, however, varies very much, from £4 to £8 per ton. Larch B. is much less valuable; it is also of much greater bulk in proportion to its weight. The B. is a very important source of the revenue derived from many woods and coppices.

BARK BEETLE, or BARK-CHAFER, a name common to many of the large family of Coleopterous Insects (q. v.), called by entomologists *Xylophagi* (Gr. wood-eaters). They are all small, and generally of uniform color; they have hard bodies, and short, often club-shaped antennæ. Most of the family live in wood or other vegetable substances, as mushrooms, dried plants in herbariums, &c., and some of them are extremely injurious to living



Tomicus typographus.
a, natural size; *b*, insect magnified; *c*, galleries made by the insect.

trees. Those called B. beetles or bark-chafers bore holes in the bark, and deposit their eggs in the inner bark, in which the larvæ excavate pathways, often causing the death of the tree. One species in particular, sometimes called the common Bark-chafer (*Tomicus typographus*), and sometimes the Typographer Beetle, from the figure of its burrows, has from time to time appeared in extraordinary numbers, ravaging the forests of Germany. In 1783, it caused the death of a million and a half of pines in the Harz Forest alone. This insect is mentioned in some of the old German liturgies under the popular name of 'the Turk,' which its dreaded ravages obtained for it.

BA'RKAL, or JE'BEL BA'RKAL, a singular sandstone rock in Nubia, situated in lat. 18° 31' N., and long. 31° 46' E., about a mile from the right bank of the Nile. It is quite isolated, perpendicular on the side facing the river, and very steep on all. It is about two miles in circumference at the base, and 400 feet in height, its summit forming a pretty broad plateau. Between it and the river are the remains of some magnificent temples, the two principal ones being known as the Typhonium, and the Great Temple, one of the largest monumental ruins of Nubia. The ancient city of Napata is supposed to have been situated in the vicinity. The two red granite lions, now in the Egyptian Room of the British Museum, were brought from here in 1832 by Lord Prudhoe.

BA'RKER, EDMUND HENRY, a well-known English philologist, was born 22d December 1788 at Hollym, in Yorkshire, and studied at Cambridge. Besides editions of several Latin classics, and numerous contributions to periodicals, particularly to the *Classical Journal*, he was led, during a residence with the famous philologist Parr, to undertake a revision of Stephen's *Thesaurus Linguæ Græcæ*. This gigantic work was violently assailed in the *Quarterly Review* by Blomfield, against whom B. wrote his *Aristarchus Anti-Blomfieldianus* (Lond. 1818); yet he and his publisher, Valpy of London, carried it on and completed it in a spirited manner (13 vols., 1816—1828). In 1812 appeared the first volume

of his *Classical Recreations*. He also supplied materials for the composition of Strutz's *Etymologicum Gudianum*. He likewise translated some works of German philologists, among others, Buttmann's *Greek Grammar for Schools*. He collected the mass of anecdote and criticism relative to his friend Dr. Parr, which was published in 2 vols. in 1828—1829, under the title of *Parriana*, a work well-nigh unreadable, from the superabundance and ill-digested nature of its matter. He also assisted Professor Dunbar in the compilation of the Greek and English Lexicon published in 1831. He lost all that he had in a lawsuit about a valuable inheritance, so that he was obliged to sell his fine library, and was put into the debtors' prison. He died in London, March 21, 1839, in extreme proverty.

BA'RKER, JOHN, descended of an English mercantile family, became, in 1799, agent for the East India Company at Aleppo; in 1826, British consul at Alexandria; and afterwards consul-general in Egypt. In the year 1834, he removed from this situation to the lonely but lovely valley of Suedia on the Orontes, 4 leagues from Antioch, where he employed himself in the cultivation of the choicest fruits of Asia and Europe. We are indebted to him for the Hanwick Nectarine, the most delicious yet introduced into our gardens. The good terms on which he stood with the people around him and with the government, enabled him to render many valuable services to European travelers. He died at Suedia on the 5th of October 1850.

BA'RKER'S MILL (Fr. *Rou à réaction*, Ger. *Segner's Wasserrad*), a water-wheel invented by Dr. Barker towards the end of the 17th c. It is represented in its simplest or typical form in fig. 1. A is a wide metal pipe, resting at its lower end by the steel spindle T, on a metal block B, and kept in a vertical position by the spindle S, at its upper end, which passes through the frame of the machine, so that it can easily revolve round its axis. Near its lower end, two smaller pipes or arms, C, C, are inserted, which project horizontally from it, and these have each, at the outer extremity, a hole cut vertically in them, opening towards opposite sides. The water is supplied by the pipe P, which opens over a funnel-like widening on the upper part of A, and the quantity is so regulated that while the pipe A is kept nearly full, no more is admitted than issues from the lower orifice.

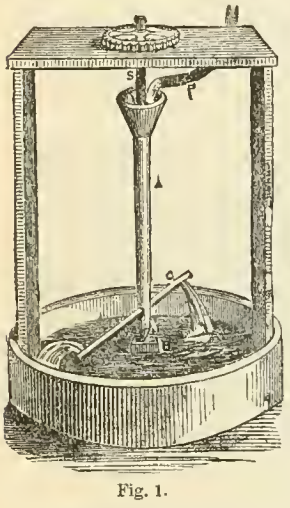


Fig. 1.

The reaction caused by the water gushing from the arms, forces them backwards, and gives to the whole machine a rotatory motion. This reaction is much the same as is seen in the recoil of a gun when fired, or in the pushing back of a small boat by the foot on stepping ashore. It may be also thus explained: Suppose that the arms were closed all round, the water would press against the sides with a force proportional to the height of the water in the pipe A, and the pressure against any particular surface of the side would produce no motion of the arm, because an equal pressure is exerted in a contrary direction by a corresponding surface opposite to it. Now, if one of these surfaces be cut out, the pressure against the other being uncounteracted, forces the arm in the opposite direction to that of the side in which the hole is made. This being done to both arms on opposite sides, two equal pressures are produced, which conspire in generating the same motion of rotation. As soon as motion ensues, centrifugal force comes into play, which, throwing the water out towards the ends of the arms, increases the rapidity of its discharge, and also its reacting power. When the wheel is in action, the water thus acts under the influence of two forces—one being the pressure of the column in A, and the other the centrifugal force generated by the rotation of the wheel itself. The motion of the wheel is transmitted by the spur-wheel fixed to the spindle S, to the machinery which is to be driven by it, or, in the case of a corn-mill, the spindle passes directly through the lower millstone, and is firmly fixed into the upper one.

The power is manifestly increased by heightening the water-column, or by lengthening the arms—the former increasing the pressure of the water, and the latter increasing the leverage at which the pressure acts. In the mill shown in the figure, the column in A cannot be advantageously heightened, for the higher it rises, the greater must be the weight which the conical spindle, T, has to sustain, and the greater, consequently, becomes the friction. It is from this circumstance that such mills are found, in practice, to yield but a small mechanical effect—the friction consuming too large a proportion of the work of the wheel. Hence, in the reaction-wheels now in use, the original B. M. has been so modified as to allow of the water being conducted from the reservoir below the arms instead of above. This is effected by making the vertical pipe revolve below in a stuffing-box at its junction with the conduit, and above by a pivot moving in the fixed frame. By this arrangement, the friction attending the rotation is reduced to a minimum, for not only is the weight of the water placed out of account, but also a large proportion of the weight of the wheel itself, which is borne by the upward pressure of the water. The mechanical performance of such wheels is said to be highly satisfactory, producing, with a limited supply of water falling from a considerable height, a useful effect, hardly to be obtained by any other contrivance. The power of these machines may be also increased by using curved (fig. 2) instead of straight arms. With straight arms, a considerable loss of force is incurred by the sudden change of the direction of the current when it leaves the arm, which does not take place to the same extent with curved arms, where this change is effected gradually. In Whitelaw's Mill (hence called the Scottish turbine), the form of B. M. generally met with in Scotland, there are three instead of two curved arms of this description. Considerable difference of opinion still exists as to the merits of B. M., some considering it as the most perfect way of applying water-power, and others putting it in the same rank as an under-shot wheel, with the same water-supply. Of late years, it has been more extensively employed than formerly, both in this country and on the continent. See WATER-POWER.

Fig. 2.

BA'RKING, a town of the county of Essex, England, in a low flat situation, on the left bank of the Roding, about two miles above its junction with the Thames, and five miles north-east of London, on the North Woolwich Railway. Pop. (1871) 5766, among whom are many fishermen, who pursue their occupation on the Thames, the tide flowing up the Roding to the town. The mouth of the Roding is often called Barking Creek. The neighborhood sends large quantities of potatoes and vegetables to the London market. There is also a transit trade in coal and timber. The church of St. Margaret is an edifice of considerable beauty, in the Perpendicular style, and probably of the beginning of the 15th c.; but it contains three columns of the Early Norman style, supposed to have been brought from the ruins of the adjacent abbey.—*Barking Abbey* was one of the richest nunneries in England. It was founded about 677 A.D., in the reigns of Sebba and Sighere, kings of the East Saxons, by St. Erkenwald, Bishop of London, whose sister, St. Ethelburga, was the first abbess. In 870, it was burned to the ground by the Danes, and the nuns killed or dispersed. It was rebuilt and restored to its former splendor by King Edgar, in the middle of the 10th century. The Abbess of Barking was one of four ladies who held the rank of baroness in right of their office. She lived in great state, and always furnished a quota of men to the king in time of war. She was required also to maintain certain embankments on the Thames. Several queens of England, and other ladies of very high birth, assumed the office of Abbess of Barking. After the suppression of convents by Henry VIII., the abbey buildings soon went to ruin, and scarcely any remains exist except the gate-house.

BA'RK-STOVE, in Gardening, a kind of hot-house intended for those plants which require not only the greatest heat, but also a continually moist atmosphere. It derives its name from the use of tanners' bark, for the purpose of producing this atmospheric condition. The bark is placed in a pit, lined and paved with brick, and pots containing tropical plants are sunk in it; by which means the plants not only enjoy a moisture resembling that of their native climates, but the earth around their roots is kept uniformly and moderately heated. The principle of the B. is adopted in pineries, palm-houses, &c., also in forcing-stoves for producing the ordinary fruits and vegetables of temperate climates at unusual seasons. A considerable heat results from the fermentation of tanners' bark, but it is not upon this that its value in the B. chiefly depends.

BA'RLAAM AND JO'SAPHAT, one of the most widely-spread religious romances of the middle ages, relating the conversion of the Indian prince Josaphat by the hermit Barlaam, and thereby illustrating the power of Christianity to overcome temptation, and proving its superiority over all other creeds. The story, however, has been discovered to be nothing more or less than a Christianized version of the legendary history of Buddha, agreeing with it in its essentials and many details. The celebrated divine, John Damascene, is regarded as the author of the original Greek MS., which was first published by M. de Boissonade in the 4th volume of his *Anecdota* (Paris, 1832), and translated into German by Liebrecht (Münst. 1847). But even in the middle ages, a Latin version of this romance had been extensively circulated. About the end of the 15th c., it was often printed in a detached form, and later, it appeared amongst the works of John Damascene (Paris, 1609).

Vincent de Beauvais wove the story into his *Speculum Historiale*. From the Latin version sprung three French poetical versions belonging to the 13th c., and as yet unprinted. The Italian *Storia di S. Barlaam* (latest edition, Rome, 1816) may be traced to a Provençal original as early as the beginning of the 14th c. In Germany, Rudolf von Ems derived his poem, *B. and J.*, first printed at Königsberg (1818), and later at Leipsic, from the Latin of John Damascene. There is also an Augsburg impression of a prose translation of the ancient Latin text, belonging to the close of the 15th c. The Spanish *Historia de B. y J.*, by Juan de Arze Solorzano (Madrid, 1608), the Polish poetical version, by Kulizowsky (Cracow, 1688), as well as the Bohemian (Prague, 1593), are all borrowed from the Latin; while the Icelandic *Barlaams Saga*, and the Swedish popular tale, *B. och J.*, have a German source. A Norwegian version, printed from an old vellum MS. of the beginning of the 13th c., said to be by King Hakon Sverreson, appeared in 1851. This romance has even been rendered into the Tagala language of the Philippines. See *Buddhist Birth Stories*, by Rhys Davids (1881).

BAR-LE-DUC, or BAR-SUR-ORNAIN, a town in the department of the Meuse, France. It is situated on the Ornain, about 125 miles east of Paris, with which it is connected by railway, and with the Rhine by canal. Pop. (1876) 16,643, who manufacture cotton and calicoes, and carry on a considerable trade in timber from the Vosges, for the use of Paris, and in iron, wool, and wine. B. has a communal college, normal school, and public library. Its origin dates back from the 10th c.

BARLE'TTA, a fortified seaport of Italy, province of Bari, on the Adriatic. Pop. (1881) 31,994, who carry on a large shipping-trade with Greece, the Ionian Islands, and other ports of the Adriatic. The town is well built, handsome, and clean has a fine cathedral, a colossal statue supposed to represent the Emperor Heraclius, a college, theater, and castle, formerly one of the most impregnable fortresses in Italy. A feature of B. is the large and magnificent gateway which leads to its harbor. During the blockade of B. by the French in 1502—1503, which ended in the defeat and death of their commander, the Duke of Nemours, the celebrated combat between eleven cavaliers of France, and as many of Spain, in which the Chevalier Bayard so distinguished himself, took place, and ended in a drawn battle.

BA'RLEY (*Hordeum*), a genus of Grasses, to which belongs one of the most extensively cultivated kinds of grain. The genus is distinguished by spiked inflorescence, three spikelets being always situated upon each tooth of the rachis, of which sometimes only the middle one is fertile, and sometimes all the three, so that in the former case the fruit-bearing spike is two-rowed, and in the latter case, six-rowed; the glumes are two, containing a single floret; the paleæ two, the outer one awned; and the seed is surrounded by the paleæ. The species of this genus are almost all annual, although some varieties of B. are sown in the end of autumn, and the cultivation of them extends over the winter. B. is mentioned in the books of Moses and other books of the Old Testament, also by the Greek and Roman writers, and has been extensively cultivated from remote antiquity. Beer made from it was known to the Greeks, the Egyptians, and the ancient Germans. The cultivation of it appears to have extended from Italy northwards in Europe, but it is better adapted than any other grain to the most northern regions, some of its varieties being cultivated with advantage where the climate is too cold, or the summer too short, for any other cereal crop; and it is deemed probable that its native country is Northern or Central Asia. It is capable, however, of being cultivated in very warm climates, and extends over a wider climatic range than any of the other grains. B.-meal is used for bread in the northern parts of Europe, but in other parts of the world, B. is more generally converted into malt for the making of beer (see BREWING), or merely deprived of its outer skin, and so used as an article of food. B. intended for brewing is first subjected to the process of *malting*, by which it is converted into MALT (q. v.). B. simply deprived of the husk (*paleæ*) in a mill is called *Pot B.* or *Scotch Barley*. When the pellicle of the seed is also removed, and the seed itself rounded and polished, it is *Pearl Barley*.—What is sometimes called *Patent B.*, is a farina obtained by grinding pearl B., and differs from B.-meal in being quite free from a degree of acridity which the latter derives from the integuments of the seed.

It is doubtful if this grain is produced by more than one species, or whether what have been described as distinct species by botanists, are not really mere varieties, the result of long cultivation. *H. vulgare* is usually distinguished as having the grains disposed in four rows; *H. hexastichon*, as having them in six rows, and *H. distichon*, as having the lateral spikelets abortive, and the grains, therefore, in two rows. But the lower part of the spike in the varieties ranked under *H. vulgare* is often six-rowed, and only the upper part four-rowed; and in rich soils, a tendency to resume the six-rowed form is otherwise manifest. Nor are the kinds known as *Naked Barley*, in which the seed separates readily from the paleæ, to be looked upon as more distinct. The four-rowed or six-rowed varieties are generally coarser, but more productive than the two-rowed; and some of them, often called BEAR, or BIGG, are regarded as most suitable for exposed situations and inferior soils. A kind with naked seeds, called *Siberian B.* (*H. cæleste* of some writers), is extensively cultivated in some parts of Europe, and its straw is regarded as affording a richer food for cattle than that of most other kinds. The *Nepaul* or *Himalaya B.*, another variety with naked seeds, and further characterized by the irregular manner in which the grains are placed in the spike, paleæ three-lobed at the end, and very short awns—and which is therefore regarded by some botanists as a distinct species (*H. trifurcatum* or *H. Aegiceros*)—has been recommended as particularly adapted for cold mountainous regions, yielding good crops in the Himalaya at an elevation of 14,000 feet above the level of the sea.—Of the two-rowed B., there are many varieties, of which the Common or Early English B., the Italian B., and the *Chevalier B.* are among the most esteemed, the latter being in particular demand for the brewing of the finest ales. It takes its name from M. Chevalier, who introduced it.—The *Sprat* or *Battledore B.* (*H. zeocriton* of many botanists) is also two-rowed, but is distinguished by the grains standing out from the spike, their awns spreading very widely. It is sometimes called *German Rice*, as it swells by boiling in the way that rice does, and for some purposes forms a good substitute for it. It is scarcely cultivated in Britain, but is in much esteem in Germany, and succeeds well in the Alps at an elevation of 3360 feet.

Three species of *Hordeum* are natives of Britain, of which one (*H. murinum*), a small grass, is pretty common on waste-grounds, especially in England, and is apt to prove troublesome by its long awns causing inflammation in the mouths of cattle. Still more injurious in this way is the North American *H. jubatum*, or Squirrel's Tail. Another, MEADOW B., or MEADOW B.-GRASS (*H. pratense*), frequent in meadows in England, is reckoned a good pasture-grass. *H. bulbosum*, a native of the south of Europe and north of Africa, is cultivated in Britain for herbage, of which it yields a large quantity, much relished by cattle, and particularly by horses. Several species are natives of North America.

BA'RLEY, CULTIVATION OF. Barley was cultivated largely by the Romans, as well as many other nations of antiquity. Though sometimes used as food by the soldiers, it was most generally used as food for horses. The ancient inhabitants of Gaul prepared a spirituous liquor, a kind of beer, from it. Many of the other western nations latterly applied it to the same use, and it also became an important article of food. Being a plant which is most productive where the climate is moderately dry and warm, the excessive heats of some parts of Europe are adverse both to the quantity and quality of its grain. It is, however, cultivated to a large extent in some parts of the continent where the soil is specially suited to it, such as in Belgium, Holland, Prussia and Denmark. Indeed while most of the countries of Europe send us wheat, it is chiefly Denmark and Silesia that supply us with barley. For this reason, the prices of B. have been relatively higher in this country than those of wheat, since the introduction of free-trade in grain. No country seems to possess a soil and climate so well suited to its growth as many parts of Britain. In former times, this grain was largely used in the British Islands as human food; but this is not the case now, except in some parts of Ireland and, in a stray instance, in the Highlands of Scotland, where the condition of the population has undergone comparatively little amelioration. In Scotland, however, a considerable quantity is made use of in the making of broth. In this case, the grain is denuded of its husk by the friction of revolving millstones, and goes under the name of Pot Barley. But the larger proportion of the B. grown in Great Britain, as well as that which is imported, is employed in the distillation of spirits, and in the manufacture of beer, ale, and porter. The moderate qualities are taken up by the distillers, while the brewers of ale and porter require the finest, which are known by the silvery color of the husk, and the specific gravity of the grain. Fine malting B., therefore, always commands a ready demand in the London market, as well as a high price. For several years barley has not only grown better than any other grain with the British farmer, but has commanded relatively the best prices.

Perhaps the cultivation of B. occupies as prominent a share of the arable lands of Suffolk and Norfolk as of any other part of Britain. Fine malting qualities are grown on the turnip-soils of these counties, as well as throughout the south-eastern counties, where the four-course rotation is adopted. In this rotation, the B. follows the turnip-crop, which is usually consumed on the land by sheep. The ground is carefully prepared by ploughings and rollings, to pulverize it thoroughly before the reception of the seed, which is usually sown by a drill machine at the rate of about two bushels to the acre. On the strong lands of Suffolk and Huntingdon, the B.-crop is sown after a summer-fallow or a green-crop, in which case the soil is ploughed before the frosts of winter set in, to render it friable by spring. As soon as the weather permits,

after the first week of February, the seed is committed to the ground. A fine mould is in this way obtained, and the crops are usually abundant and of good quality. In the south of England, the grain is allowed to stand till it is fully ripe, when it is either cut with the scythe or most commonly now with the reaping-machine. In some parts, it is not bound up into sheaves, but remains in the swath for a few days, when it is afterwards carted, and stored into barns. A small portion of the B.-crop is still thrashed out by the flail, owing to the maltsters being under the impression that the thrashing-mills injure the germinating powers. The chief varieties grown in England are the Chevalier, the Common, the Early English, and the Norfolk. The first named is the most largely sown, as the quality is superior to any other, and, under liberal treatment, the yield is greater. The produce is more influenced by the seasons than that of wheat, as it is liable to suffer from droughts in the early part of the year. On well-farmed land, from 48 to 60 bushels and upwards are got to the acre. In the peaty soils of the fens of Lincolnshire, B. is not raised, as it is too liable to lodge with the rain; neither is B. a favorite crop in the moist climate of the west of England. It does not endure the rains so well as wheat, nor do so well on highly farmed land. In Wales and Lancashire, it is generally grown after a crop of wheat, and the cultivation and management are not so careful as in the east.

Barley has long been grown in Scotland, and comes to great perfection where the soil and climate are suitable. The level parts of the Lothians and other counties in the east of Scotland, with Moray, Inverness, and Ross in the north, are the districts in which the finest crops are raised. In these rich districts, B. is commonly sown after a portion of the turnip-break. For this reason, it does not occupy so large a proportional breadth as it does under the Norfolk four-course. The produce is equally abundant, however, and the quality of the grain is often not inferior. Chevalier is the favorite variety there also. The crop, when ripe, is cut by sickle, scythe, or reaping-machine; bound up at once, and put into stooks, to defend it from the weather till ready to cart, and to be built up in neat round stacks. The grain is invariably thrashed out by machinery. In the higher districts of Scotland, where the soil and climate are not so good, the inferiority of the grain, unless in an especially favorable year, both in quality and quantity, is considerable. It is only in fine seasons that the quality is such as to render it an object to maltsters, and in wet, cold unsuitable seasons, distillers can only make use of it at a reduced price. The Chevalier variety is a little late for inferior climates, and the Early English and other kinds that come sooner to maturity are often preferred. In Berwickshire, Aberdeenshire, Banffshire, Kincardineshire, and Forfarshire, the five-course rotation—of two years' grass, oats, turnips, and B.—is more generally adopted than in some other counties in Scotland, and a large quantity of this grain is raised, but the quality is generally inferior to that of the crops in East Lothian. Along the light soils fringing the Moray and Cromarty firths, as fine quality of grain is got as in East Lothian. Morayshire barley has long been famous for its fine sample, and is in great demand with English brewers. On the other hand, in the less genial climate of the western counties, and also of the upper part of Aberdeenshire, Banffshire, and Perthshire, less B. is sown, and oats frequently succeed the green-crops. In these parts the variety known as bear, or bigg, was for many a day preferred to any other, as it is not so liable to lodge, and it withstands wet weather far better, and comes earlier to maturity. Bear, too, is the variety which is cultivated by many of the small cotters in the Highlands and islands. Instead of a rotation in which green-crops find a place to husband and spare the natural resources of the soil, a succession of corn-crops are taken, with an occasional rest to the soil, and then a resumption of the cropping.

As to the manuring of the crop, on the turnip-soils of the south of England, the land is enriched by the droppings of the sheep. In the strong soils of Norfolk and Huntingdon, guano, rape-cake, and other manures abounding in nitrogen, are applied when the seed is sown. In the west of England, the moist climate renders the application of manures more precarious, and B. is frequently taken after a crop of wheat without any application of fertilizers. When the turnip-crop is drawn from the land, as it often is in Scotland, guano is the manure held in most estimation; the quantity applied is from 2 to 4 cwt. per acre. In Berwickshire and Morayshire, as in Norfolk, the prevalence of the five-course shift, and the practice of eating the crop on the ground, secure a sufficiently liberal manuring. In other parts, where B. is taken after wheat, farm-yard manure is often applied, as well as guano and phosphoric manures. In some northern counties, the root-crops are laid down with artifical manures, and the roots carted off, farm-yard manure spread on the land and ploughed in with the 'seed furrow.' Barley requires a fine tilth and soil in rich manurial condition. The earlier it is sown in the season, the more liberal ought to be the application of nitrogenous manures. The later it is sown, manures containing nitrogen should be used more sparingly, and a portion of phosphoric manures substituted in their stead.

BARLEY-BREAK, a popular amusement, very common in the reign of James I., and, with certain modifications, in name and practice still existing among young persons, both in England and Scotland. Originally, it was played by six people, three of each sex, who formed into couples. A piece of ground was then apportioned into three parts; and in the center one, called *hell*, a couple was doomed by lot. The sport consisted in the two in the condemned part 'catching' one of the other couples when they were in the act of changing places, when the couple caught had to go into the center. It was, however, no easy matter for the two in the center to capture another couple, for, by the rules of the game, they were bound to keep united, while the others, when hard pressed, might sever. Thus, Sir Philip Sidney, in describing the game, says:

> Soon as the middle two
> Do, *coupled*, towards each couple make,
> They false and fearful do their hands *undo*.

When the whole had been caught, the game was ended, and the last couple taken was said to be in hell. Their punishment appears to have consisted in kissing each other. Herrick says, in referring to the game:

> If kissing be of plagues the worst,
> We'll wish in hell we had been last and first.

In Scotland, the game consisted in one person chasing the rest round the stacks in a farmyard; and when one was caught, he or she had to assist in capturing the rest. The origin of the name is doubtful. Dr. Jamieson suggests that, in Scotland, the locality of the game may have given it its name—'barla-bracks, about the stacks.' The same authority also adds: 'Perhaps from *barley* and *break*, q., breaking of the *parley*, because after a certain time allowed for settling preliminaries, on a cry being given, it is the business of one to catch as many prisoners as he can.' This supposition is not improbable. In the modern games of 'Shepherds a-warning,' and 'Tig,' which appear to have been derived from B., 'a barley' means a *parley*.

BA'RLEYCORN, JOHN, a personfication of the spirit of barley, or malt-liquor, used jocularly, and also in humorous poetical effusions. There exists a whimsical English tract of old date, under the title of *The Arraigning and Indicting of Sir John Barleycorn, Knt., printed for Timothy Tosspot*, in which Sir John is described as of 'noble blood, well beloved in England, a great support of the crown, and a maintainer of both rich and poor.' See Hone's *Every-day Book*, vol. i.

BARLEY-SUGAR, a confection prepared with sugar and a decoction of barley. See SUGAR.

BA'RLOW, JOEL, an American poet and politician, born in 1755 at Reading in Connecticut. He studied at Yale College in New Haven. He was intended for the profession of the law, but served as a military chaplain during the War of Independence. In 1787 he published a poem called *The Vision of Columbus*, which in 1805 appeared anew in an enlarged form as *The Columbiad*. It abounds in beautiful passages, but is overburdened with political and philosophical disquisitions, and disfigured by singularities of expression. B. accepted a commission in 1788 to prosecute the sale of lands for the Ohio Company in England and France, where he signalized himself by zealous republicanism; published in 1792 in London a poem entitled *The Conspiracy of Kings*, and endeavored also to work upon the public mind in England by political pamphlets. In autumn 1792 he was deputed by the London reformers, with whom he was associated, to proceed to Paris, where he received the rights of French citizenship. He spent some years on the continent of Europe in political, literary, and mercantile pursuits, and was for a short time American consul at Algiers. He returned to America in 1805, and was appointed ambassador to France in 1811. He died in October 1812 at Zarnawicze, near Cracow, when on his way to a conference with the Emperor Napoleon at Wilna.

BARM. See YEAST.

BA'RMECIDES, or BA'RMEKIDES, a Persian family, distinguished amongst the most powerful in the province of Khorasan, the cradle of the greatness of the Abbaside califs, whose cause the *children of Barmek* espoused. *Khaled-ben-Barmek*, the first of these whose authentic history has reached us, was the prime-minister of Abul Abbas Al-Saffah, the first Abbaside calif; and his influence enduring through the reigns of Al-Mansur and Mohdi, the latter intrusted him with the education of his son, the celebrated Harun Al-Rasehid. Yahya, the son of Khaled—according to eastern historians, equally conspicuous for virtue and talent—was made vizier by Harun upon his accession to the califate (786 A.D.), and both by his military skill and civil administration, contributed largely to the prosperity of the reign—the calif himself bestowing on him the appellation of Father. Harun, however, afterwards becoming jealous of the growing power and popularity of two of Yahya's sons, Fadhl and Jarfar (the Giafar

of the *Arabian Nights*), had them executed, and the whole of the B. throughout the kingdom arrested, and their goods confiscated. Harun even carried his enmity so far as to forbid the mention of their name on pain of death; but their virtues and their glory are celebrated by almost all Mohammedan poets and historians.

BA'RMECIDE'S FEAST, a phrase originating most probably in the story of the barber's sixth brother, recorded in the *Arabian Nights*, and abridged in the *Guardian*, No. 162. The substance of the story is as follows: One Schacabac being in great want, and not having tasted food for two days, ventured to visit a rich Barmecide (see BARMECIDES) noted both for his hospitality and eccentric humor, in the hope of generous entertainment. The Barmecide, on learning his condition, invited him to dinner. Schacabac was presented with an empty plate, requested to 'make himself at home,' and by and by, asked 'how he liked his rice-soup.' It was apparently a cruel jest to play off on a starving man. Schacabac, nevertheless, feigned to enter into the humor of his host, and expressed his conviction, that the rice-soup was delicious. The Barmecide, continuing the imposition, next asked his victim if he ever saw whiter bread. Poor Schacabac, who saw neither bread nor meat, nor indeed anything eatable, made a prodigious effort to look happy; he even went the length of gently remonstrating with his host for not supposing him completely satisfied. In this way a magnificent but fictitious dinner was disposed of. When wine, however, was produced, Schacabac pretended only to taste it on the ground that he was 'quarrelsome in his liquor,' and might do his host an injury. The Barmecide forced him, however, and at last Schacabac, who was really in a most excusable rage at being so elaborately tantalized, feigned to have got flustered, and gave the eccentric old gentleman 'a good box on the ear.' This put a stop to the joke. The Barmecide was mightily pleased with the patient humor of his guest, a visible dinner was immediately ordered up, and Schacabac now enjoyed in reality what he had previously partaken of only in imagination.

BAR'MEN, a most charming valley, about two leagues in length, on the Wupper, about two leagues from Elberfeld, in the province of Rhenish Prussia. It is divided into Upper and Lower B., and contains five towns or villages, which united form the town of B., now continuous with Elberfeld, with (1880) 95,941 inhabitants, chiefly Protestants. Nowhere in Germany is so much manufacturing industry accumulated in a single spot. B. is the principal seat of the ribbon-manufacture on the continent. Its fabrics go to all parts of the world. It produces linen, woollen, cotton, silk, and half-silk ribbons, cloth of various kinds, stay-laces, thread, &c. It has also considerable manufactures of soap, candles, metal wares, buttons, machinery, and pianofortes. There are, besides, in the valley, numerous bleachfields and Turkey-red dye-works. Lower B. has a mineral spring and a bathing establishment.

BA'RNABAS, ST., properly Joses, mentioned in the Acts of the Apostles as a fellow-laborer of Paul, and even honored with the title of apostle. He is also supposed to have founded the first Christian community at Antioch. According to tradition, he became the first Bishop of Milan, but he is differently reported to have died a natural death, and to have suffered martyrdom at the hands of the Cypriot Jews, 61 A.D. The epistle ascribed to him is of very doubtful authenticity.

BA'RNABAS, ST., EPISTLE OF. This Epistle contains twenty-one chapters. Its aim is obviously to strengthen the faith of believers in a purely spiritual Christianity. It commences by declaring that legal sacrifices are abolished, and then proceeds to show, though not in a very coherent or logical manner, how variously Christ was foretold in the Old Testament. In the tenth chapter, it spiritually allegorizes the commands of Moses concerning clean and unclean beasts; in the fifteenth, it explains the 'true meaning' of the Sabbath; and in the sixteenth, what the Temple really prefigured. This concludes what may be termed the doctrinal portion of the Epistle; the remainder, which is of a practical character, describes the two ways of life—the way of Light and the way of Darkness, and closes with an exhortation that those who read it may so live that they may be blessed to all eternity. It is a simple, pious, and earnest work; but makes a far more judicious use of the New Testament than of the Old.

BA'RNABITES, an order of monks which sprung up at Milan in 1530. They were so called because the church of St. Barnabas in that city was granted them to preach in. They were approved of by Pope Clement VII. and Pope Paul III. Their special duties were, to attend the sick, to preach, to instruct the young, and to take the charge of souls. They soon established themselves in Italy, France, Austria, and Spain, and enjoyed the privilege of teaching theology in the schools of Milan and Pavia. Many eminent men have been sent forth by them. Besides the three usual monastic vows, they took a fourth, viz., not to sue for church preferments. In France and Austria, they were employed in the conversion of Protestants; but they have now, as a body, almost fallen into oblivion. Only a few monasteries exist here and there in France and Italy.

BA'RNACLE, or BE'RNICLE (*Lepas*, also called *Anatifa* and *Pentalasmis*), a kind of shell fish, a genus of *Cirrhopoda* (q. v.), the type of a family of articulate animals distinguished by a long flexible stalk or peduncle, which is provided with muscles, upon the summit of which, in the true barnacles, are shelly valves, five in number, enclosing the principal organs of the animal, and opening and closing on one side like the opercular valves of *Balanus* (q. v.), to admit of its spreading out and retracting its net—an apparatus similar to that by which the animals of that genus obtain their food. Barnacles abound in almost all seas, attaching themselves in great numbers to logs of wood, ships' bottoms, &c. They grow very rapidly. Some of the species are eaten in some parts of the world, and perhaps they were among the *balani* which the ancient Romans esteemed a delicacy.—In some cirrhopods, very nearly allied to the true barnacles, and resembling them in general form, the shelly valves almost entirely disappear.

Group of Barnacles.

In former times, the B. was supposed to be the embryo of a goose or bird of some kind; a notion which doubtless arose from a fancied resemblance between the convolutions of the fish in its shell and the embryo of a bird in the egg. It was, therefore, believed that the barnacle goose, described in next article, sprung from these marine shells. Hollinshed gravely affirms that such was the case; and the most learned men of their time were weak enough to give credence to the absurdity. Gerard, in his *Herbal* (1597), declares, that after 'a thing in form like a lace of silke finely woven, as it were, together'—which he correctly enough states to be 'the first thing that appeareth' when 'the shell gapeth open'—there next follow 'the legs of the bird hanging out;' and at last the bird, increasing in size, 'hangeth only by the bill,' and 'in short space after it cometh to full maturity, and falleth into the sea, where it gathereth feathers, and groweth to a fowl bigger than a mallard, and lesser than a goose,' &c. All this was represented as constantly taking place on the coast of Lancashire and the Hebrides, and continental writers of greater name reported in like manner the same fable, against which Ray and other early naturalists were obliged seriously to argue. The B., however, really undergoes transformations not less wonderful than the fabled ones, which have rendered it an object of so much interest. See CIRRHOPODA.

BA'RNACLE GOOSE, or BE'RNICLE GOOSE, often also called BARNACLE, or BERNICLE (*Anser Bernicla* or *leucopsis*), the bird which the fables of former days represented as deriving its origin from the cirrhopod of which it bears the name. It is in size smaller than the common wild goose, being only a little more than 2 feet long, and about five pounds in weight. It is very

Barnacle Goose.

prettily marked, having the forehead, cheeks, and throat white, the bill black, and a black stripe extending from it to the eye; the crown of the head, neck, and upper part of the breast black; the rest of the plumage on the upper parts of the body chiefly ash-gray and black, in undulating bars—on the lower parts, white. It is a common winter visitant of the western coasts of Britain and of Ireland, but in the eastern parts of Britain it is rare. It retires in spring to more northern regions, where it breeds, vast numbers passing northward along the coast of Norway to the Arctic Ocean. It is highly esteemed for the table.

The Brent Goose, or Brent Barnacle (*Anser Brenta* or *torquatus*, *A. Bernicla* of some naturalists), has frequently received the name of the B. G., and no little confusion has existed concerning them in books of science, although the birds are sufficiently distinct.

The Brent Goose is smaller than the B. G., being only about 21 inches in length. It is also of much darker plumage, the whole head, throat, and neck being black, except a small patch on each side of the neck, which is white, mixed with a few regularly placed black feathers; the upper parts of the body generally almost black, and the lower parts slate-gray, except the vent and under tail-coverts, which are white. It is remarkable for length of wing and powerful flight, and for its distant migrations. It is very common in winter on the British shores, but it breeds in high northern latitudes. It is a winter-bird of passage in the United States and Canada, as in Britain and on the continent of Europe. It is excellent for the table.

Very nearly allied to these species is the Red-breasted Goose, or Red-breasted Barnacle (*Anser ruficollis*), a beautiful bird, of which the neck and the upper part of the breast are of a rich chestnut red. In size, it resembles the Brent Goose; it is a very rare visitant of Britain and of the continent of Europe, and is abundant only in the extreme north of Asia.—Another species, called Hutchins' Goose or Barnacle (*A. Hutchinsii*), of dark plumage, and with a triangular patch of white on each side of the head and neck, is abundant in Hudson's Bay, and the extreme north of America.

These species are regarded by some naturalists as constituting a genus *Bernicla*, distinguished chiefly by a shorter and more slender bill from the ordinary or true geese.

The Egyptian Goose or Bargander (*Anser Egyptiacus*) is sometimes ranked with these, sometimes made the type of a distinct genus, *Chenalopex*, upon account of the longer bill, a short spur with which the bend of the wing is armed, and the anatomical peculiarity of a hollow bony enlargement at the bottom of the trachea of the male. It has long been kept in parks and pleasure-grounds in Britain, chiefly on account of the beauty of its plumage, and has become partially naturalized. It is a little smaller than a common goose; its voice more resembles that of a wild-duck. The prevailing color of the plumage is light chestnut brown, minutely rayed with darker lines; the neck and part of the wings are white. Large chestnut patches surround the eyes. It is very abundant on the Nile, and is frequently figured in Egyptian sculptures. It is much esteemed for the table, and was kept and fattened for it by the ancient Egyptians. It is the *Chenalopex* of Herodotus.

BA'RNACLES, in Heraldry, resembling what are now called twitchers, were instruments used by farriers to curb and command unruly horses. B. are frequently introduced into coats of arms as a charge.—The term BARNACLES, applied to spectacles, is derived from *beryllus*, a transparent stone; dim. *beryllicula*, *berynicula*, *bernicula*. Old Fr. has *béricle;* the dialect of Berri, *berniques*. Twitchers resembled the original spectacles that clasped the nose.

BA'RNARD CA'STLE, an inland town in the south of Durham county, on the right bank of the Tees, about 40 miles from its mouth, and 26 miles south-west of Durham. It stands on the slope of an eminence rising from the river. Its chief manufactures are hats, carpets, shoemakers' thread, leather, plaids, and stockings. It has one of the largest corn-markets in the north of England. On a rocky height over the river are the ruins (covering 6¾ acres) of a castle, founded about 1180 by Barnard, son of Guy Baliol, a follower of the Conqueror, and ancestor of John Baliol, king of Scotland, who was born in the castle, and founded an hospital for the poor in the town. B. C. is the scene of part of Sir W. Scott's poem of *Rokeby*. Pop. (1871) 4306; (1881) 4544.

BARNAU'L, a town of West Siberia, in the government of Tomsk. It is situated at the junction of the Barnaul, with the river Oby, and has a population of (1881) 14,000, who are chiefly engaged in the mining and smelting of the metals found in the vicinity, which consist of silver, lead, and copper. B. has 120 furnaces at work, is the seat of a mining board, and has a magnetic and meteorological observatory.

BARNAVE, ANTOINE - PIERRE - JOSEPH - MARIE, a distinguished character and victim of the French Revolution, was born at Grenoble in 1761, was the son of an advocate, adopted his father's profession, and early attracted attention in the parliament of Grenoble by the talents which he displayed. A pamphlet which he published against the feudal system led to his being returned as deputy from his province to the States-general in 1789. He zealously advocated the proclamation of the Rights of Man, was vehement in opposition to the Absolute Veto, carried through the confiscation of church-property to the use of the nation, the emancipation of the Jews, and the abolition of the religious orders, and was mainly instrumental in the liberation of the slaves and reorganization of the colonies. As a leader of the extreme party in the earlier stages of the revolution, he became the idol of the people, and particularly after his victory over Mirabeau, in the question of the power of peace and war, which Mirabeau wished to remain with the king, and B. successfully claimed for the National Assembly. He subsequently, however, became inclined to a more moderate course, defended the inviolability of the king's person, and resisted the assertion by the Assembly of power to remove ministers. This conduct led to his being regarded as a renegade from the national party, and to his being assailed by the fierce vituperations of the daily press. He retired to his native place on the dissolution of the National Assembly; but after the 10th of August 1792, he was impeached, along with Lameth and Duport-Dutertre, on account of correspondence with the court; was brought to Paris, tried before the Revolutionary Tribunal, condemned, and guillotined on the 29th of November 1793.

BARNES, ALBERT, an American theologian, born in the state of New York, in 1798. He was minister of the first Presbyterian church of Philadelphia, from 1830 to 1867. He is best known by his *Notes* on various parts of the Old and New Testaments, specially adapted for the use of Sunday schools and Bible classes, which have had an extraordinary circulation. Two editions of 18 vols. were published in England, 1860–62. Mr. B. died at Philadelphia, 1870.

BARNES, REV. WILLIAM, poet and philologist, is author of three collections of poems written in the dialect of Dorsetshire, the first entitled *Poems of Rural Life in the Dorset Dialect, with a Dissertation and Glossary* (Lond. 1844); the second, *Hwomely Rhymes*, &c. (Lond. 1859); and the third, *Poems of Rural Life*, &c. (Lond. 1862). The first of these collections reached a second edition in 1847, showing that at least some interest was taken even at that early period in Mr. B.'s 'hwomely rhymes.' They were not critically noticed, however, so far as has been ascertained, until November 1859, when a highly eulogistic review of them appeared in the *North British Review*, pronouncing Mr. B. to be 'the best writer of rustic eclogues since Theocritus.' The reviewer also says, speaking of Mr. B.'s poetry, 'that it combines in a high degree the special merits of Wordsworth and Burns, but in a way which is so perfectly original, as to bear no trace of even a perusal of those poets by the author.' Such praise, although exaggerated, is not altogether without foundation. Mr. B. is a true poet, combining with a genuine love of nature, as seen in the rich grazing-lands of Dorsetshire, a keen sympathy with the rustic population, their hopes and fears, loves, joys, sorrows, and superstitions. It is for this audience that Mr. B. professed to write, and it is only such that can thoroughly appreciate his verse. He has, however, also written a collection of poems, called *Poems of Rural Life in Common English* (1868), and *Poems of Rural Life in the Dorset Dialect* (1879). A writer in *Macmillan's Magazine* for June 1862, in an article evidently from the same pen as that in the *North British*, claimed for Mr. B. a place 'at the very head of the properly idyllic poetry of England.' In that article, we are informed that in the previous year (1861), the pension-list, which announced a yearly grant of £50 to Mr. Close, in consideration of his deserts *as a poet*, mentioned one scarcely larger in amount conferred on Mr. B. in consideration of his acquirements *as a philologist*. Mr. B. was born of humble parentage at Rush-hay, Bagber, Dorsetshire, in 1810, and was for many years master of the grammar-school at Dorchester. He is B.D. of St. John's College, Cambridge, was ordained in 1847, and was promoted from the curacy of Whitcombe to the rectory of Winterbourn-Came, in Dorset, in 1862. Besides the collections of poems mentioned, Mr. B. is author of *An Investigation of the Laws of Case in Language* (Lond. 1840); *An Arithmetical and Commercial Dictionary* (Lond. 1840); *The Elements of English Grammar* (Lond. 1842); *The Elements of Linear Perspective* (Lond. 1842); *S. Geflysta (the Helper): an Anglo-Saxon Delectus* (Lond. 1849); *Notes on Ancient Britain and the Britons* (Lond. 1858); *Views of Labor and Gold* (Lond. 1859); *The Song of Solomon in the Dorset Dialect, from the authorized English Version* (Lond. 1859)—printed at the expense of Prince Louis Lucien Bonaparte; *Tiw, or a View of the Roots and Stems of the English as a Teutonic Tongue* (Lond. 1862); *Early England and Saxon English* (1869). The philological works of Mr. B. show considerable learning and ability.

BA'RNET, CHI'PPING, a town in the south of Hertfordshire, on a hill-top, 11 m. N.N.W. of London. Pop. (1881) 4095. It was formerly a place of importance on the great northern coach-road. Large cattle-fairs are held here. Here, in 1471, was fought the famous battle of B. between the Yorkists and the Lancastrians, in which the latter, after a desperate struggle, were routed, and their leader, Warwick, 'the king-maker,' killed, by which event Edward IV. was firmly established on the throne. A commemorative obelisk is now erected near the spot.

BA'RNÉVELDT, JAN VAN OLDEN, Grand Pensionary of Holland, born 1547, early showed great ardor in the cause of the independence of his country. As advocate-general of the province of Holland, he proved equally his insight into affairs and his address in diplomatic management. Penetrating the secret designs of Prince Maurice (q. v.) of Orange, he became the head of the republican party, which aimed at subordinating the stadtholder to the legislature. It was he also who opposed the warlike tendencies of Maurice, concluded (1609) a truce with Spain, and prevented the States-general from taking part in the revolt of the Bohemians. His influence excited the House of Nassau to still greater jealousy, which in the religious controversies between the Remonstrants

(see ARMENIUS) and Gomarists degenerated into the bitterest hostility. With the view of obviating a civil war, B. proposed an ecclesiastical assembly, which resulted in agreeing to a general toleration in respect to the disputed points. The states at first concurred in this wise measure; but the intrigues of the Orange party brought about a change of views, by representing the Remonstrants as secret friends of Spain. B., who sympathized with the more tolerant principles of that party, was attacked in scurrilous publications, and was insulted even in the meeting of the states by the mob, with whom Maurice was an idol. The strife between the Remonstrants and Gomarists became hotter every day, and threatened to end in civil war. On August 29, 1618, B. was illegally arrested, along with Grotius and Hoogerbeets, and thrown into prison. In the following November, Maurice procured the summoning of the Synod of Dort (q. v.), which condemned the Remonstrants with the utmost rigor and injustice. In March 1619, while the Synod was still sitting, B. was brought to trial before a special commission of 24 judges, who condemned as a traitor the innocent man to whom his country owed its political existence. It was in vain that his friends and relations raised their voice; equally vain was the interference of the Dowager Princess of Orange and of the French ambassador; Maurice was not to be moved. On May 13, 1619, the venerable man of 71 years of age mounted the scaffold, and laid down his head with the same firmness that he had shown through all the events of his life. His sons, Wilhelm and René, were at the same time dismissed from office. Four years after their father's death they took part in a conspiracy against the life of the prince, which however, was discovered. Wilhelm escaped to Antwerp, but René was seized and beheaded.—See Motley's *Life of B.* (2 vols. Lond. 1874).

BA'RNSLEY, a town in the West Riding of Yorkshire, 39 miles south-west of York. It is situated on a hill, has coal and iron mines, linen manufactures, bleaching and dye works, manufactures of iron and steel, wire-works, and glass-works. Besides ample railway communication, it has the advantage of two canals. It has a large number of educational and benevolent institutions, and a public park of 20 acres. Chief buildings are the county court and bank. Pop. (1871) 23,021; (1881) 29,789.

BA'RNSTAPLE, a town in north-west Devonshire, on the right bank of the Taw, 6 miles from its mouth, and 34 north-west of Exeter. The Taw is here crossed by an ancient bridge of 16 arches, which has been widened by iron-work on each side. In consequence of the river and harbor having become filled up with sand, much of the trade of B. has been transferred to Bideford. It has manufactures of pottery and lace. It sends two members to parliament. B. has existed since the reign of Athelstan, who built a castle here. The poet Gay was born near the town, and educated at its grammar-school. Pop. (1871) 11,790; (1881) 12,283.

BARNUM, PHINEAS TAYLOR, American showman, was born at Bethel, Connecticut, July 5, 1810. His father was a tavern-keeper; and while young B. attended the village school, he traded with and played practical jokes upon his father's customers. At the age of 13, he was employed in a country store; and about five years afterwards, went largely into the lottery business. When only 19, he married clandestinely, and then moved to Danbury, where he edited *The Herald of Freedom*, and was imprisoned 60 days for a libel. In 1834, he moved to New York, where, hearing of Joice Heth, nurse of General Washington, he bought her for 1000 dollars, and with the aid of forged documents and puffing, exhibited her to considerable profit. Reduced again to poverty, he sold Bibles, exhibited negro dancers, and wrote for newspapers, until he bought the American Museum in New York, which he raised at once to prosperity by exhibiting a Japanese mermaid, made of a fish and monkey, a white negress, a woolly horse, and finally, a noted dwarf, styled General Tom Thumb, whom he exhibited in Europe in 1844. In 1847, he offered Mademoiselle Jenny Lind 1000 dollars a night for 150 nights, and received 700,000 dollars—the concert tickets being sold at auction, in one case for 650 dollars for a single ticket. He built a villa at Bridgeport, in imitation of the Brighton Pavilion, and engaged in various speculations, one of which—a clock-factory—made him bankrupt. Settling with his creditors in 1857, he engaged anew in his career of audacious enterprises, and made another fortune. In 1866, he stood as a candidate for a seat in Congress, but was unsuccessful. His *Autobiography* (1854, since greatly enlarged) has the merit at least of frankness. In 1865, he published *The Humbugs of the World;* and *Struggles and Triumphs* in 1869. In 1871, he again returned to the business of showman, from which in 1868 he had withdrawn. In 1882 he purchased from the London Zoological Society the elephant 'Jumbo,' for £2000, for exhibition in America, and in 1884 he exhibited in New York and other cities an animal advertised as 'King Thuban's Royal White Sacred Elephant.'

BARO'CH, BROACH, or BHARUCH, a large town of British India, in the province of Bombay, on the north bank of the Nerbudda. The Nerbudda is here a noble river, two miles wide even at ebb-tide, but shallow, and the navigable channel winding and difficult even at high water. It abounds in fine fish. B. is a very ancient town; it is supposed to be the *Barygaza* of Arrian. Situated in the midst of a most fertile district, it was formerly a very flourishing town, with a large population; but fell in consequence of political troubles, into decay. It has of late begun to recover prosperity, and its commerce is increasing. Its present pop. is estimated at 15,000, within the walls; but including the suburbs, which are extensive, the pop. in 1872 was 36,963. B. belonged to the Mussulman kingdom of Guzerat, on the overthrow of which by the Emperor Akbar, it was assigned to a petty nawab; and falling under the dominion of the Peishwa, was taken by the British in 1772, ceded to Scindiah in 1783, in acknowledgment of the kind treatment of some British prisoners; and again stormed by a British force in 1803, since which date it has remained in the possession of the British. The heat at B. is often excessive, and the situation is regarded as unhealthy. B. carries on a considerable trade with Bombay and Surat—the principal exports being raw cotton, grain, and seeds. It was long famous for its manufactures of cloth; but that of the finer kinds has fallen off very much, in consequence of the importation of English goods. Many of the weavers of B. are Parsees, of whom also are some of the most opulent classes—as ship-owners and ship-brokers. B. has one remarkable institution—a Brahmanical hospital for sick animals, into which horses, dogs, cats, monkeys, peacocks, and even insects are received. It is ostensibly attended by a number of Brahmans, who derive a good income from lands devoted to it, and from voluntary contributions. Pop. of collectorate (1872), 350,322.

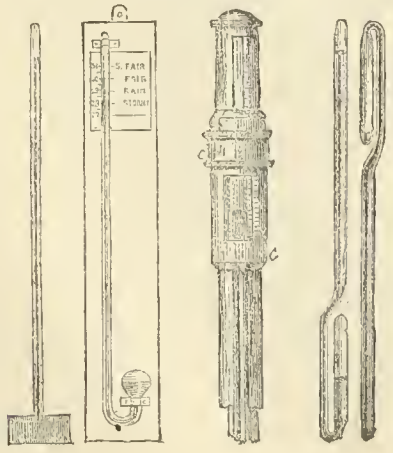
BAROCHE, PIERRE-JULES, an eminent French politician, was born at Paris on the 8th November 1802. He passed as an advocate in 1823, and distinguished himself by his talents as a pleader. In 1847, he was sent to the Chamber of Deputies as representative of Rochefort, took his position among the moderate reform party, and was one of those who signed the accusation drawn up against the Guizot ministry. During the republic, he voted at first along with the democratic party, but subsequently supported General Cavaignac, and, after the 10th December, the policies of Louis Napoleon. B. was now made Procureur-général of the Republic at the Paris appeal court. In March 1850, he succeeded Ferdinand Barrot as Minister of the Interior, after which he became a decided Bonapartist. In April 1851, he was appointed Minister of Foreign Affairs, with Leon Faucher as colleague. After the *coup d'état* of the 2d December 1851, B. accepted the vice-presidency of the Consultative Commission, and was authorized to make known officially the result of the *plebiscitum*. He became Minister of Foreign Affairs in 1860, and Minister of Justice and Public Worship in 1863. He received the grand cross of the Legion of Honor in 1855. His death took place on the island of Jersey in 1870.

BARO'DA, a city of Guzerat, and capital of a state of the same name. It is 40 m. from Tunkaria, and 231 N. of Bombay, with which it is connected by railway. It stands on the Biswamintri, which is here crossed by a stone bridge of singular construction—an upper range of arches resting on a lower one. B. is the residence of the Guicowar, a protected Mahratta prince. Pop. (1872) 112,057; trade considerable. It occupies an important position between the coast and the interior. In 1873, numerous complaints having been made to the British government about the misrule of the Guicowar, Malhar Rao, a commission was appointed to examine into the state of affairs; and as a result, the Guicowar was allowed 18 months in which to reform his administration. His misrule, however, continued, and a suspected attempt to poison Colonel Phayre, the British resident at his court, led to his arraignment before a mixed British and native tribunal in 1875. The court was divided in opinion as to his guilt, but the British government deposed the Guicowar for his obvious misrule.

BARO'METER (Gr. *baros*, weight; *metron*, a measure), an instrument for measuring the weight or pressure of the atmosphere. The term is generally understood to refer to one in which the measure is the height of a column of liquid sustained by atmospheric pressure. The fundamental principle of the construction of the B. is the best shown in the experiment which led Torricelli to the first discovery of the pressure of the air. A glass tube, about 33 inches in length, open at one end, is completely filled with mercury, and, being firmly closed by the thumb, is inverted and placed vertically in a cup containing mercury. When the thumb is removed, the mercury sinks in the tube till it stands, generally about 30 inches above the level of the mercury in the cup, leaving in the upper part a space free of air, which receives the name of the Torricellian vacuum (fig. 1). The mercury within the tube being thus removed from the pressure of the air, while that in the cup is exposed to it, the column falls, till the pressure

at the section of the whole, in the same plane as the surface of the mercury in the cup, is the same within and without the tube. A similar experiment is seen when, in a U-shaped tube, having one branch much wider than the other, a column of mercury in the narrow branch balances a column of water nearly 14 times as high in the other. In the Torricellian experiment, we have the air and the space occupied by it taking the place of the wide water branch of the U-shaped tube, and the glass tube and the mercury forming the narrow branch, as before; the narrow branch, however, in this case being closed above, to prevent the air from filling, as it were, both branches. In both cases, the heights of the columns are inversely as the specific gravities of the liquids of which they consist; and as air is about 10,000 times lighter than mercury, we should have the aërial column 10,000 times 30 inches high. It will be found, under ATMOSPHERE, that from the air lessening in density as it ascends, the height is considerably greater. Any changes that take place in the height or density of the aërial column will be met by corresponding changes in the height of the mercurial column, so that as the latter rises or falls, the former increases or diminishes. We have, then, in this simple tube, an infallible index of the varying amount of atmospheric pressure, and, in fact, a perfect barometer. The changes, however, are indicated on a scale at least 10,000 times diminished, so that the variations in the tube show very considerable changes in the weight of the atmosphere. If water be used instead of mercury, the water column would be 14, or, more correctly, 13.6 times as high as the mercurial column, or about 34 feet; and the scale on which the changes take place would be correspondingly magnified, so that a water B. should be much more delicate than a mercurial one. Water is, however, exposed to this serious objection, that its vapor rises into the empty space above, and causes by its elasticity a depression of the column, the depressions being different for different temperatures. At zero, Fahrenheit, for instance, the depression thus arising would be $\frac{1}{4}$ an inch, and at 77°, more than 1 foot. It would be doubtful, likewise, at the time of any observation, whether the space referred to was filled with vapor of the elasticity corresponding to the observed external temperature or not, so that the necessary correction could not with certainty be made. The vapor of mercury, on the other hand, at 77° F.—a temperature considerably above the average—produces in the B. a depression of only $\frac{1}{1250}$ of an inch, an amount practically inappreciable. After 200 years of experience and invention, we have yet no better index of the pressure of the atmosphere than the simple mercurial column of Torricelli, and in all exact observations it is taken as the only reliable standard.

Simple as the B. is, its construction demands considerable care and experience. It is of the first importance that the mercury to be used is chemically pure, otherwise its fluidity is impaired, and the inside of the tube becomes coated with impurities in such a way as to render correct observation impossible. Mercury as usually sold, is not pure; and before being employed for barometers, must be shaken well with highly dilute but pure nitric acid, to remove extraneous metals and oxides. The same object is effected more thoroughly by keeping it several weeks in contact with the dilute acid, stirring every now and then. After either process, the metal must be thoroughly washed with distilled water, and dried. In filling the tube, it is essentially necessary to get the column free from air and moisture. To effect this, the



Figs. 1, 2. 4, 6, 7.

mercury, after filling, is boiled in the tube, so that air and moisture may be expelled, partly by the heat, and partly by the vapor of the mercury. This process demands great experience and skill, but the same end may be more easily and as effectually attained by boiling the mercury, in the first instance, in an atmosphere of carbonic acid, and then pouring it into the previously heated tube by a filler reaching to the bottom of it. Such care is only expended on the best instruments; ordinary weather-glasses, not needing to be quite accurate, are more simply filled. Notwithstanding all these precautions, minute bubbles of air manage

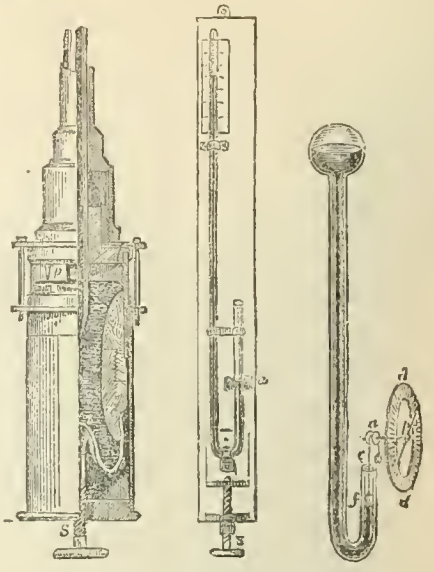


Fig. 3. Fig. 5. Fig. 8.

to keep secreted, and creep up in the course of time into the Torricellian vacuum. To obviate this risk of error, an air-trap is recommended by which any air that may accidentally find its way into the tube is arrested in its ascent to the top, and the instrument sustains no damage from the accident.

Barometers are generally divided into two classes—cistern barometers, and siphon barometers. The simplest form of the cistern B. is that shown in fig. 1, which only requires to be set properly in a frame, and provided with a scale, to make it complete. Fig. 2, presents another form of that class, being that generally seen in weather-glasses or ordinary barometers. The tube is bent at the bottom, and the cistern is merely an expansion of the lower end. Very generally, the cistern is hidden from view, and protected from injury by a wooden cover in front. There are two causes of inaccuracy in cistern barometers—one being the capillarity, which tends to lower the column; and the other being the difference of level in the cistern caused by the fluctuations in the tube, which renders the readings on the fixed scale above at one time too great, and at another too small, according as this level rises above or falls below the original level from which the scale was measured.

The effect of capillarity may be avoided by using tubes of more than half an inch in bore, in which the depression becomes so small, that it may be left out of account; and in smaller tubes it may be estimated from tables constructed for the purpose. Wide tubes have the additional advantage, that atmospheric changes are seen earlier in them than in narrow tubes, there being less friction in the former than in the latter. It is worthy of notice, that the capillary depression is less in boiled than in unboiled tubes, in consequence of the admixture of a minute quantity of the oxide of mercury, formed in the process of boiling, which lessens the repulsion between the mercury and glass. With reference to the error of level, it must be borne in mind that the height of the column sustained by the atmosphere is always to be reckoned from the lower level. This error becomes all the less the larger the capacity of the cistern is compared with that of the tube, for then a very considerable rise or fall in the tube, when spread over the surface of the cistern, makes only a slight difference of level in it. Care must be taken, then, in ordinary barometers, to make the cistern as large as possible. The only B. in which the error of level is completely obviated, is that invented by Fortin, which, from its being in every respect the most perfect cistern B., deserves particular notice. The cistern, and the lower portion of the tube of this B., is shown in fig. 3. The cistern is made of boxwood, with a movable leather bottom, *bb*, and a glass cylinder is inserted into it above, all except the glass being encased in brass. In the bottom of the brass box a screw works on the upper end of which the leather rests, so that by the sending in or taking out of the screw, the bottom of the cistern, and with it the cistern level of the mercury, can be raised or depressed at will. A small ivory pin, *p*, ending in a fine point, is fixed to the upper frame of the cistern; and when an observation is made, the sur-

face of the mercury is made to coincide with the point of the pin as the standard level from which the barometric column is to be measured.

The tube of the B.—the upper part of which is shown in fig. 4—is enclosed in one of brass, which has two directly opposite slits in it for showing the height of the column, and on the sides of these the graduation is marked. A brass collar, *cc*, slides upon the tube with a vernier (q. v.), *vv*, marked on it for reading the height with the greatest exactness, and in which two oblong holes are cut, a little wider than the slits in the brass tube. When a reading is taken, the collar is so placed that the last streak of light is cut off by the two upper edges of the holes, or until they form a tangent to the convex mercurial curve. By this means, the observer is sure that his eye is on a level with the top of the column, and that the reading is taken exactly for this point. This is the contrivance usually adopted to prevent the error of parallax, or that caused by the eye being slightly above or below the top of the column, by which the scale and the top of the column are projected too high or too low, the one upon the other, as the case may be. The only other arrangement worthy of mention for effecting the same object is that by Weber, who etches the scale on a piece of silverized glass placed over one side of the tube; and when—the mirror and tube being vertical—the image of the eye appears along with the vertex of the column, the eye is in the same horizontal line with it. Fortin's B. is generally arranged so as to be portable, in which case the screw, *s*, is sent in until the mercury fills the whole cistern, by which the air is kept from entering the tube during transport, the leather yielding sufficiently at the same time to allow for expansion from increase of temperature. It packs in a case, which serves as a tripod when the instrument is mounted for use. On this tripod it is suspended about the middle, swinging upon two axes at right angles to each other, so that the cistern may act the part of a plummet in keeping the tube vertical—the position essential to all correct measurements.

The siphon B. consists of a tube bent in the form of a siphon, having the same diameter at the lower as at the upper end. Fig. 5 represents a simple form of it. The tube travels along the board on which it is placed by passing easily through fixed rings or collars of brass. A scale, divided in inches and parts of an inch, is fixed on the upper part of the board; and when an observation is taken, the tube is adjusted by the screw, *s*, working below it, so that the top of the lower mercurial column may be on a level with the fixed mark, *a*, which is the point from which the fixed scale is measured. In the best forms of the siphon B., both tube and scale are fixed, the latter being graduated upwards and downwards from a zero-point near the middle of the tube, and the height of the column is ascertained by adding the distances from it of the upper and lower levels. The siphon B. is in many respects a more perfect instrument than the cistern barometer. In the first place, the bore at the upper and lower ends of the tube being the same, the depression arising from capillarity is alike for both, and the error from this cause disappears in taking the difference of the heights. In the second place, since the final reading is got from a reference to both upper and lower surfaces, the error in the cistern B. produced by the different capacities of the tube and cistern, is effectually avoided. On the other hand, the taking of two readings, one for each column, is a serious addition to the labor of observation. Gay-Lussac's siphon B. (fig. 6) is bent near the bottom so as to allow of the lower branch being placed in the same straight line as the upper one—a position highly favorable to accurate observation. When constructed for transport, the tube at the bend is narrowed, as in the figure, to a capillary width, which effectually excludes the air; and when the tube is inverted (fig. 7), being the position in which it is carried, the mercury is nearly all held in the longer branch. Such a tube when mounted, like Fortin's B., makes an excellent traveling instrument, and is comparatively light, from the small quantity of mercury it contains. See ANEROID BAROMETER.

The wheel B., originally invented by Hook, and generally seen as a parlor ornament, has little to recommend it as a trustworthy instrument. Fig. 8 shows the main features of this construction. It is essentially an ordinary B. like the siphon B. below, but having a cistern above, to increase the amount of variation in the lower branch. A small piece of iron or glass, *f*, floats on the open surface, and a thread is attached to it, and passed over a small wheel, *a*, fixed to a horizontal axis, to which it is kept tight by a small weight, *c*, hanging at the other end. A pointer, *p*, is fixed to the other extremity of the horizontal axis, which moves to the right or left of the dial, *dd*, according as the mercury falls or rises in the lower branch. The great sweep which the index takes, as compared with the comparatively minute variations of the mercurial column, is the only merit of this instrument. It is easy to see, that with so much intervening between the mercury and the index, the chances of error from friction and other causes are very considerable.

The correction of the B. for temperature is of importance. Mercury expands $\frac{1}{5555}$ of its bulk for every degree of Fahrenheit's thermometer; consequently, a column of 30 inches at 32° F., or the freezing-point, would, at 65° F., for instance, be $\frac{5555-33}{5555}$ times 30 inches, or nearly $\frac{1}{10}$ of an inch longer, for 30 $\frac{1}{10}$ inches of mercury at 60° produce the same pressure as 30 inches of it at 32°. In order, therefore, that all observations may be compared correctly with each other, the observed heights are reduced to what they would be at 32° F. as a standard temperature. The rule for reduction is very simple: Multiply the number of degrees above or below 32° F. by the observed height, divide the product by 9990, and substract or add the quotient from or to the observed height for the reduced height. Tables for this purpose have been published by the Royal Society, from which the corrections are found at once.

The variations of the B. are found to be both periodical and irregular. Periodical variations are those taking place at stated and regular intervals, and irregular, such as have no regular period of recurrence. The only truly periodical variation is the daily one, which varies from 0·150 to 0·001 inch. In most regions of the globe there is also a well-marked annual variation, widely different for different regions. Accidental variations have a range of about 3 inches. See ATMOSPHERE.

The uses of the B. may be classified into physical, hypsometrical, and meteorological. It is of essential use in all physical researches where the mechanical, optical, acoustical, and chemical properties of air or other gases are dependent on the pressure of the atmosphere. Its use in hypsometry, or the art of measuring the heights of mountains, is very valuable. When a B. is at the foot of a mountain, the pressure it sustains is greater than that which it experiences at the top by the weight of the column of air intervening between the top and bottom. A formula of considerable complexity is given by mathematicians for finding very nearly the true height of a mountain from barometrical and thermometrical observations made at its base and summit, the interpretation of which does not come within the compass of this work. The following rules give very nearly the same result: 1. Reduce the mercurial heights at both stations to 32° F. 2. Take the logarithms of the corrected heights, subtract them, and multiply the result by 10,000, to give the approximate height in fathoms of the upper above the lower station. 3. Take the mean of the temperature at both stations, take the difference between this mean and 32, multiply the difference by the approximate height, and divide the product by 435. This last result is to be added to the approximate height, if the mean temperature is above 32, and subtracted, if below, to find the true height in fathoms. A Fortin's or Gay-Luzzac's B. is employed in measuring heights.

The best known use of the B. is as a meteorological instrument, or as a weather-glass. Opticians have attached to certain heights of the B. certain states of weather, and at certain points of the scale the words 'Rain,' 'Changeable,' 'Fair,' &c., are marked; but the connection thus instituted is very misleading. Those who have observed most carefully the connection of barometric heights with changes of the weather, discard entirely the use of these terms, and state that it is not the actual height of the B. at any place, but this height as compared with that of surrounding regions which indicates the coming weather. Several elaborate codes of rules have been drawn up to serve as a key to the variations, but as these are more or less of a local character, they would be out of place here. Generally speaking, a falling B. indicates rain, a rising B., fair weather. A steady B. foretells a continuance of the weather at the time; when low, this is generally broken or bad, and when high, fair. A sudden fall usually precedes a storm, the violence of which is in proportion to the barometric gradient. An unsteady B. shows an unsettled state of weather; gradual changes, the approach of some permanent condition of it. The variations must also be interpreted with reference to the prevailing winds, each different wind having some peculiar rules. The connection between changes of weather and the pressure of the atmosphere is by no means well understood. One reason is given, which may to some extent account for the B. being lower in wet than in dry weather—viz., since, as has been shown by Dalton, moist air is lighter than dry air, wherever a large amount of aqueous vapor has displaced a part of the drier air, the barometric column will read relatively low. Hence much depends on the nature of the winds. The south and south-west winds, which are, in Western Europe, more than any other, the rain-bringing winds, are warm and moist winds. Now, a column of such air, to be of the same weight as one of cold dry air, must be higher; but this it cannot well be in the atmosphere, for no sooner does the warm moist column, by its lightness, rise above the surrounding level of the upper surface of the aërial ocean, than it flows over, and becomes nearly of the same height as the cold air around it. The interchange taking place less interruptedly, and consequently less slowly, in the higher strata than in those near the ground, it is some time before the equilibrium thus disturbed is restored, and meanwhile the B. keeps low under the pressure of a rarer atmospheric column. On the other hand, the northerly and easterly winds, being comparatively cold and dry, are accompanied with

fair weather and a high barometer. It is thus to the warmth, as well as to the moisture of these winds that the low pressure is to be ascribed.

Hence, then, the rain attendant on a low B., as well as the fine weather accompanying a high B., are the necessary concomitants of our geographical position—of our having the land to the east, and the ocean to the west of us. In Great Britain a high and rising B. frequently accompanies east winds with a drenching drizzle; and on the La Plata River, things are the reverse of what they are with us; there the cold south-east wind, coming from the ocean, brings rain with a high barometer, and the land winds warmed by the plains of South America, maintain fine weather with a low barometer. That the temperature, as well as the moisture of the air, is at least an important cause of the changes of the B., is also shown by the fact, that, in the tropics, where the variations of the temperature are slight compared with the temperate zones, the B. experiences almost no change. In Central Asia, the summer pressure is nearly an inch less than that of winter, and at Deniliquin, towards the interior of Australia, it amounts to 0·250 inch.

BA'ROMETZ, or Tartarian or Scythian Lamb, the prostrate stem (rhizome) of a fern (*Aspidium Barometz*) which grows in the salt-plains near the Caspian Sea. It is shaggy with a silky down, and has a sort of general resemblance to an animal. In the days of ignorant credulity, when the story of the phœnix was received as a truth of natural history, and barnacles were believed to grow into geese, and horses' hairs into eels, marvelous tales were told of the B., which was supposed to partake of the natures of a plant and an animal, to grow on a stalk, and eat grass like a lamb, &c. Erman (*Travels in Siberia*) supposes that the fables regarding the B. may have some connection with the cotton plant.

BA'RON. This term, as to the origin of which much difference of opinion exists, is probably derived from the Latin word *baro* (allied to *vir*, a man, a hero), which originally signified a stupid, brutal man, afterwards came to signify a man simply, and latterly, by one of those strange transmutations which are not uncommon in language, a man pre-eminently, or a person of distinction. Teutonic, Celtic, and even Hebrew derivations have also been assigned to the word; but the fact of its having been introduced into this country by the Normans, seems in favor of a Romanic origin. It is now the title which we apply to the lowest degree of hereditary nobility. The degree of B. forms a species of landing-place, corresponding amongst noblemen, in a certain sense, to that of gentleman, at a lower stage of the social pyramid. It was in this sense that the word was used in former times to include the whole nobility of England, because all noblemen were barons, whatever might be the higher ranks in the peerage which they occupied. The word peer has recently come to be used with the same signification, perhaps because it is no longer necessarily the case that every nobleman should be a B., there being instances in which earldoms and other honors have been given without a barony being attached to them, and in which the barony has been separated from the higher degree by following a different order of descent. The general theory of the constitution, however, still is, that it is as barons that all the peers sit in the upper house; and it is on this ground that the archbishops and bishops are said to sit in virtue of their baronies. The distinction into *greater* and *lesser* barons seems from an early period to have obtained in most of the countries of Europe. The greater barons, who were the king's chief tenants, held their lands directly, or *in capite*, as it was called, of the crown; whilst the lesser held the greater by the tenure of military service. The greater barons, who corresponded to the *Freiherren* (free lords) of Germany, had a perpetual summons to attend the great councils of the nation; whereas the latter were summoned only in case of their lands embracing a certain extent, which in England was thirteen knights' fees and a quarter. See KNIGHT'S FEE. When the representation of the middle class in England came to be confined to the knights of the shire and burgesses of towns, the minor barons ceased to receive the royal summons, and by degrees the title B. came to be applied to the greater barons, or lords of parliament, as they were called, exclusively. For an account of the barons of England immediately after the Conquest, and of the lands which they held, see DOOMSDAY-BOOK. The habit of conferring the rank of B. by letters-patent, by which it was converted into a mere title of honor, apart from the possession of landed property or of territorial jurisdiction, was first introduced by King Richard II., who, in 1388, created John Beauchamp, of Holt Castle, B. of Kidderminster. In Germany, the old barons of the empire were for the most part raised to the dignity of *grafs* (counts) and princes; whilst the lesser, in place of passing into the ranks of the untitled gentry, as in England, constituted a grade of the lower nobility, to which no duties were assigned, and scarcely any political privileges belonged.

When a B. is summoned to the House of Lords by writ, a letter, in the sovereign's name, directs him to repair to the parliament, to be holden at a specified time and place, to advise with his sovereign, the prelates, and nobles, about the weighty affairs of the nation. On the arrival of the new peer, he is presented by two barons to the lord-chancellor, his patent or writ being carried by a king-at-arms. This having been read by the chancellor, he congratulates him on becoming a member of the House of Peers, and invests him with his robe. The oaths are then administered by the clerk of parliament, and the new B. is conducted to a seat on the barons' bench. In addition to barons by writ and barons by patent, barons by prescription are usually mentioned, but incorrectly according to Blackstone, who remarks that 'those who claim by prescription must suppose either a writ or patent made to their ancestors, though by length of time it is lost.' (Kerr's Ed., vol. i. p. 406.) There are some distinctions between a creation by writ and by patent which ought to be mentioned. 'The creation by writ,' says Blackstone, 'is the more ancient way, but a man is not ennobled thereby, unless he actually takes his seat in the House of Lords; and some are of opinion that there must be at least two writs of summons, and a sitting in two distinct parliaments, to evidence an hereditary barony.' In consequence of the inconvenience thus attending it, the creation by writ may now be considered as obsolete, although the eldest son of a peer is still frequently called up to parliament by means of it, there being in that case no danger of the children losing their nobility even should their father never take his seat. But though creation by patent is thus in general the surest way of insuring the hereditary character of the peerage, it labors under one disadvantage as compared with a creation by writ—viz., that whereas in the latter case the dignity once insured by possession, passes to the heirs of the holder without any words to that purpose, in the former there must be words to direct the inheritance, else the dignity endures only to the grantee for life. Where the patent, again in place of being silent as to the succession, expressly sets forth that the dignity is for life merely, it was held, in the Wensleydale case, that it does not make the grantee a lord of parliament at all.

The coronation and parliamentary robes of a B. differ very slightly from those of an earl. The right of wearing a coronet was conferred on barons for the first time by King Charles II.; their head-dress till then having consisted of a cap of crimson velvet, lined with ermine, and having a plain gold band. A baron's coronet is adorned with six pearls, set at equal distances on the chaplet. Coronets are worn only on great occasions of state ceremonial. In ordinary garb, there is nothing to distinguish a B. from a commoner. A B. has the title of 'Right Honorable Lord,' &c., and is addressed as 'My Lord,' or 'Your Lordship.' His wife has also the title of 'Right Honorable,' and is addressed as 'Madam,' or 'Your Ladyship.' A B., in signing, sinks his Christian and family surname, and subscribes his titular designation. His children enjoy the prefix of Honorable, as the 'Honorable'—mentioning Christian and surname. In literature and conversation, a deceased B. is referred to by his Christian name, according to his number in the list of peers of the same title, as 'Henry, eighth baron.'—The Barons of Exchequer (q. v.) and of the Cinque Ports (q. v) are examples still existing of the ancient barons by office.

Baron's Coronet.

In the United Kingdon, there are persons who possess the title of B. imparted by some foreign power; as, for example, 'Baron Rothschild.' No such honor can be legally enjoyed without the consent of the sovereign; but at best the title is only honorary, and communicates no special privileges. A good article on the Baronage will be found in the *Cyclopædia of Political Knowledge*, published by Bohn, London, 1853. See PEER.

BA'RON AND FEME, or FEMME. These are two Norman-French words used in English law-books to denominate HUSBAND AND WIFE (q. v.); and see MARRIAGE.

BA'RON AND FEMME, in Heraldry, is the expression used to designate the bearing by which the arms of husband and wife are carried per pale, or marshalled side by side on the same shield. The husband's arms are always carried on the dexter side. Where the wife is an heiress—i. e., the representative of her father's house—her husband carries her arms, not *per pale*, but in a shield of pretence; and they are quartered with the paternal coat by the issue of the marriage.

BA'RON OF BEEF, a large piece of beef, consisting of both sides of the back, or a double sirloin, and weighing, according to the size of the animal, from 50 to 100 lbs. This monstrously large piece of beef, roasted, is served only on particular festive occasions at the English court, and at great public entertainments. When served according to ancient custom at civic feasts at Guildhall, London, the B 's honored with a distinguished place on a kind of elevated rostrum, where it is ceremoniously carved for the assembled guests. The term B. probably originated in a fanciful allusion to the word sirloin; inasmuch as a *baron* is superior in rank to a *sir*.

BA'RONET. This title, which is the diminutive of baron, is the lowest degree of hereditary honor in the United Kingdom.

Baronets were instituted, for the first time, by King James I., on the 22d May, 1611. The ostensible object was to promote the plantation of Ulster, in Ireland, with English and Scottish settlers; but the real aim was to raise money. Each B. was bound to maintain 30 soldiers in Ireland for 3 years, at the rate of 8*d.* per diem for each man; the wages of one whole year to be paid into the exchequer on the passing of the patent. The sum thus exacted, with the fees of honor due to the officers, amounted to upwards of £1000 on each patent. It is a striking proof of the passion for hereditary distinction, that 200 persons were willing to accept the honor on such terms. It was part of the bargain that no title should be created between a B. and a baron, and that the number of the former should be permitted to diminish as the families of the original 200 died out, thus enhancing the value of the title to those that remained. But the latter stipulation was very speedily departed from, and a new commission was appointed to fill up the vacant places, and even to treat with new applicants. Such was the origin of English baronets. From the date of the Union, in 1707, those created in England and Scotland were baronets of Great Britain. Irish baronets were created until 1800, since which period all baronetcies are of the United Kingdom. There is no limit to the creation of baronets but the will of the sovereign. At investiture there is no ceremony. The rank is communicated by patent or writ, issued under authority of the crown; the fees of office being considerable. There are differences in the terms on which the honor descends (suggested, perhaps, by the recipient according to family circumstances). Sometimes, according to the patent, the rank is confined to direct heirs-male; sometimes it embraces heirs-male collateral; and sometimes, in default of direct male heirs, it passes to the husbands of heirs-female. For the style and privileges of Baronets, in matters of ceremony, see Burke's *Peerage and Baronetage*. Baronets have precedence of all knights, except those of the Garter, bannerets made under the royal banner in open war, and privy-councillors. They are entitled to have *Sir* prefixed to their name, along with B. as an affix. The wife of a B. is legally styled *Dame;* but in common speech she is called Lady, and addressed as 'Your Ladyship.' The rank of B. does not raise a person above the degree of commoner; but many baronetcies have, in course of time, been heritably acquired by peers, which lessens the ostensible number.

Baronets of Scotland and Nova Scotia originated in a project of James I.; but were not instituted till 1625, by Charles I. The professed object was to encourage the settlement of Nova Scotia in North America; and a grant of a certain portion of land in that province, to be held of Sir William Alexander, afterwards Earl of Stirling, who was then his majesty's lieutenant in Nova Scotia, actually accompanied the title—the grants of land being of course illusory, for their very designations was a fiction. The first person who received the honor of a Nova Scotian baronetcy was Robert Gordon of Gordonstone, a younger son of the Earl of Sutherland, whose patent bears date May 28, 1625. There are no new additions to this branch of the baronetage; the latest creation having been in 1707, the year of the Union of Scotland and England. In point of title and popular recognition, there is no distinction between these and other baronets.

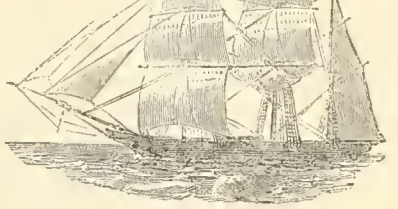
BARO'NIUS, CÆSAR, an eminent Roman Catholic ecclesiastical historian, born at Sora, in Naples, on the 30th October 1538, and educated at Naples and Rome. He was one of the first pupils of St. Philip Neri, who founded the congregation of the Oratory, of which B. became superior in 1593. He soon after became Father Confessor to the Pope, Apostolical Prothonotary, and finally, in 1596, Cardinal, and Librarian of the Vatican Library. On the death of Clement VIII., in 1605, 30 voted in conclave for the election of B. as Pope; and but for the opposition of the Spaniards, who were indignant at him for his treatise *De Monarchia Siciliæ*, in which he argued against Spain's claim to that country, he might have been elected. The controversy against the work called the *Magdeburg Centuries* (q. v.), which had already been weakly attempted by Muzio in 1570, seemed at that time the most important undertaking for the learning of the Church of Rome. B. entered upon this controversy with great energy and in a position most favorable for access to authorities, composing his *Annales Ecclesiastici a Christo nato ad ann.* 1198 (12 vols., Rome, 1588—1607), in which work he labored till his death, 30th May 1607. As his object was to prove that the Church of Rome has not departed in doctrine or constitution from the Christian Church of the 1st c., B. has been accused of not using his authorities according to their proper historical sense, but artfully concealing, obscuring, and falsifying many things—sometimes, perhaps, from ignorance of the Greek, but more frequently with design. His *Annals* have been frequently reprinted, but the reprints are often incorrect and incomplete. The most recent, provided with copious notes, &c., and containing Pagi's *Critical Examination* and Rinaldi's continuation, although not yet entirely correct, is the edition of Mansi (43 vols., 1738—1757). The *Critica in Annales Ecclesiasticos Baronii* of Anthony Pagi, the Franciscan (4 vols., Antwerp, 1705, improved by Francis Pagi, Antwerp, 1724), corrects B. in many points, especially of chronology. Among the continuations of the *Annals*, all of which are inferior in value to the work itself, the most rich in matter are that of Bzovius, extending to 1572 (9 vols., Rome, 1616—1672), and that of Rinaldi (10 vols., Rome, 1646—1677), who availed himself of the materials left by B., for the period from 1198 to 1571. Amongst the other works of B., his publication of the *Martyrologium Romanum* deserves to be noticed (Rome, 1586, and repeatedly).

BA'RONS OF THE EXCHE'QUER. See EXCHEQUER, COURT OF; COMMON LAW; COMMON LAW, COURTS OF; REVENUE.

BA'RONY is, or, it may rather be said, was a manorial and hereditary right arising out of land, known to the law both of England and Scotland. In England, manors were formerly called baronies. In the Scotch law, a right of B. is a right in relation to lands which have been erected, or at least confirmed by a clause in crown-charters making the grant *in liberam baroniam*, as it is called; and by the crown alone could such a right be conferred. It involved a civil and criminal jurisdiction to which, in theory, all the inhabitants of the B. lands were amenable. But such jurisdiction has, by modern legislation, been so limited and obstructed as scarcely ever to be exercised; and, indeed, in regard to the right of B. itself, the clause in crown-charters erecting baronies has, since the abolition of heritable jurisdictions by the 20th Geo. II. c. 43, became obsolete. But they are permitted on the sea-coast for encouragement of fisheries, and the bailies thereof (see BAILIE) are to have the powers of justices of the peace. In England, the lord or baron of the manor may hold his COURT BARON (q. v.; see also MANOR). For the B. in Ireland, see LOCAL GOVERNMENT.

BARO'SMA. See BUCKU.

BARQUE, or BARK, is a name frequently given to ships, but with no very definite meaning. Sometimes it denotes simply a ship of small size; sometimes a broad-sterned vessel without a



Barque.

figure-head; but more technically it applies to three-masted vessels whose mizzen-sails are fore-and-aft instead of being square. An *armed B.* is one variety of a special sort of vessel noticed in another article. See ARMED SHIP.

BARQUESIME'TO, a city of Venezuela, the capital of a province of the same name, situated on an affluent of the Portuguesa, in a high plain, 156 miles west-south-west from Caraccas. B. was founded by the Spaniards in 1552; and in the beginning of the 19th c. was a flourishing town, with straight wide streets and some fine buildings, the pop. about 15,000; but in 1802, it was almost totally destroyed by an earthquake. The existing town has been mostly built from the ruins. The pop. is supposed to be about 12,000.—The province of Barquesimeto extends along the coast of the Caribbean Sea, contains an area of 9305 sq. m., and a pop. of about 313,000. Wheat, maize, coffee, cacao, indigo, and cattle are its principal products.

BARR, or BA'RRA, a petty Mandingo kingdom of Western Africa, at the mouth of the Gambia, with an estimated area of about 250 square leagues, and a population of 200,000, the males being remarkable for their fine proportions. The surface, which is fertile, but rather marshy, is well cultivated.

BA'RRA, a pleasant suburban town about 3 miles east of Naples, with a population of 9000. It has numerous fine country residences.

BA'RRA, a small island near the south extremity of the Hebrides, Scotland, belonging to Inverness-shire, and 42 miles west of Ardnamurchan Point; lat. of Barra-head, 56° 48′ N., long. 7° 38′ W. It is 8 miles long, and 2 to 4 broad, with deep inlets of the sea. A low sandy isthmus, over which the sea nearly breaks at high water, connects the two parts into which B. is divided. The south or larger part contains a rocky mountain, 2000 feet high, and is divided into small valleys. The island is formed of gneiss. The soil is sandy, but sheep and cattle are fed on the hill and meadow pastures. Pop. (1881) 1869, chiefly Roman Catholics, speaking Gaelic

with great purity; and among the most industrious of Scottish fishermen. Their boats are sharp fore and aft, and are built by the fishermen themselves, who engage extensively in the cod, ling, herring, and shell-fish fisheries. 200 horse-loads of shell-fish (cockles, limpets, mussels, razor-fish, lobsters, crabs) have been taken off the sands in one day during the summer spring-tides. The light-house on Barrahead, the loftiest in Britain, is 680 feet above the sea, and is seen 33 m. off.—The parish includes several smaller islands, the total pop. of the group in 1871 being 1753.

BARRACKPO'RE, a native town and military cantonment on the E. bank of the Hoogly, and 16 m. up the stream from Calcutta. Pop. (1872) 9591. From the salubrity of its air, B. is a favorite retreat for Europeans from Calcutta, the govenor-general having here his country residence. In fact, B. appears to have long enjoyed this kind of distinction; Mr. Job Charnock, the founder of Calcutta, having erected a bungalow here as far back as 1689. In 1857, B. became famous as the cradle of the formidable mutiny or rebellion of that year. Several regiments of native troops were stationed at Barrackpore. The men objected to bite off the ends of the cartridges for the Enfield rifle, believing the paper to be polluted by animal fat. The troubles connected herewith—a mere prelude to the fatal outbreak at Meerut in May—commenced about the beginning of February, and continued to assume various degrees of intensity, till at last two regiments of Bengal native infantry had to be disbanded—the 19th, on 31st March; and the 34th, on 5th May. It was in the last-named corps that the first blood would appear to have been drawn, an intoxicated sepoy having attacked and wounded his officer, Lieut. Baugh, with sword and pistol. This fellow, whose name was Mungal Pandy, would seem to have had the equivocal honor of giving the local designation of Pandies to the entire body of insurgents.

BA'RRACKS are permanent structures for the accommodation of soldiers, as distinguished from huts and tents. Originally, the word, derived from the Spanish *barracas*, applied to small cabins or huts; but in England, the term is now always considered to relate to structures of brick or stone. Great opposition was made in this country to the introduction of permanent B. during the early part of the last century, on the ground that the liberty of the subject might possibly be endangered by thus separating the soldiery so completely from the citizens, and placing them in the hands of the ruling power. On the other hand, it was contended that the older system of billeting the soldiers on the people is vexatious and burdensome; and that the morals of towns-people and villagers are liable to be vitiated by the constant presence of soldiers. The permanent B. were few in number down to the year 1792, when George III. obtained the consent of parliament for the construction of several new ones, and for the founding of the office of barrack-master-general. Various changes in the arrangements were made from time to time. The expenditure for B., in building, rebuilding, enlarging, and repairing, between 1793 and 1804, was £4,100,000; between 1804 and 1819, £3,220,000; and between 1819 and 1859 (including Aldershott B.), upwards of £7,000,000. It was found that in 17 B., constructed between 1832 and 1857, the cost varied from £27 to £209 per soldier accommodated, according to the inclusion or exclusion of officers' quarters, &c. The funds provided for the construction and maintenance of B. in 1879–80 was £436,850.

The condition of British soldiers has, ever since the disasters in the Crimea in the winter of 1854, been an object of much public solicitude. This solicitude was so strongly expressed as to break through the cold formalities of the official departments. Returns were ordered, and commissions and committees appointed, partly to inquire into existing facts, partly to suggest improvements. The Barrack-master-General was replaced at the beginning of this century by Commissioners for Barracks, whose functions were absorbed by the now extinct Board of Ordnance in 1822. Barracks are now under the supervision of the Surveyor-General of the Ordnance, who provides for their construction and maintenance through the Royal Engineers; and for their victualling and daily service through Commissaries of the Control Department. Under these commissaries are barrack-clerks and barrack-sergeants, to assist them in the duties. The furniture of the B. is bought by the War Office. The French have a singular plan of *hiring* such furniture at 15 francs per man per annum; the English cost is about 25s. per man, and some of our officers are of opinion that it might with advantage be superseded by the French plan. The barrack-rooms have arm and accoutrement racks, shelves, and pegs; with a regular order for depositing everything thereon. During the day, all the bedding is placed in exact array; as well as dishes, tins, and canteens. A subaltern officer visits every room every day. The iron bedsteads are turned down every evening, and up every morning. One non-commissioned officer (sergeant or corporal) has control over each room, and is responsible for quiet, cleanliness, &c. Married women, in the rate of 6 to a company of 100 soldiers, may live in the B. with their husbands, in separate rooms known as 'Married Soldiers' Quarters,' but not unless the marriage has been with consent of the commanding officer. The married soldier may, however, sleep out of B., and is allowed an extra 2*d.* per day if he does so. Each soldier in a barrack has an iron bedstead, a rug, a paillasse, a bolster, two blankets, and two sheets; he pays nothing for these. Each soldier has his name and number written near his bed and knapsack.

Notwithstanding the order and regularity established in B., committees of inquiry appointed in 1855 and 1857 ascertained the existence of grievous defects. It was found that, out of the 252 B., only 20 had separate sleeping-rooms for married soldiers; the wives of such soldiers, in the other 232, being obliged to put up with arrangements repugnant to all decency and propriety, or else sleep away from the B. altogether.

In regard to sanitary arrangements, great efforts have been made at vast cost in recent years to improve all the hygienic conditions, such as drains, ventilation, means of ablution, recreation, circulation of air, &c. The result has been very apparent in the reduced rate of mortality. Army-physicians recommend 600 cubic feet of room-space per soldier; and this is the standard now demanded in all practicable cases by the War Office. It has been estimated that a new barrack for 1000 footguards in London would cost £150,000, *besides land*, the cost of which would depend wholly on the particular site selected. The necessity for grounds for exercises, stores, surgery, offices, &c., renders a barrack a very costly congeries of buildings. Twenty acres may be taken as the minimum space needed for 1000 men. In relation to all the various subjects of barrack-life, a committee of military officers has drawn up a most comprehensive scheme of reform; but unfortunately the cost of making these improvements would be so enormous, that nothing better than a very gradual adoption can be expected.

The finest existing B. in this country are perhaps those at Aldershott, attached to the camp noticed in another article. See ALDERSHOTT CAMP. The buildings extend in two long lines, branching out of the Farnborough and Farnham road, with a large parade-ground between them. The infantry and artillery B. are on the north side of this space, and the cavalry B. on the south. The infantry B. are divided into blocks, forming each a spacious quadrangle, with a courtyard in the center. Each block is a complete barrack for a full regiment, with all the men's rooms, storerooms, school-rooms, offices, &c. The officers' rooms are, however, separate, and occupy open spaces between the blocks of buildings. All the four sides of each quadrangle are occupied by various rooms and buildings; the men's living and sleeping rooms being mostly on the side next to the parade-ground. The sleeping rooms, each for 24 men, are very large and airy; the washing-rooms are ample and well fitted; and the cooking-rooms will each cook for 350 men. Dry play-grounds and drill-yards, under glass roofs, are provided. A broad balcony outside every range of sleeping-rooms enables the soldiers to look out upon these grounds. The married soldiers and their wives are comfortably provided for, in rooms wholly apart from the rest. The artillery and cavalry B. resemble in their general features those for the infantry.

By the Military Forces Localization Act of 1872, £3,500,000 was to be raised and expended in building and adapting barracks for the seventy sub-district brigades among which the infantry is now divided.

BARRACOON, the appellation given to a depôt for newly captured slaves on the coast of Africa, and where they remain under restraint until carried off by vessels in the slave-trade.

BARRA'DA, or BURA'DA, a river of Syria, which rising in lat. 33° 50' N., long, 36° E., flows in a south-south-east direction towards Damascus, above which it divides, one branch being diverted to irrigate the city and its gardens, while the other passes on the north side. The branches, which it is supposed were the *Pharpar* and *Abana* of Scripture, afterwards unite, and flow into the marshes and lake of Bahr-el-Merj.

BARRAFRA'NCA, a town of Sicily, in the province of Caltanisetta, about 10 miles south-east of the town of Caltanisetta, with a pop. of about 9000.

BARRA MA'NSA, a town of Brazil, in the province of Rio de Janeiro, and 70 miles north-west of the city of that name. It is situated on the right bank of the Parahiba. Pop. 6000.

BARRAS, PAUL-JEAN-FRANÇOIS-NICOLAS, COUNT DE, a distinguished character of the French Revolution, was born at Foy, in Provence, 30th June 1755. In his youth he served as a lieutenant against the British in India, and after his return home, wasted his property in Paris in dissipation. He eagerly joined the revolutionary party, and was a deputy of the *Tiers Etat* in the States-general in 1789. He was actively concerned in the storming of the Tuileries, was appointed administrator of the department of Var, and afterwards of the county of Nice. In the Convention, he voted for the execution of the king without delay or appeal, and on the 31st May 1793 declared against the Giron-

dists. The siege of Toulon, and triumph of the revolutionary party in the south of France, were in a great measure owing to his activity and energy; and after the victory, he was deeply concerned in all the bloody measures which were adopted. Yet he was hated by Robespierre and the Terrorists, as one of the less decided revolutionists; and their overthrow was accomplished mainly by him, the Convention appointing him commander-in-chief, and virtually investing him with the dictatorship for the time. While holding this high office, in which he acted with great decision and vigor, and on the same day on which Robespierre fell, he paid a visit to the Temple, and provided for the better treatment of the king's son; he hastened also to the Palais de Justice, and suspended the execution of a large number of persons who had been condemned to death. On subsequent occasions, he acted with decision both against the intrigues of the Royalists and the excesses of the Jacobins; and on 13th Vendémiaire (5th October 1795), being again appointed commander-in-chief by the Convention, he called his young friend Bonaparte to his aid, and crushed the sections with merciless discharges of artillery. The Directory being appointed in November 1795, B. was nominated one of the five members, and in this capacity he procured the nomination of Bonaparte as commander-in-chief of the army in Italy. It was he who arranged the marriage of Bonaparte with the widow Beauharnais. On the 18th Fructidor (see FRUCTIDOR, and FRANCE), he was again invested with the dictatorship, and was again victorious. His authority now became preponderant in the Directory, and he affected the pomp of a king, and began to give splendid entertainments in the palace of the Luxembourg. This continued for about two years till the decline of the power of the Directory. After 30th Prairial Sièyes and he had the whole executive power in their hands; and whilst B. secretly negotiated, it is said, with the Bourbon princes, demanding a large reward for their restoration, Sièyes, in secret understanding with Bonaparte, brought about the revolution of 18th Brumaire.

Notwithstanding the favors he had formerly conferred on Bonaparte, he was now, perhaps unavoidably, an object of suspicion to him, was compelled to remove from the neighborhood of Paris, resided in Brussels, then in Marseille, was banished to Rome, and thence sent to Montpellier, being kept under constant serveillance of the police, and actually found to have been engaged in conspiracies for the restoration of the Bourbons. After the Restoration, he returned to Paris, and purchased an estate in the neighborhood of it, where he died on 29th January 1829. He had acquired a considerable fortune in the Revolution. His Memoirs, which must be of historic importance, were seized by the government.

BA'RRATRY, COMMON, or, as it is called in old English law-books, *Barretry*, is the offence of inciting and stirring up suits and quarrels among the queen's subjects. *One* offensive act of the kind is not sufficient in order to maintain an indictment for this offence; but it must be shown that the party accused *frequently*, or at least on more than *one* occasion, conducted himself in the way imputed; and therefore the principle of the law appears to strike at the *habit* or *disposition* of evil-minded persons, who would incite to quarrelling, or busy-bodies, as they are in fact called in old law-reports; who, to use a familiar expression, 'set people by the ears.' This term is supposed by some to be derived from the French word *Barrateur*, which signifies a deceiver; by others, from the Latin word *Barratro*, a vile knave. Some, again, account for it by the suggestion that it is made up of *Barra*, the bars of courts of justice, and *Rettum*, an old word signifying an offence; while, by other antiquarian lawyers, it is supposed to have been borrowed from the Normans; the Anglo-Norman *baret* signifying a quarrel or contention. In old English indictments, charging this offence, the accused is not only described as *pacis domini regis perturbator*, but also *oppressor vicinorum suorum;* that is, he who is guilty of B., is not only a disturber of the public peace, but a nuisance to his neighbors. The punishment for this offence is fine and imprisonment; but if the offender belongs to the profession of the law, as is too frequently the case, he may besides be disabled from practising his profession for the future. And, indeed, it is the existing statute law of England, that if any one who has been convicted of B. shall practise as an attorney, solicitor, or agent in any suit, the court, upon complaint, shall examine the matter in a summary way; and if the fact of such conviction be proved, may direct such offending attorney, solicitor, or agent to be kept in penal servitude for not more than seven or less than three years.

Akin to this offence is another of equal malignity and mischief; namely, that of suing another in the name of a fictitious plaintiff. If committed in any of the superior courts, this offence is treated as a high contempt, punishable at discretion, and in inferior courts, by six months' imprisonment, and treble damages to the party injured.

B., in the sense above explained, is not a technical term in the law of Scotland. But in that system there is a word *Baratry*, which is defined as the crime committed by a judge who is induced by a bribe to pronounce a judgment, or who barters justice for money.

There is also *Baratry of Mariners*, which signifies—in the law not only of England and Scotland, but also of France and other European states—the fraud of the master or mariners of a ship tending to their own advantage, but to the prejudice of the owners. Such conduct, however, is one of those risks which are usually insured against in marine policies of insurance. See INSURANCE.

BA'RREL (It. *barile;* Fr. *baril* = *barrique*), primarily, a large vessel for holding liquids—probably from *bar*, in the sense of to guard, confine, contain—and then a certain *measure*, but varying in every locality, and almost for every liquid. In the old English measures, the barrel contained 31½ gallons of wine, 32 of ale, and 36 of beer—the wine gallon itself differing from that of ale and beer. In imperial gallons, their contents would be: old wine barrel = 26¼ gal.; ale do., 32½; beer, 36½. The Italian barile varies from 7 to 31 English gallons; the French barrique of Bordeaux = 228 French litres = 50 English gallons. Four barriques make a tonneau. In many cases, *B.* signifies a certain *weight* or other quantity of goods usually sold in casks called barrels. In America, flour and beef are sold on the large scale in barrels: a B. of flour must contain 196 lbs.; of beef, 200 lbs. A B. of butter = 224 lbs.; of soft soap, 256 lbs.; of tar, 26¼ gallons.

BA'RREL, GUN. The relation which the barrel of small-arms bear to the stock, lock, and other parts, is described in such articles as MUSKET, PISTOL, RIFLE, REVOLVER, BREECH-LOADING ARMS, &c.; but the remarkable process of manufacturing these barrels may be briefly noticed once for all.

The iron for all good musket-barrels contains a portion of steel, or undergoes some kind of steeling process. Horseshoe nails or stubs, after much violent usage, yield a very tough kind of iron when re-heated; and English gun-makers have been accustomed to buy such refuse on the continent; but the foreign makers now use the old nails themselves; and Birmingham has to rely mostly on various home supplies of old tough iron. The best barrels are now made in England of laminated, twisted, and Damascus steel.

To prepare *laminated steel*, Mr. Greener, a celebrated Birmingham gunsmith, collects scraps of saws, steel-pens, files, springs, and steel-tools, from the various workshops; cuts them into small and nearly equal pieces; cleans and polishes them by revolving in a cylinder; fuses them into a semifluid state; gathers them into a 'bloom' or mass; forges this bloom with a three-ton hammer; hardens and solidifies it with a tilt-hammer; rolls it into rods; cuts each rod into pieces six inches long; welds these pieces together; repeats the rolling, cutting, and welding several times; and thus, finally, brings the metal into a very hard, tough, fibrous, and uniform state. *Twisted steel* for barrels is made by taking thin plates of iron and steel, laying them alternately one on another in a pile, welding them by heat and hammering, and twisting them by very powerful mechanical agency, until there are twelve or fourteen complete turns to an inch; the length becomes reduced one-half, and the thickness doubled, by this twisting. *Damascus steel* barrels are made of steel which has undergone a still further series of welding and twisting operations. *Stub Damascus* barrels are made of a mixture of old files with old horse-nails; the files are heated, cooled in water, broken with hammers, and pounded in a mortar into small fragments; three parts of these fragments are mixed with five of stub; and the mixture is fused, forged, rolled, and twisted. An inferior kind of Damascus-twist is made by interlaying scraps of sheet-iron with charcoal, and producing an appearance of twist, but without the proper qualities. *Threepenny-skelp* and *Twopenny-skelp* are inferior kinds of barrel-iron; and the worst of all is *sham-dam skelp*, of which gun-barrels are made for hawking at a cheap price at country-fairs, and for barter with the natives of Africa and the backwoods and prairies of America.

The gun-barrel manufacture of England is now almost wholly conducted at Birmingham and at Enfield, very few barrels being made elsewhere. The best barrels are all twisted into form. The skelps, or long strips of prepared steel, are twisted into a close spiral a few inches long; several of these spirals are welded end to end; and the fissures are closed up by heating and hammering. The rough barrel, with a core or mandril temporarily thrust in it, is placed in a groove, and hammered cold until the metal becomes very dense, close, strong, and elastic. The interior is then bored truly cylindrical by a nicely-adjusted rotating cutting-tool. If, on narrow inspection, the interior is found to be straight and regular, the exterior is then ground on a rapidly revolving stone, and finally turned in a lathe. Commoner barrels are not twisted: the skelps are heated, laid in a semi-cylindrical groove, hammered till they assume the form of that groove, placed two and two together, and heated and hammered until one B. is made from the two halves. See PROOF OF FIRE-ARMS; and RIFLED ARMS.

Common barrels are browned externally with some kind of

chemical stain; but the best are rubbed with fine files, and polished with steel burnishers.

BA'RREL-BULK, a term denoting a measurement of 5 cubic feet, used chiefly in the coasting-trade.

BA'RREL-ORGAN, an Organ (q. v.) in which the music is produced by a barrel or cylinder, set with pins and staples, which, when driven round by the hand, opens the valves for admitting the wind to the pipes according to the notes of the music. The number of tunes that any one instrument can play is, of course, very limited. Barrel-organs are generally portable, and mostly used by street-musicians. A street-organ costs from £30 to £70, according to the size. The most perfect barrel-organs are those which are driven by a motive-power, of which the best are made in Vienna, and cost from £100 to £300. The Orchestrion, made by Kaufmann in Dresden, is a large self-acting barrel-organ.

BARRHEA'D, a town of recent growth in the east part of Renfrewshire, 6 miles south-west of Glasgow. It has cotton-mills, and bleaching and print works. Pop. (1871) 6209; (1881) 7495.

BARRICA'DES are defence-works employed both in the military and naval services. Military engineers, and sappers and miners, are instructed in the art of barricading streets and roads with beams, chains, *chevaux-de-frise*, and other obstacles, either in defending a town against besiegers, or in suppressing popular tumults. In a ship, a strong wooden rail, supported on stanchions, and extending across the foremost part of the quarter-deck, is called a barricade; during a naval action, the upper part of this barricade is sometimes stuffed with hammocks in a double rope-netting, to serve as a screen against the enemy's small-shot. B. have been made use of in street-fights since the middle ages, but they are best known in connection with the insurrections in the city of Paris. As early as 1358, the streets of Paris were barricaded against the Dauphin, afterwards Charles V. A more noteworthy barricade-fight was that of 1588, when 4000 Swiss soldiers, marched into Paris by Henry III. to overawe the Council of Sixteen, would have been utterly destroyed by the populace, firing from behind B., had the court not consented to negotiation; and the result was, that the king fled next day. The next barricade-fight of importance in Paris was that of 1830, which resulted in the expulsion of the Bourbons from the throne of France, and the election of the citizen king, Louis Philippe.

During the three days which this revolution lasted, the number of B. erected across the streets amounted to several thousands. They were formed of the most heterogeneous materials—overturned vehicles, trees, scaffolding-poles, planks, building-materials, and street paving-stones, men, women, and children, taking part in their erection. In February 1848, the insurrection against Louis Philippe commenced with the erection of B.; but the most celebrated and bloody barricade-fight was that between the populace and the Provisional Government, which, commenced on the night of the 23d June 1848, lasted throughout the three following days, when the people had to surrender. The national losses by this fight were estimated at 30,000,000 francs; 16,000 persons were killed and wounded, and 8000 taken prisoners. The Emperor Napoleon III. widened and macademized many of the principal streets of Paris, partly with the express purpose of rendering the successful erection of B. next to impossible. There was a remarkable barricade-erection in London in 1821. The ministry desired that the body of Queen Caroline should be conveyed out of the country to Germany, for interment, without the populace having the opportunity of making any demonstration. On the matter becoming known, a vast barricade was erected at the point where the Hampstead Road joins the New Road; and as nothing but the use of artillery could have forced the way, the officer in charge of the funeral cortege deemed it prudent to change his course, and pass through a more central part of the metropolis. During the revolutions of 1848, B. were successfully carried in Paris, Berlin, Vienna, and other places, by abandoning the attack in front, and breaking through the houses of contiguous streets, taking their defenders in the rear.

BA'RRIER ACT, the name commonly given to an act of the General Assembly of the Church of Scotland, 8th January 1697, intended as a barrier against innovations, and a hindrance to hasty legislation. It provides that no change can be made in the laws of the church without being submitted by that General Assembly which first approves it, to the consideration of all the presbyteries, and approved by a majority of them; after which it still remains to be considered by the next General Assembly, which then may or may not pass it into a law. The B. A. is regarded as of the greatest importance, both in the Established Church of Scotland, and in the Free Church. Analogous regulations have been adopted by other Presbyterian churches.

BA'RRIER REEF, an immense coral-reef extending along the north-east coast of Australia for nearly 1300 miles, at a distance from the shore of from 10 to upwards of 100 miles. The reef is, in general, precipitous, and in many places rises out of great depths, lines of 280 fathoms have failed to reach the bottom on the outer side. Formerly, ignorance of anything like its precise extent and character led to many shipwrecks; but within the last thirty years, it has been surveyed, and pretty accurately laid down on charts. In the course of its length there are several breaks or passages in it. In the voyage from Sydney to Torres Strait, the inner route is usually taken. It is narrow, and requires delicate steering; but it is safe, and not so much exposed as the outer route, which enters Torres Strait by Flinders Entrance.

BA'RRING OUT, a practice formerly very common in schools, but now almost, if not altogether, abandoned. It consists in the scholars taking possession of the school, and fastening the door against the master, at whose helplessness they scoffed from the windows. The usual time for B. O. was immediately prior to the periodical vacation. It seems to have been an understood rule in B. O., that if the scholars could sustain a siege against the master for three days, they were entitled to dictate terms to him regarding the number of holidays, hours of recreation, &c., for the ensuing year. If, on the other hand, the master succeeded in forcing an entry before the expiry of that period, the insurgents were entirely at his mercy. The masters, in most cases, appear to have acquiesced good-humoredly in the custom; but some chafed at it, and exerted their strength and their ingenuity to storm or surprise the garrison. Addison is said to have been the chief actor in a B. O. of the master of Litchfield. One remarkable and fatal case of B. O. occurred at the High School, Edinburgh, in September 1595. The scholars had to complain of an abridgment of their usual holidays by the town-council, who, on being remonstated with, refused, even though the claim was supported by the master, to grant more than three of the eight days which the boys demanded as their privilege. They, accordingly, took advantage of the master's temporary absence to lay in a store of provisions, and having done so, they barricaded the doors. The magistrates, the patrons of the school, in vain sought admission, the boys saying they would treat with their master only; and after a day and night had passed, it was resolved to force an entrance. The result was, that one of them, Bailie Macmoran, was shot dead on the spot by a scholar named Sinclair. The scholars of Whitton School, Cheshire, were directed by the statutes drawn up by the founder, Sir John Deane, to observe the practice: 'To the end that the schollars have not an evil opinion of the schoolmaster, nor the schoolmaster should not mistake the schollars for requiring of customs and orders, I will that upon Thursdays and Saturdays in the afternoons, and upon holidays, they refresh themselves—and a week before Christmas and Easter, *according to the old custom, they bar and keep forth the school the school-master, in such sort as other schollars do in great schools.*' This school was founded in 1558. See Brand's *Popular Antiquities*, Chambers's *Domestic Annals*, and Carlisle's *Endowed Grammar Schools*.

BARRINGTONIA'CEÆ, a natural order of exogenous trees and shrubs, natives of tropical countries, and generally very beautiful both in foliage and flowers. Few plants, indeed, exceed some of them in beauty. The stamens are very numerous, and form a very conspicuous part of the flower. The fruit is fleshy, with bony seeds lodged in pulp. That of some species is eaten, as *Careya arborea*, an Indian tree, the stringy bark of which is used in the countries along the foot of the Himalayas as a slow match for matchlock guns. Humboldt and Bonpland mention that children become quite yellow after eating the fruit of an American species, *Gustavia speciosa*, of which, however, they are very fond; but that this color disappears in a day or two. The MOORDILLA (*Barringtonia speciosa*) is described by Sir J. E. Tennent as a tree which much attracts the attention of travelers in Ceylon. It has dark, glossy leaves, and delicate crimson-tipped white flowers. 'The stamens, of which there are nearly 100 to each flower, when they fall to the ground, might almost be mistaken for painters' brushes.' Some botanists include this order in *Myrtaceæ* (q. v.).

BA'RRISTER, REVISING. See REVISING BARRISTER.

BA'RRISTERS, or BA'RRASTERS, as sometimes spelt in old books. This is the distinctive name by which the advocates or pleaders at the English and Irish bars are known; and thus its derivation is perhaps sufficiently accounted for. They are admitted to their office under the rules and regulations of the INNS OF COURT (q. v.), and they are entitled to exclusive audience in all the superior courts of law and equity, and generally in all courts civil and criminal, presided over by a superior judge. In the whole of the county courts, attorneys are allowed to practice without the assistance of counsel; also at petty sessions, though at the quarter sessions where four counsel attend, the justices always give them exclusive audience. In Scotland, the same body are styled ADVOCATES (q. v.), and they have the same exclusive privileges that B. enjoy in England and Ireland. These Scotch advocates, however, are members of the Faculty of Advocates, or Scotch Bar, properly so called, and are not to be confounded with the advocates who practice under that name in the town and

county of Aberdeen, and who, as explained in a former article, are merely country attorneys. See ATTORNEYS AND SOLICITORS.

Barristers were first styled *Apprentices*, who answered to the bachelors of the universities, as the state and degree of a serjeant did to that of a doctor. These apprentices or barristers seem to have been first appointed by an ordinance of King Edward I. in parliament in the twentieth year of his reign (Stephen's *Commentaries*, vol. i. p. 17, and authorities there referred to.) Of barristers there are various ranks and degrees, and among each other they take precedence accordingly; the general name, 'counsel,' being, in the practice of the court, common to them all. But they may be divided into three leading bodies. 1*st*, Barristers simply, or utter barristers, who occupy the position of junior counsel, wearing a plain stuff-gown and a short wig; 2*d*, *Serjeants-at-law*, a legal order of very ancient state and degree, and who are distinguished by the *coif* and other peculiarities (see SERJEANT-AT-LAW); and 3*d*, *Queen's Counsel*, of Her Majesty's Counsel learned in the law, as they are more formally called, and who may be selected either from the outer or junior bar, or from the serjeants. They may be described as the ordinary leaders of the bar, and are distinguished by a silk gown, and on state-occasions, and always in the House of Lords, they wear a full-bottomed wig. For further details, see QUEEN'S COUNSEL. Besides these three orders or gradations of rank at the English bar, the crown sometimes grants letters-patent of precedence to such barristers as Her Majesty may think proper to honor with that mark of distinction, whereby they are entitled to such rank and pre-audience as are assigned to them in their respective patents. See PRECEDENCE.

Thus constituted, the English bar perform their functions, enjoying many professional privileges and immunities, and a high social position. As we have before stated, they have exclusive audience in all the superior courts, where upon terms and conditions, and according to an etiquette, which are all well understood by attorneys or solicitors, they take upon themselves the protection and defence of any suitor, whether plaintiff or defendant. With the *brief* (q. v.), or other instructions, by means of which their professional services are retained, B. receive a *fee*, or such fee is endorsed on the brief or instructions, and afterwards paid. Such, generally, is the existing practice at the English bar, differing in this respect from the practice of the bar in Scotland—and, we believe, to a great extent in Ireland also—where *pre*-payment of the fee is the rigid etiquette. The amount of this fee in England depends, of course, on the nature of the business to be done, the time to be occupied, and the labor to be bestowed; and it is usually, especially in the case of leading counsel, a liberal sum. The barrister's fee, however, is not a matter of express contract or stipulation, recoverable at law like an attorney's bill of cost, but is regarded as a mere honorary reward—*quiddam honorarium*, as it is called in law-books. There is, therefore, no means of enforcing its payment, and indeed, in this respect, the barrister has nothing to rely upon but the honor and the good faith of those who employ him. Where, however, it can be proved that the client or party gave money to the solicitor or attorney, with which to fee the counsel, the latter may maintain an action against the former for the amount in some special cases.

In order to encourage due freedom of speech in the lawful defence of their clients, and, at the same time, to give a check to unseemly licentiousness, it has been held that a counsel is not answerable for any matter by him spoken, relative to the cause in hand, and suggested in his client's instructions, although it should reflect upon the reputation of another, and even prove absolutely groundless;* but if he mentions an untruth of his own invention, or even upon instructions, if it be impertinent to the cause in hand, he is then liable to an action from the party injured; and counsel guilty of deceit or collusion are punishable by the statute Westm. I. (3 Edw. I., c. 28) with imprisonment for a year and a day, and perpetual silence in the courts—a punishment which may be inflicted for gross misdemeanours in practice, although the course usually resorted to is for the Benchers of the Inn of Court, to which the person so offending belongs, to *disbar* him. See Stephen's *Commentary*, and Ker's *Blackstone*, and see BENCHERS and DISBAR.

But besides advocacy and forensic disputation, B. in England have other business to which they have extended their practice, to the great advantage of the public. This additional practice consists in advising on the law by their opinion on a case stated, by means of which harassing and fruitless litigation is often prevented (see OPINION OF COUNSEL); in drawing or preparing the pleadings or statement of facts on which an action or suit is founded (see PLEADING); and in preparing the drafts or scrolls of legal instruments, indentures, deeds, contracts, or other conveyances. See CONVEYANCING and CONVEYANCER. As a correlative privilege of the position in which they stand in respect of their fees, barristers are not personally liable for the injurious consequences of any erroneous advice they may give; and they claim absolute control over the conduct of all litigation in which they may be engaged, even to withdrawing it from court, unless the client expressly dissent; and until lately, it was the opinion of the profession that counsel might at any time, during the progress of a cause, compromise the matter in dispute; but the exercise of such discretion was successfully opposed in a recent case, and it is now admitted that B. have no *ex officio* privilege beyond the guidance and conduct of actual litigation in court.

It is from the body of B. that all the judges in England, superior and inferior, are appointed; and B. are also always chosen for the office of paid magistrate. The only exception to the exclusive appointment of B. to judicial offices, is the case of justices at petty and quarter sessions, chiefly a criminal jurisdiction, but which works well in practice, and has many claims to consideration. See QUARTER SESSIONS.

The bar in Ireland stands on the same footing, and has the same ranks and degrees, and is subject very much to the same rules and regulations, as the English bar; and in that country, barrister also is the name by which the profession of an advocate is distinguished. In Scotland, the same office is simply called by its own name of *Advocate*. See ADVOCATE, FACULTY OF.

At the bar of the House of Lords, and before parliament generally, before the privy-council, and also, it is believed, in all trials for high treason, whether in England, Ireland, or Scotland, the three bars rank on a footing of equality, taking precedence according to the date of their call and admission to their own respective bars, with the exception of those who are Queen's counsel, who recently have also been introduced into Scotland, and now are next in precedence to the Lord Advocate (see ADVOCATE, LORD), the *Solicitor-General of Scotland* (q. v.), and the *Dean of Faculty* (q. v.). It was at one time disputed between the Lord Advocate of Scotland and the Attorney-General of England, which of them should lead the other at the bar of the House of Lords; and a case occurred in 1834 in the House of Lords, before Lord Chancellor Brougham, in which very high pretensions were urged on behalf of both functionaries. These were the late Lord Chancellor Campbell as attorney-general, and the late Lord Jeffrey as lord advocate, who contended that as he was not only the first law-officer of the crown in Scotland, but also a high political officer, he was entitled to lead the former. But the House decided that the attorney-general of England has precedency over the Lord Advocate of Scotland, in all matters in which they may appear as counsel at their lordships' bar; and it is presumed that the same rule would be followed before parliament generally, the privy-council, and in all trials for high treason, whether in England, Ireland, or Scotland. The relative rank of the *Irish* law-officers to English is the same.

It only remains to be added, that as the three bars are on a footing of equality in the House of Lords, and the other imperial and supreme tribunals above mentioned, the English bar have no exclusive audience in these, even in English cases; but all causes whatever there, whether English, Irish, Scotch, or colonial may be equally and indiscriminately taken and advocated by English, Irish, or Scotch counsel.

BA'RROS, JOAO DE, the most distinguished of Portuguese historians, was born of an ancient and noble family at Viseu in 1496; became a page to King Emmanuel, and afterwards companion to the Crown Prince. He pursued his classical and other studies with great diligence, and wrote a historical romance in his 24th year, which attracted much admiration by the peculiar beauty of its style. Hereupon the king assigned him the task of writing the history of the Portuguese in India, which he undertook, but of which only the first three decades proceeded from his pen, under the title of *Asia Portugueza* (Lisb. 1552—1563); the continuation extending to twelve decades, was the work of Diego de Couto. (A new edition of the whole appeared at Lisbon, in 8 vols., in 1778—1788). B. was for some time governor of the Portuguese settlements in Guinea, and afterwards treasurer and general agent for the Indies. In 1539, the king bestowed on him the province of Maranhao in Brazil, that he might found a colony there; but he was obliged to renounce the enterprise after much loss. He died at his estate of Alitem on the 20th of October 1570.

BARRO'SA, a village of Spain 16 miles south-south-east of Cadiz, celebrated in history as the place where General Graham (afterwards Lord Lynedoch), in March 1811, with a handful of English troops, succeeded in gaining over the French, after his Spanish allies had retreated, one of the most glorious victories of the Peninsular campaign. More than 2000 French were killed and wounded (some authorities give nearly 3000 killed alone), 300 prisoners taken, 6 pieces of cannon, and an eagle—the first captured in the war.

BARROT, CAMILLE HYACINTHE ODILLON, a French jurist and statesman, son of a member of the Convention, and afterwards of the Council of Five Hundred, was born at Villeforte, Lozère, 19th of July 1791. In 1814, he became an advocate in the Court of Cassation, Paris, and soon acquired a high reputation as

* But the publication of the counsel's statement by a *third party* may expose such third party to an action.

an eloquent pleader. Entering the Chamber of Deputies young, he in time came to be regarded as one of the most influential of leaders of the liberal opposition. At the Revolution of 1830, he was one of the three commissioners appointed by the provisional government to accompany Charles X. from Rambouillet to Cherbourg on his embarkation for England. Under the new government he was appointed prefect of the department of the Seine; and in Lafayette's ministry, a member of the Council of State. In a few months, however, he resigned his office of prefect, and declined the post of ambassador at Constantinople, offered him by Louis Philippe. After Casimir Périer became minister, he lost also his place in the Council of State. He now began his opposition career in the Chamber of Deputies against the reactionary policy of the government, and became the rallying point for all who desired the carrying out of the principles of the July revolution. He essentially contributed to the removal of the Doctrinaires (q. v.) from office, in February, 1836, and energetically opposed the ministry of Molé, even supporting the Doctrinaires in accomplishing its overthrow, in January 1839. The same year he visited England and Scotland. When, in March 1840, Thiers was placed at the head of the government, B. for the first time declared himself in favor of the ministerial policy on the oriental question. On the return of Guizot to office in October following, his opposition to the government was renewed. Taking a conspicuous part in the Reform movement of 1847, he attended several of the provincial reform banquets, which led to the revolution of 1848. On the outbreak of the struggle of 23d February, when Louis Philippe called upon Thiers to form a new ministry, B. was appointed president. His advice to the king to withdraw his troops proved fatal to the throne of July. In the last sitting of the Chamber of Deputies, B. supported the claim of the Count de Paris to the throne, and the regency of the Duchess of Orleans. Under the Presidency of Louis Napoleon he was for some time a minister, and conducted the government with success till 1851, when he retired from active political life. He, however, took part in the conference in favor of Poland, held at Paris in 1864. In 1872, he was made a councillor of state and vice-president of the council. In his retirement he wrote a pamphlet *De la Centralisation et de ses Effets* (1861), &c. He died in 1873.

BA'RROW, a distinctive term applied to two prominent localities of the Arctic Ocean, in honor of the secretary to the Admiralty of the same name, the prime mover in the more recent era of northern discovery.—1. *Point B.*, in lat. 71° 23′ N., and long. 156° 31′ W., generally received as the most northerly spot on the American mainland; see, however, BELLOT STRAIT. From this circumstance, it has also been called *Cape North*—a designation inconveniently ambignous, as tending to confound this headland at once with Cape North in Asia, and with North Cape in Europe.—2. *Barrow Strait*, the earliest of Parry's discoveries, leading to the west out of Lancaster Sound, which Parry's immediate predecessor, Captain, afterwards Sir John Ross, had pronounced to be landlocked in that direction. Besides its main course, B. Strait throws off *Prince Regent's Inlet* to the south, and *Wellington Channel* to the north. The passage averages about 40 miles in breadth, extending, pretty nearly along the parallel of 74° N., from 84° to 90° W.

The interval between these two localities, thus spanning 66° of long. or at least 2000 miles, only one navigator has ever traversed —the indefatigable M'Clure, carrying his good ship, the *Investigator*, round Point B., and leaving her behind him only when almost in sight of B. Strait.

BA'RROW, a river in the south-east of Ireland. Of the Irish rivers, it is in importance next to the Shannon. It rises in the north of Queen's County, on the north-east slope of the Slieve Bloom ridge of mountains. It flows first east past Portarlington to the border of Kildare County, and then south between Queen's, Kilkenny, and Waterford counties on the west, and Kildare, Carlow, and Wexford counties on the east, passing the towns of Athy, Carlow, and New Ross. It has a course of 100 miles through a carboniferous, granitic, and silurian basin. Two miles above New Ross it receives the Nore (q. v.), and eight miles east of Waterford, it is joined by the Suir (q. v.). These three rivers (called the Three Sisters, from their rising in the same mountain-ridge, and joining near the sea, after flowing through different counties) form, near the sea, the large and secure estuary of Waterford harbor, 9 miles long. The B. is navigable for ships of 300 tons to New Ross, 25 miles up, and for barges to Athy, 65 miles up, whence the Grand Canal communicates with Dublin. The B., below Portarlington, falls 227 feet.

BA'RROW, ISAAC, an eminent English mathematician and divine, was born in 1630. He received his early education at the Charter-house, where he was distinguished chiefly by his negligence and pugnacity. At Felstead school, in Essex, to which he went next, he greatly improved; and in 1643, he was entered at Peter-house, Cambridge, under his uncle Isaac Barrow, then a fellow of that college, and finally bishop of St Asaph. On the ejection of his uncle in 1645, he removed to Trinity College, where he became B.A. in 1648, fellow in 1649, and M.A. in 1652. Finding that to be a good theologian he must know chronology, that chronology implies astronomy, and astronomy mathematics, he applied himself to the latter science with distinguished success. To the classics he had already devoted much study, and on the vacancy of the Greek chair, he was recommended for the office; but a suspicion of Arminianism interferred with his success. After this disappointment, he went abroad (1655), and traveled during four years through France and Italy, to Smyrna and Constantinople, back to Venice, and home through Germany and Holland. On the voyage from Leghorn to Smyrna, his determined personal courage seems to have been instrumental in scaring away an Algerine pirate, after a brisk exchange of shots. Soon after his return he took orders, and in the following year was appointed professor of Greek. The neglect with which he was treated after the Restoration is celebrated in his couplet addressed to the king—

> Te magis optavit redditurum, Carole, nemo,
> Et nemo sensit te redisse minus.

In 1662, he was appointed to the Gresham professorship of geometry, which, on his being appointed to the Lucasian professorship in 1663, he thought it his duty to resign. The latter also he resigned in 1669, in favor of his pupil Isaac Newton. On quitting his professorship, he obtained from his uncle a small living in Wales, and from Dr. Seth Ward, bishop of Salisbury, a prebend in that cathedral. He devoted the revenues of both to charitable purposes, and resigned them in 1672, on being appointed by the king Master of Trinity College. To him, while in this office, is due the foundation of that valuable library, which is one of the chief ornaments of the university. In 1675, he was nominated vice-chancellor of the university; and in 1677, he died at the early age of 47, having achieved, by his numerous able works, and the force of his noble personal character, a reputation which time has left unimpaired. Of his original mathematical works, the principal are his *Lectiones Geometricæ* and *Lectiones Opticæ*, of which it has been said that they are 'a mine of curious interesting propositions, to which geometry is always applied with particular elegance.' As a theologian, his fame rests chiefly on his sermons, which are very remarkable as specimens of clear, exhaustive, and vigorous discussion.

His sermons, it may be added, were generally of excessive length. One, on charity, lasted three hours and a half; and at Westminster Abbey, he once detained the audience so long that they got the organ to play 'till they had blowed him down.' B.'s English works, consisting of sermons, expositions, &c., have been edited by Dr. Tillotson, Dean of Canterbury, and prefaced with a life by Mr. Hill. His works, besides those already mentioned, are very numerous, and include *Euclidis Elementa*, *Euclidis Data*, *Mathematicæ Lectiones Opuscula*, containing Latin sermons, poems, speeches, &c. *Lectiones Mathematicæ* and *L. Geometricæ* have been translated by Kirby and Stone. *Euclidis Elementa* has also been translated.

BA'RROW, SIR JOHN, BARONET, an English traveler, was born on the 19th June 1764, at Dragleybeck, in Lancashire; was early instructed in mathematics; and after having published a small volume on land-surveying, filled a situation in a Liverpool iron-foundry, visited Greenland with a whaler, and after his return taught mathematics in an academy at Greenwich. He received an appointment as private secretary and keeper of accounts to Lord Macartney, who went as ambassador to China. He availed himself of his residence in China to learn the Chinese language, and to collect valuable materials for the account of China, which he afterwards gave to the world, partly in articles in the *Quarterly Review*, and partly in his *Travels in China* (Lond. 1804). When Lord Macartney afterwards became governor of Cape Colony, B. availed himself of his residence in South Africa to make extensive excursions in the interior of the country, which he described in his still valuable *Travels in the Interior of Southern Africa* (2 vols., Lond. 1801—1803). Having returned to London, in the year 1804, he was appointed by Lord Melville secretary to the Admiralty, which situation he continued to hold till 1845, except for a short time in 1806. Besides the works above mentioned, B. published *A Voyage to Cochin-China in the Years* 1792 *and* 1793 (Lond. 1806), *The Life of Macartney* (2 vols., Lond. 1807), *A Chronological History of Voyages into the Arctic Regions* (Lond. 1818), also a series of Lives of English Naval Worthies. Under Peel's ministry in 1835, he was raised to the baronetcy. In the year 1845 he retired from public service, but afterwards published *An Autobiographical Memoir* (Lond. 1847), and *Sketches of the Royal Society*, and died at London, 23d November 1848. He rendered many services to geographical science by suggesting and promoting scientific expeditions; with him also originated the idea of the Geographical Society, founded in 1830, of which he was vice-president till his death.

BA'RROW-IN-FURNESS, a seaport and rapidly increasing town of North Lancashire, England, situated on the south-western coast of the peninsula of Furness, opposite to a small island called Barrow Island, which is traditionally reported to have been in former times a burial-place of Norse rovers. It is 8 miles south-west from Ulverston, and 18 miles west-north-west from Lancaster. It is connected by railway with Dalton, from which it is not quite four miles distant, and so with the whole railway system of England. The growth of B. has of late years been so rapid as to be almost unparalleled in the history of the towns of England. In 1847, it was an insignificant fishing-village of about 300 inhabitants, in 1857, the population was more than 2000, a large proportion being sailors and fishers; in 1871, the population had increased to 18,245; and by 1881 it was 47,111. This rapid increase is owing to the great quantity of iron ore, of the best quality—red hematite—which exists in the neighborhood, and the establishment both of mines and smelting-works. A small quantity of iron ore from this neighborhood was, for many years, exported to be smelted elsewhere; but about the year 1859, smelting-works were established at B. by Messrs. Schneider, Hannay, & Co., which soon gave employment to a great number of men, and converted the old fishing-village into a prosperous town. In 1865, these works produced about 160,000 tons of iron. In 1866, the Barrow iron-works were taken over by the Barrow Hematite Steel Company, which has now 16 blast-furnaces in constant operation, and 18 converters for making Bessemer steel. The Company partly raise their own ore, employ at their works and mines nearly 5000 men, and utilize about 500,000 tons of ore annually. The amount of pig-iron made weekly is about 5500 tons, of which nearly 1000 tons are taken to the steel-works, and there converted by the Bessemer process into steel. Great quantities of limestone and coke are used in the iron furnaces and steel-works. The red hematite of B. yields an average of 57 per cent. of iron. The B. steel-works are the largest Bessemer steel-works in Britain, producing about 140,000 tons of steel annually. In the B. works, the iron is conveyed in a molten state from the blast-furnaces to the 'converters,' where it is made into steel. Some of the steam-hammers employed have heads of five tons weight, and some of six tons. Copper as well as iron ore is obtained in considerable quantity near B., and is exported to the amount of about 3000 tons annually. About 20,000 tons of slate are also annually quarried in the neighborhood, and sent by coasters or by rail to other parts of Great Britain.

The town of B. is built on a regular plan, mostly in rectangles. St. George's Church is a handsome Gothic building, erected chiefly at the expense of the Dukes of Devonshire and Buccleuch, the principal land-owners of the town and neighborhood. There are other places of worship belonging to the Church of England and other denominations.

The Furness Railway Company have recently expended a large sum of money in converting the channel between the mainland and Barrow Island into docks. The total cost is estimated at £200,000. There are three principal docks. The Ramsden Dock has an area of 78 acres, and the Cavendish Dock of 200 acres. Barrow Island has become a great seat of iron shipbuilding. A large jute-work employs 2000 hands. Other branches of industry have also begun to be attracted to Barrow. Its foreign trade is increasing; the imports include timber from Sweden and Canada, coal from Wales, and preserved provisions from New York. The chief exports are ore, steel rails—of which about 20,000 tons are shipped annually—and pig-iron. Steamers ply regularly between Belfast, Glasgow, and Douglas, Isle of Man. The interesting ruins of Furness Abbey lie within 2 miles from the town; while on Piel Island there are the ruins of a castle built by the Abbot of Furness. From the excellence of the harbor, the abundant facilities of railway conveyance, and the mineral wealth of the district, it may confidently be expected that B. will still rapidly increase in importance.

BA'RROW-ON-SOAR, a village in the N. of Leicestershire, 10 m. N. of Leicester. It is noted for its blue lime or terras, which makes good cement under water. It has manufactures of lace and stockings. It has free schools and several charities; and is the seat of the Poor-Law Union of the district, with a workhouse capable of accommodating 500 persons.

BA'RROWS, artificial mounds of earth generally believed to have been erected for sepulchral or monumental purposes. They are very numerous in Great Britain, and many of them are supposed to belong to a period long prior to the Roman invasion. The counties of Wilts and Dorset are especially rich in these remains, and the B. of the former have been thoroughly explored, described, and classified by Sir R. C. Hoare in his *Ancient Wiltshire* (2 vols. fol. 1810—1821). In the sepulchral B., the human remains are buried either in a rude stone 'cist' or chest, in which the body was doubled up, or are laid at full length in the earth, accompanied by arms and other utensils. Where the body was burned, the remains were laid on the floor of the barrow, in a cist excavated on the spot, or at a later epoch, in a clay urn. Sir R. Hoare considers the Wiltshire B. as indicating three stages in the progress of society. The first class contains spear and arrow heads of flint and bone; the second, of brass; and the third contains arms and instruments made of iron. One of the largest barrows in Europe is Silbury Hill, near Marlborough, in Wiltshire, which covers 5 acres, 34 perches of land, and has a slope of 316 feet, with a perpendicular height of 170. According to Sir R. Hoare, barrow-burial was practised down to the 8th c., from a period of unknown antiquity. The practice of erecting sepulchral mounds prevailed among all the principal nations of antiquity both in Europe and Asia, and they are found in great numbers in Central America. Many barrows are only partly artificial; natural mounds having been shaped by human hands into the form, round or oblong, which it was wished they should take.

BA'RRY, a small island, of about a mile long, in the Bristol Channel, off the south coast of Glamorganshire, 10 miles south-west of Cardiff. It has the ruins of an ancient castle and of two

Barry. Barry-bendy. Barry-pily.

chapels. On Nell's Point, in the south part of the island, is a fine well, to which great numbers of women resort on Holy Thursday, and having washed their eyes in the spring, each drops a pin into it.

BA'RRY (in Heraldry), the term applied to a shield which is divided transversely into four, six, or more equal parts, and consisting of two or more tinctures interchangeably disposed.

Barry-bendy is where the shield is divided in four, six, or more equal parts, by diagonal lines, the tincture of which it consists being varied interchangeably.

Barry-pily is where the shield is divided by diagonal lines, the colors being interchanged as in the example.

BA'RRY, Comtesse du. See Du Barry.

BA'RRY CO'RNWALL. See Procter, Bryan Walter.

BA'RRY, Sir Charles, R. A, architect of the two Houses of Parliament, son of Walter Barry, Esq., Westminster, was born there in May 1795. Educated at private schools in Leicestershire and Bedfordshire, he was indentured to Messrs. Middleton and Baily, architects, Lambeth. In 1817, at the age of 22, he went to Italy. A wealthy countryman of his own, attracted by the beauty of his drawings, took him with him to Egypt, as his companion, defraying his expenses. He also visited Greece and Rome. On his return to England after an absence of three and a half years, he became the successful competitor for the design of a church at Brighton. He was also the architect of the Manchester Athenæum, a building in the Grecian style; and of the Grammar School of King Edward VI. at Birmingham; the latter esteemed the most beautiful of his works. In London, he designed the Traveler's Club, and the Reform Club, both in Pall Mall, and the College of Surgeons, Lincoln's Inn Fields. After the burning of the old Houses of Parliament in 1834, on a public competition, B.'s design for the new building was adjudged the best. The work was commenced in 1840; and on 3d February 1852, Her Majesty opened the Victoria Tower and Royal Gallery in state, and on the occasion knighted the architect. Chosen a Royal Academician in 1842, Sir Charles was also a Fellow of the Royal Society, of the Society of Arts, and of the institute of British Architects. He died May 12, 1860.

BA'RRY, James, a historical painter, born at Cork, October 11, 1741; and distinguished more by the force of his conception than the excellence of his manipulation, or the beauty of his color. Dr. Johnson's criticism on his works was: 'Whatever the hand may have done, the mind has done its part. There is a grasp of mind there which you will find nowhere else.' The *chef-d'œuvre* of B. is the *Victors at Olympia*—a work, the sight of which, Canova said, was of itself sufficient to repay a journey to England. B. was a protégé of Edmund Burke. He was of irritable temper, which led him into many quarrels; and the result of one with the Royal Academy was his expulsion from the academy. He died on the 22d of February 1806, in poor circumstances, while some friends were engaged in raising subscriptions to purchase him an annuity.

BA'RRY, Martin, a physiologist of eminence, was born at Fratton, Hampshire, in 1802. He studied at the medical schools of London, and also at the university of Edinburgh, where he took his degree of M.D. in 1833. He wrote much on physiological subjects, and especially on animal development and embryology, for discoveries in which he is best known. Until the publication of his papers in the 'Philosophical Transactions' of the Royal

Society of London in 1840—1843, it was not known that spermatozoa actually penetrate *within* the ovum; and physiologists are also indebted to him for the knowledge of the segmentation of the yelk in mammals. In his private capacity, B. was amiable and greatly benevolent. His means being ample, he gave his professional services largely to the poor; and he acted as house-surgeon to the Edinburgh Royal Maternity Hospital. He died at Beccles, in Suffolk, in April 1855.

BARSCH, or BARS, a fortified town of Hungary, capital of the county of the same name. It is situated on the Gran, which divides it into Old and New B. It is a mart of some importance for grain and fruit. Pop. (1869) 910.

BAR-SUR-AUBE, a town of France, in the department of Aube, situated on the right bank of the river of that name. It is an ill-built ancient town; numerous old coins and urns attesting that the Romans must have had a station here. B. was destroyed by the Huns in the 5th c., but rebuilt again soon after, when it became a place of commercial importance. A chapel built on the bridge which here crosses the Aube, now marks the spot from which the Bastard of Bourbon was hurled into the river by command of Charles VII. in 1440. B. is also noteworthy as the place where the council of the allied sovereigns, which decided the plan of the campaign ending in the first fall of the Empire, was held in February 25, 1814; and where, two days after, the French were defeated by the allies, under the chief command of Schwarzenberg. B. has a pop. of (1876) 4495; a good trade in wine, wood, hemp, corn, and wool. Its principal industrial products are calicoes, table-covers, brandy, paper, vinegar, and nails.

BAR-SUR-SEINE, an ancient town of France, in the department of Aube, pleasantly situated on the left bank of the Seine. It has a trade in grain, brandy, wool, and wine. Pop. (1876) 2572. It is celebrated as the place where the allies, under the Prince of Würtemberg, defeated the French under Macdonald, in March 1814.

BARTA'N, a town of Anatolia, situated near the mouth of the Chati-su (ancient *Parthenius*) on the Black Sea. Pop. 10,000, who carry on a brisk trade with Constantinople.

BARTAS, Guillaume de Salluste du, a soldier, diplomatist, and man of letters, was born at Montfort, in Armagnac, about the year 1544. His reputation was great during his lifetime, alike in 'the court, the camp, the grove.' His chief poem is *The Divine Weeks and Works*, which gives an account of the creation, and the history of the Jews as far as the book of Chronicles, and is said to have had a considerable influence on Milton's *Paradise Lost*. Thirty editions of the work passed through the press in six years. Dryden, when a boy, thought his verse incomparably superior to Spenser's; an opinion, however, which he lived to be ashamed of having ever entertained. B.'s name is now quite forgotten, or remembered only in connection with bad taste. It is not to be denied, however, that his fancy, though generally grotesque and lawless, occasionally strikes out most picturesque imagery and epithets. His use of compound words first led to their introduction into England, through his translator Sylvester (q. v.), and to the consequent enrichment of our poetry. He died of wounds received at the battle of Ivry, 1590.

BA'RTER, in commerce and political economy, a term used to express the exchange of one commodity for another, as contrasted with the sale of commodities for money. It is usual to suppose that in the history of any community B. preceded the other methods of commerce, as people would find the convenience of exchanging one article for another before they were acquainted with money or credit. In point of fact, ships visiting savage countries are generally to some extent freighted with weapons, tools, or ornaments, to be used in B., if it be desirable to carry on a trade with the inhabitants. Under old artificial systems of political economy, there was much useless discussion about the question, whether a B.-trade or a money-payment trade was more advantageous to the community at large, and which of them should be encouraged while the other is depressed. On the one side, it was maintained that nothing but an export sale for cash was really profitable; on the other, that it was more advantageous to get goods in return, because thus there was a double transaction and double profit. See Balance of Trade. But the simple doctrine of the present day, that whatever the merchant finds most profitable to himself will also be most profitable to the community, saves the necessity of making these distinctions, and of acting upon them by interference with commerce. B. is, in reality, one of the commonest forms of trade, taken at large in the present day. The exporter sends goods to his agent, who, without probably ever touching hard cash in the course of the transaction, lays in a cargo of import goods with the value, and these are literally brought home in exchange for those sent out.

In law, Barter, or Exchange, as it is now more generally called in law-books, is a contract for transferring property, the consideration being some other commodity; or it may be described as a contract for the exchange of two subjects or commodities. It thus differs from *sale*, which is a contract for the transference of property in consideration of a price in *money*. See Exchange; Sale of Goods.

BA'RTFA, or BA'RTFELD, a small but very old free town of North Hungary, in the province of Saros, on the Tepla, 155 miles north-east of Pesth. Its position on the borders of Galicia has frequently made it a place of refuge for Poles and Russians. Its hot baths are much frequented, and a trade in wine, brandy, linen, and earthenware is carried on. Pop. 5500.

BARTH, Heinrich, Ph.D., D.C.L., an enterprising modern African traveler, born at Hamburg, 19th May 1821, received his education in his native town, and afterwards went to the university of Berlin. In his youth his favorite studies were the Roman and Greek classics and antiquities, along with the geographical sciences. Hence he imbibed a strong desire to explore the shores and countries of the Mediterranean. After visiting Italy and Sicily, he embarked, in 1845 at Marseille, and from Gibraltar passed over to Tangier in Africa. Proceeding along the Algerian coast he made excursions into the interior, to Tunis, Tripoli, and Bengazi. On his journey thence to Cairo, he was attacked by a band of Arab robbers, whom he bravely resisted, but was severely wounded, and lost all his effects and papers. He afterwards extended his researches into Egypt, Sinai, Palestine, Asia Minor and Greece. These travels occupied him for nearly three years, and in 1849 he published, at Berlin, an account of a portion of them in a work entitled *Wanderungen durch die Küstenländer des Mittelmeeres*. On the 8th December of that year he again sailed from Marseille, having been (along with Dr. Overweg) appointed by the British government scientific companion to Mr. James Richardson, then charged by the Foreign Office with a political and commercial mission to Central Africa. Starting from Tripoli on the 4th February 1850, Dr. B. and his companions crossed the Great Desert amid much difficulty and danger. B. soon separated from his friends, and pursued his researches for the most part by himself. Both Mr. Richardson and Dr. Overweg succumbed to the climate, and thenceforward B. was quite alone. He did not, however, return disheartened, but continued his explorations, which, when he returned to Tripoli in September 1855, had extended over 24 degrees of latitude and 20 of longitude, from Tripoli in the north to Andamawa in the south, and from Bagirmi in the east to Timbuktu in the west, upwards of 12,000 miles. The result of his researches was given to the world in his *Travels and Discoveries in Central Africa*, 5 vols. (Lond. 1857—1858). Afterwards, he made several journeys in Greece, Turkey, Asia Minor, and other countries on the Mediterranean. Shortly after returning from one of these, he died at Dresden, Nov. 25, 1865. In 1858, appeared his *Reise von Trapezunt durch die nördl. Hälfte Kleinasiens nach Skutari;* in 1862, his *Sammlung und Bearbeitung central-afrik. Vocabularien*.

BARTH, Jean, or BART, a French naval hero, the son of a fisherman, born in 1651 at Dunkirk, but, according to others, in the Netherlands. At an early age he entered the Dutch navy, but on the commencement of the war with Holland he passed over to the French service. As persons not of noble birth could not then obtain the rank of officer in the navy, he became captain of a privateer. In this capacity he displayed astonishing bravery, so that Louis XIV. despatched him on a special mission to the Mediterranean. His exploits at last induced the king to appoint him lieutenant of a man-of-war. In an action against a superior English force he was taken prisoner, and carried to Plymouth, from which he made his escape in an open fishing-boat to France, where the king now raised him to the rank of captain. In the year 1696, Louis XIV. received him with distinction at Versailles, but at the same time spoke continually of the mischance which had befallen him the year before. Stung by this, B. hastened to Dunkirk, and in spite of the blockade of the harbor by the English, undertook a cruise, in which he was remarkably successful. Louis XIV., in a personal audience in 1697, appointed him to the command of a squadron, upon which B. exclaimed: 'Sire, you have done well in this.' The courtiers laughed, as at a piece of gross rudeness; but the king took the answer in good part, and B. very soon showed how well he merited such an appointment. The peace of Ryswick terminated his active career. He died at Dunkirk in 1702. His rough frankness and coarse wit, in which he spared neither high nor low, made him popular, no less than his boldness and readiness for battle. When the Prince de Conti was nominated king of Poland, B. was required, by command of Louis XIV., to convey him to Elsinore, and the ship being attacked by the English on the voyage, was near being taken. After the action, the prince expressed to him his great delight that they had escaped from the enemy. 'We had no need,' was the reply, 'to be afraid of being made prisoners; I had despatched my son with a match to the powder-magazine, to blow up the ship on the first wink!'

BARTHÉLMEY, Auguste-Marseille, a French poet and politician of some eminence, was born at Marseille in 1796. Whilst still very young, he was sent to the college of Juilly; and he had scarcely completed his studies when he began to acquire reputation in his native town as a poet of distinct promise. He was naturally attracted to Paris, where, at first, his verses, published without his name, did not attract much attention. Gradually, however, he became known; and in 1825, in conjunction with his fellow-townsman, M. Méry, he issued a collection of satirical epistles, under the title *Les Sidiennes;* and the year after, a mock-heroic poem, *La Villéliade, ou la Prise du Château de Rivoli.* This vigorous political squib had a great success; in the course of the year it ran through fifteen editions, and is said to have put into the pocket of the young authors some 24,000 francs. Continuing to work together in opposition to the government of Charles X., and in the interest of Napoleonic ideas, they put forth upwards of 20 pieces of a like satirical cast before 1830. The Revolution of July of that year found B. in prison for an offence done to the government in one of his later publications. His liberation of course was immediate; and along with his friend, Méry, he celebrated the victory of the people in a poem dedicated to the Parisians, and entitled *L'Insurrection,* which is characterized by the great critic, M. de Sainte-Beuve, as one of the happiest productions of the writers. A pension of 1200 francs, bestowed on him by Louis-Philippe, did not deter B. from attacking his ministers with the same asperity he had exercised towards those of the dethroned monarch; and in consequence, it was within a year or two withdrawn. During all the changes which followed, B. was indefatigable as a versifier on the political events of the day; but, except for readers intimately versed in the detail of these, the mere list of his numerous productions could have only the very faintest significance. The force and brilliancy of his satire is on all hands admitted; and though, in his later years, his popularity somewhat declined, his writings throughout exercised considerable influence in determining opinion among the lively population of Paris. He was, from the first, a warm supporter of the second Napoleonic *régime.* His death took place, August, 1867, at Marseille, of which city he was librarian.

BARTHÉLEMY, Jean Jacques, a historian and antiquary, born 20th January 1716 at Cassis, near Aubagne, in Provence. He was educated under the Jesuits for the church, but soon abandoned all thought of becoming a priest, and devoted himself to the study of the Greek, Hebrew, Syriac, Arabic and Chaldee languages, though he retained the dress and title of an abbé. He first acquired distinction by the discovery of the Palmyran alphabet. In 1745, he was appointed assistant-superintendent of the Royal Cabinet of Medals, and in 1747 elected a member of the *Académie des Inscriptions et Belles-lettres.* To complete his studies he visited Rome in 1754, in the suite of M. de Stainville, afterwards Duke of Choiseul, and then French ambassador, where he was courteously received by Pope Benedict XIV. After his return, he was again employed in the arrangement of the Royal Cabinet of Medals, which he augmented by a great number of costly specimens. The Due de Choiseul, who became minister in 1758, placed him, by means of a pension and other favors, in a position to devote himself entirely to learned researches, which he quietly pursued till the revolution of 1789 deprived him of his offices. In September 1793, he was imprisoned on a charge of being an aristocrat, but almost immediately released. Shortly after, he was offered the situation of national librarian, then vacant, but his age and infirmities compelled him to decline it. He died April 30, 1795.

His most celebrated and popular work is the *Voyage du jeune Anacharsis en Grèce dans le Milieus du quatrième Siècle avant l'ère Chrétienne.* Paris, 1788, 4 vols. (Travels of the Young Anacharsis in Greece about the Middle of the Fourth Century B.C.). The work (see Anacharsis) is a very pleasing and agreeable performance; exhibits an extensive knowledge of the ancient world, especially of Greece and its colonies; and abounds in observations which, if not profound, are at least judicious. Later, and more severe criticism has, however, pointed out many deficiencies and anachronisms. It has been translated into almost every European language. Among B.'s other works may be mentioned a romance, entitled *Caryte et Polydore* (Paris, 1760); *Explication de la Mosaïque de Palestrine* (Paris, 1760); *Réflexions sur l'Alphabet et la Langue de Palmyre* (Paris, 1754).

BARTHÉLEMY SAINT-HILAIRE, Jules, a learned Frenchman, member of the Institute, and a representative of the people, was born at Paris on the 19th of August 1805. He first held a subordinate office under the minister of finance. During 1828—1830, he was one of the editors of the *Globe,* a Paris paper. After the July revolution, he took part with the society *Aide-toi et le Ciel t'aidera* (q. v.), revised several of its democratic manifestoes, established the *Bon Sens,* and continued to attack the government of Louis Philippe in the *Constitutionnel,* the *Courrier-Français,* and the *National.* In 1833, he desisted from political strife, and betook himself to more quiet studies. In 1834, he was named *Repetiteur* for the French Literature Class in the *Ecole Polytechnique;* and in 1838, professor of Greek and Latin philosophy in the *Collége de France.* The revolution of February, however, brought him once more into the political arena. He was appointed secretary to the Provisional Government, but refused his support to the government of Cavaignac, and even appeared as his accuser, though he failed to establish his charges against the suppressor of the June insurrection. B. was at first in favor of Louis Napoleon, but the *coup d'état* on the 2d of December, and the overthrow of the constitution, compelled him to become an oppositionist. He then retired for a time from public life, and resigned his chair, but in 1862 he was reappointed. In 1869, he was returned to the Corps Législatif by the first circumscription of Seine-et-Oise; and, in 1871, to the Assembly for the department of Seine-et-Oise. In 1875 he was elected by the Assembly one of the 75 life members of the new senate.

His principal writings are his translations of Aristotle's works—*Politique d'Aristote* (Paris, 1837); *De la Logique d'Aristote* (1838); *La Logique d'Aristote,* translated into French for the first time (1839—1844, 4 vols.); *Psychologie d'Aristote, Traité de l'âme* (1846), *De l'Ecole d'Alexandrie* (1845); *Rapport sur la Comparaison de la Philosophie Morale et Politique de Platon et d'Aristote, avec les Doctrines des plus grands Philosophes Modernes* (1854); *Des Védas* (1854); *Du Bouddhisme* (1855). An enlarged edition of this last, with an account of Buddhism in Ceylon at present, was published in 1860.

BARTHEZ, Paul Joseph, one of the most learned physicians of France, son of a distinguished engineer, born in Montpellier, 11th December 1734. After serving as an army-physician, he founded at Montpellier a medical school, which rose to high European reputation. His *Nouveaux Eléments de la Science de l'Homme* (Montpell. 1778; 2d ed., 2 vols., Par. 1806), in which he set forth a system founded on dynamical principles, was translated into most of the languages of Europe. He became, in 1785, titular chancellor of the university of Montpellier; and consultations with him on serious cases were sought from all parts of the civilized world. The revolution deprived him of the greater part of his property and his places, and compelled him to leave Paris; but Napoleon recalled him, and heaped honors and dignities upon him in his old age. He died in great suffering, after an operation for stone in the bladder, on 15th October 1806. Of his numerous writings, the following deserve special mention: *Nouvelle de Mécanique des Mouvements de l'Homme et des Animaux* (Carcassonne, 1798; *Traitement des Maladies Goutteuses* (2 vols., Par. 1802; new ed., 1819; and *Consultation de Médecine* (2 vols., Par. 1810).—See Lordat, *Exposition de la Doctrine Médicale de Barthez, et Mémoires sur la Vie de ce Médecin* (1818).

BARTHOLIN, the name of a Danish family distinguished for learning and authorship, and the members of which have filled many important offices, especially in the university of Copenhagen. Kaspar B., born 12th February 1585, at Malmö, where his father was a minister, studied theology and philosophy at Rostock and Wittenberg, and afterwards studied medicine. In the year 1610, he was made doctor of medicine at Basle. He practised for some time in Wittenberg, and in 1613 accepted an invitation to be professor of the Greek language and of medicine at Copenhagen, where, in 1624, he became professor of theology. He died at Sora in 1629. His *Institutiones Anatomicæ* (Wittenb. 1611, and often reprinted), which were translated into the German, French, English, and Oriental languages, served in the 17th c., in many universities as a text-book for prelections. Of his sons, who are all known in the learned world, the following especially deserve to be mentioned: the orientalist, Jacob B., born 1623, died at Heidelberg, 1653, known as the editor of the cabalistic works, *Bahir* and *Majan Hachoclma;* and Thomas B., equally celebrated as a philologist, naturalist, and physician, who was born 20th October 1616. He became, in 1647, professor of mathematics, and in 1648, professor of anatomy, at Copenhagen; demitted these offices in 1661, and thereafter lived in retirement upon his estate of Hagstad. In 1670, the king appointed him his physician in ordinary, which situation he filled till his death, 4th November 1680. He enlarged the new edition of his father's Anatomy (Leyd., 1641; often reprinted) with a mass of new observations. Besides many other valuable anatomical and medical works, his works on biblical and other antiquities, and on natural philosophy, are particularly worthy of notice. He was one of the most learned and studious of physicians, and warmly defended Harvey's doctrine of the circulation of the blood. His son, Kaspar B., born 1654, died 1704, was likewise an accomplished anatomist; and another son, Thomas B., born 1659, died 1690, is the author of a standard work on northern antiquities—the *Antiquitatum Danicarum Libri Tres* (Copenh., 1689); also of *De Causis Contemptæ a Danis adhuc gentilibus Mortis.*

BARTHO'LOMEW, St., one of the twelve apostles, supposed to be the same person as Nathaniel. He was a native of Galilee, but nothing authentic is known regarding his life and labors. According to the traditionary record of Eusebius, he carried

Chistianity into India; Chrysostom speaks of him as a missionary in Armenia and Asia Minor, while a still later legend declares that he was crucified at Albania Pyla, the modern Derbend, a town on the Caspian Sea. The relics of St. B. 'appeared' at Rome in 983 A.D., and are preserved there in the church bearing his name. The Roman and Anglo-catholic Churches hold a festival in his memory on the 24th August; the Greek Church, on the 11th June. The primitive church possessed an apocryphal Gospel under his name, but it is now lost.

BARTHO'LOMEW, St., a Caribbean island, bought by Sweden in 1785 from the French West India Company, and acquired again by France through purchase in 1878. It lies about 30 miles to the north of St. Kitts, in about 17° 40' N. lat. and 63° E. long. With an area of only 8 square miles, St. B. contains about 2400 inhabitants. The soil is fertile, though, as is generally the case in the group, fresh water is scarce. Like most of its neighbors, St. B. is difficult of access, its only harbor (Le Carenage) being on its west side, near the chief town Gustavia.

BARTHO'LOMEW FAIR, formerly held at West Smithfield, London, but discontinued since 1855. The charter of this fair was granted by Henry I., in 1133 to a monk named Rayer or Rahere, who had been his jester, and had founded the church and priory of St. Bartholomew, with an hospital attached. The fair was held annually at the festival of St. Bartholomew (August 24, old style), and, like all ancient fairs, was originally connected with the church, under whose auspices Miracle-plays (q. v.), founded on the legends of saints, were represented, which gave place to Mysteries, and these again to Moralities; afterwards, profane stories were introduced—the origin of the modern English drama. After the opening of the fair, it was customary anciently for wrestlers to exercise their art. Wild rabbits were hunted for sport by the mob, and the scholars from the different London schools met at the priory for disputations on grammar and logic, and to wrangle together in verse. In the first centuries of its existence, B. F. was one of the great annual markets of the nation, and the chief cloth-fair of the kingdom. The clothiers of England and the drapers of London had their standings, during the fair, in the priory churchyard. A pedlar's court, or Court of *Pie Poudre* (see PIEPOWDER COURT), was held within the priory gates, for debts and contracts, before a jury of traders formed on the spot, at which the prior, as lord of the fair, presided by his representative or steward. In 1445, four persons were appointed by the Court of Aldermen as keepers of the fair and of the court of *Pie Poudre*, the city being thus in that court represented as joint lord of the fair with the prior. As the fair prospered, its chief articles of traffic were, in the first instance, cloth stuffs, leather, pewter, and live cattle; while it was rendered attractive to the crowds that attended it by a variety of popular amusements.

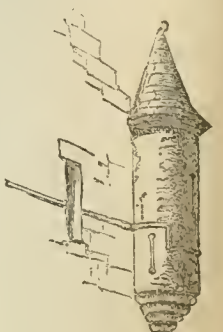
All manner of shows, exhibitions, theatrical booths, &c., thronged the fair; and tumblers, acrobats, stilt-walkers, mummers, mountebanks, and merry-andrews resorted to it in great numbers. On the suppression of the religious houses, the priory was disjoined from the hospital, and the latter, on 27th December 1546, was, by Henry VIII., transferred to the corporation of London, a new hospital being established on the site of the former. The priory was purchased for £1064, 11*s.* 3*d.* by Sir Richard Rich, Chancellor of the Court of Augmentations, afterwards Lord Chancellor under the title of Lord Rich, and became his town-house. Towards the close of the 16th c., streets of houses began to be built on the site of the Cloth Fair, a name which is still retained. In 1593, the keeping of the fair was, for the first time, suspended by the raging of the plague. The same thing happened in 1603, in 1625, in 1630, in 1665, and in 1666. At this fair, foreigners were at first licensed for three days, and the city freemen as long as they would, which was six or seven days. In 1661, after the Restoration, the fair lasted for fourteen days or more. In 1685, it was leased by the city to the sword-bearer. After this period, it began to decay as a place of trade. In 1691, the continuance of the fair was limited to three days, besides the proclamation-day. In 1701, it was represented as a nuisance. In 1750, it was again limited to three days. By the alteration of the calendar in 1752, the fair, in the following year, was, for the first time, proclaimed on 3d September. In 1798, the question of abolishing the fair was discussed by the corporation. It had long ceased to be a place of traffic, and was only considered as a haunt of amusement, riot, and dissipation. The fair had latterly been attended only by the keepers of a few gingerbread-stalls; and in 1839, measures were first seriously adopted for its suppression. In 1840, the exhibitions were removed to Islington. Wild-beast shows were allowed, but dwarfs and giants were excluded. In 1850, the last proclamation by the lord mayor took place, and in 1855 the once famous B. F. came to an end. An octavo volume, entitled *Memoirs of Bartholomew Fair*, by Henry Morley, was published in London in 1859.

BARTHO'LOMEW'S (St.) DAY (Fr. *La St.-Barthélemy;* Ger. *Bartholomäusnacht*, i. e., Bartholomew's Night, or *Bluthochzeit*, i. e., Blood-wedding), the appellation given to the massacre of the Protestants in Paris on the night of St. B. D., between 24th and 25th August 1572. After the death of Francis II. in 1560, Catharine de' Medici (q.v.), as regent for her son, Charles IX., a minor, in order to annoy the Catholic party of the Duke Francis of Guise (q. v.), had granted an edict of toleration to the Reformed, at whose head was the Prince of Condé. Both parties took up arms, and there ensued a war which lasted for eight years, the cruelties of which, through mutual exasperation, are almost incredible. The Duke Francis of Guise was murdered by an assassin, and the Prince of Condé was taken prisoner in the battle of Jarnac, in 1569, and shot.

The young Prince Henry of Bearn, afterwards King Henry IV., a nephew of Condé, then became leader of the Reformed, along with Admiral Coligny (q. v.). It was not till the strength of both sides was exhausted, that the peace of St Germain-en-Laye was concluded in 1570, whereby the Reformed obtained the free exercise of their religion. Catharine de' Medici now expressed much friendliness towards the Reformed, and even endeavored to lull them into negligence by the marriage of the youthful Henry of Bearn with her daughter Margaret, 18th August 1572. Admiral Coligny was drawn to Paris, and the king not only made him costly presents, but gave him an important office in the council of state. However, all this was only the basest hypocrisy. When, by means of the marriage of Prince Henry, the most eminent of the Reformed had been allured to Paris, Admiral Coligny was wounded by a shot from a window of the palace on 22d August 1572. The king, indeed, hastened to him, and swore to avenge him; but, on the very same day, the king was persuaded by his mother that the admiral sought his life. 'By God's death!' he exclaimed, 'let the admiral be slain, and not him only, but all the Huguenots, till not one remain that can give us trouble!' That night, Catharine held a council, and appointed St. B. D. for carrying into effect the long-contemplated massacre. After Coligny had been murdered, a bell in the tower of the royal palace, at the hour of midnight, gave the signal to the assembled companies of citizens for a general massacre of the Huguentos. The king himself fired from his palace upon those that were fleeing past. The Prince of Condé and the king of Navarre only saved their lives by going to mass, and appearing to conform to the Catholic Church. The provinces were at the same time summoned to similar slaughter; and although in some of them the officials were ashamed to publish the murderous commands which had been transmitted to them, there were found bloodthirsty fanatics enough, who perpetrated the greatest horrors for several weeks together in almost all the provinces, so that it was reckoned that 30,000 (some authorities make the number 70,000) persons were murdered. The pope celebrated the events of St. B. D. by a procession to the church of St. Louis, a grand *Te Deum*, and the proclamation of a year of jubilee. Many of the Huguenots fled to pathless mountains and to La Rochelle, to which the Duke of Anjou laid siege. Upon receiving intelligence, however, that he had been elected king of Poland, he made an arrangement on July 6, 1573, according to which the king granted to the Huguenots an amnesty, and the exercise of their religion in certain towns. See BARTHOLOMEW'S (ST.) DAY in AM. SUPP.

BARTHO'LOMEW'S (St.) HO'SPITAL, Smithfield, London, was originally a part of the priory of St. Bartholomew, founded in 1102 by Rahere, the first prior. At the dissolution of the religious houses, it was founded anew by Henry VIII., and the endowment has been subsequently enlarged from various sources, public and private. The hospital contains more than 600 beds, and affords relief to 70,000 patients annually. There is a medical school attached. The revenues are large and ample.

BA'RTIZAN, a small stone closet, thrown out upon corbels over doorways, and on other parts of medieval castles, generally for defence, but sometimes only for convenience to the inmates and defenders.



Bartizan.

BA'RTLETT, WILLIAM HENRY, an artist and popular writer, was born at Kentish Town, London, on the 29th March 1809. He was a pupil of the eminent architectural antiquary, Mr. John Britton, of London, and during his apprenticeship displayed more than ordinary talent for drawing, which was fostered by his master sending him into many of the most interesting counties in England, to make sketches from nature. Mr. Britton afterwards employed him to make drawings for his *Cathedral Antiquities*, and also for his *Picturesque Antiquities of English Cities*. Subsequently, B. visited the continent, the Holy Land, and America several times, on each occasion enriching his portfolio with innumerable interest-

ing scenes. No fewer than nineteen quarto volumes, containing about 1000 engravings from his sketches, and letterpress from his own pen and those of his fellow-travelers, Dr. W. Beattie, N. P. Willis, and Miss Pardoe, were devoted to these countries. Several other volumes, of which he was the sole author as well as artist, have also been published. Some of the books had a wonderful success, especially those on Switzerland, the Holy Land, and Egypt. B. died on the voyage from Malta to Marseille on Sep. 25, 1854. He had been revisiting Palestine, and the materials he had collected were published under the title *Jerusalem Revisited*.

BA'RTLETT is also the name of several American authors, the most eminent of whom is John Russell B., born at Providence, Rhode Island (U.S.), 23d October 1805. He was employed by the United States government, in 1850—1853, as a commissioner for determining the Mexican boundary-line, and in 1854, published an account of his explorations and adventures, &c., in that capacity. In 1855, he became Secretary of State of Rhode Island. He is also the author of *The Progress of Ethnology*, a popular *Dictionary of Americanisms. Bibliography of Books relating to the Civil War*, &c.

BARTOLI'NI, LORENZO, a celebrated Italian sculptor, was born at Vernio, in the north of Tuscany, in 1777. Circumstances brought him to Paris while still a young man, where he practised his art for some time with very little pecuniary success; but at length, having obtained an academy prize for a bas-relief of Cleobis and Biton, he was suddenly ushered into notice and prosperity. Several influential persons patronized him, such as Denon and Regnauld de St. Jean d'Angely. Through the first, he obtained a commission to execute one of the bas-reliefs in the hall of the Vendôme palace, and also the bust of Napoleon over the door of the Institute of France. Napoleon himself gave him a multitude of orders, many of which, unfortunately were never executed. In 1808, the emperor sent him to Carrara, to establish a school of sculpture. Here he remained till 1814, when he accompanied his imperial master to Elba. After the battle of Waterloo, he repaired to Florence, where he was subsequently appointed director of the sculpture department in the Academy of the Fine Arts, an office he retained till his death in 1850. B. was a very prolific artist. Besides the works already mentioned, B. executed busts of Cherubini, Mehul, Madame Regnauld, a magnificent statue of Napoleon I. (now in America), several exquisite sepulchral monuments, such as that of Lady Stratford Canning in the cathedral of Lausanne, and various groups, the most celebrated of which are his 'Charity,' and 'Hercules and Lycus.' In England and France, his style is in general greatly esteemed; in Germany, it is less highly thought of. His figures are characterized by their truthfulness of proportion and classic repose, though they also possess a remarkably life-like expression. After Canova, B. is reckoned the most distinguished Italian sculptor of modern times.

BARTOLOME'O, SAN, a town of Italy, in the province of Benevento, with a population of 5400.

BARTOLO'ZZI, FRANCESCO, an eminent engraver, was born in Florence in the year 1727. After practising his art under Wagner of Venice, he went to Rome, where he executed his admired plates from the life of St. Nilus. He was afterwards commissioned by Mr. Dalton, librarian of George III., to engrave a series of drawings by Guercino, and was induced by the same gentleman to settle in England. Here B. produced his spirited and highly finished engravings of the 'Virgin and Child' after Carlo Dolci, and 'Clytie' after Annibale Carracci, which entitle him to occupy the front rank in his profession. He also engraved numerous specimens of the works of his friend Giovanni Cipriani, of Michael Angelo, Cantarini, Cortona, &c., with equal truth and effect. B. likewise enriched Alderman Boydell's Shakspeare Gallery with many fine engravings. In 1802 he received a flattering invitation from the Prince Regent of Portugal to take the superintendence of a school of engravers at Lisbon, whither he repaired three years afterwards, in his seventy-eighth year, and there resided until his death, 25th Aug. 1821. He was the grandfather of Madame Vestris, the comedian. See *B. and his Works*, by Tuer (1881).

BA'RTON, BERNARD, an English poet, born 31st January 1784, in London. His parents were members of the Society of Friends, to the tenets of which body B. adhered through life. In 1810 he became clerk to a banking-house at Woodbridge, in which situation he continued until within two years of his death. His first poetical efforts, published in 1812 under the title of *Metrical Effusions*, brought him into correspondence with the poet Southey. *Poems by an Amateur* (1818), and *Poems* (Lond. 1820), increased his reputation, and gained him the friendship of Lamb and Byron. *Napoleon and Other Poems* appeared in 1822, and was followed within five years by several other productions. All the poems of B. are pervaded by pious sentiment, and some passages display much natural tenderness and religious fervor; but he is, on the whole, rather a fluent, pleasant versifier than a poet. So early as 1824, a reading-club founded by him in Woodbridge collected the sum of £1200 sterling, and presented it to him. Some years before his death he received, through Sir Robert Peel, a pension of £100 sterling. In addition to the works mentioned, he published *Fisher's Juvenile Scrap-book* (Lond. 1836). *The Reliquary* (Lond. 1836), and *Household Verses* (Lond. 1845). After his death, which took place suddenly, 19th February 1849, his daughter published *Selections from the Poems and Letters of Bernard Barton* (Lond. 1849).

BARTON, ELIZABETH, commonly called 'the Holy Maid of Kent,' a wretched creature, subject to spasmodic nervous affections, during which she gave utterance to incoherent exclamations and phrases. About the year 1525, she was servant in a tavern at Aldington, in Kent; and the cunning priest of the parish seeing her in her paroxysms, on the strength of her misfortune conceived the idea of presenting her to the world as a prophetess. Under his directions she played her part so well that not only the common people, but even men of intellect and education like Sir Thomas More, and Barham, the Archbishop of Canterbury, were deceived by her. The former, however, afterwards recognized her true character. She became a nun, and when, in 1532, Henry VIII. quarrelled with the court of Rome, she was induced to denounce loudly the king's separation from his first wife, and his marriage with Anne Boleyn, and even to prophesy his death. Being arrested by the king's command, along with her accomplices, she made before the judges a confession, which was afterwards publicly repeated before the people, of the fraud which had been perpetrated, and was sentenced to ecclesiastical penance and to imprisonment. She was afterwards accused of high treason, and executed along with some of her accomplices in 1534.

BA'RTON BEDS, a group of strata, composed of clay and sand, and forming part of the Middle Eocene formation, included in the Bagshot series (q. v.).

BA'RTON-ON-HU'MBER, a town in North Lincolnshire, on the south side of the Humber, six miles south-west of Hull. It is a very ancient place, having been one of the chief ports of the Humber before the foundation of Hull. It was once surrounded by a rampart and fosse, as a protection against the incursions of the Danes and Saxons. The ferry across the Humber, on the great road from London to Hull, used to be here; but the London and Hull inland traffic has now been diverted from B. by the steam-ferry at New Holland, six miles below Barton. The chief manufactures are ropes, sacking, bricks, tiles, pottery, and whiting. There are quarries of chalk and oolite. The tower of St. Peter's Church, which was built about the time of the Conquest, has both round and pointed arches; and, with the part of the building to the west, constitutes one of the few existing examples of undoubted Anglo-Saxon architecture. St. Mary's Church is a handsome structure of the 14th c. Pop. (1871) 4332; (1881) 5339.

BA'RU, a fine woolly substance found at the base of the leaves of the *Saguerus saccharifer* (also called *Arenga saccharifera*), one of the most valuable sago-palms of the Indian Archipelago. It is much employed in calking ships, in stuffing cushions, and for other similar purposes.

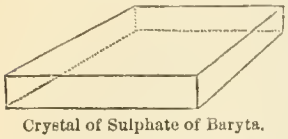
BA'RUCH (i.e., the Blessed), the son of Neriah, was the person to whom the prophet Jeremiah dictated his oracles. During the siege of Jerusalem by Nebuchadnezzar, both he and the prophet were, by their own countrymen, shut up in a narrow prison, but obtained from the conqueror freedom and permission to choose their own residence. B. remained for some time in Palestine, but afterwards accompanied Jeremiah to Egypt. His subsequent history is unknown. An apocryphal work in the Greek language has come down to us under his name—viz., the Book of B., which contains words of comfort for the Israelites, and predicts the rebuilding of Jerusalem. There is usually appended to it, as chapters vi. and vii., a letter—also apocryphal—of the prophet Jeremiah to the exiles in Babylon.

BA'RWOOD. See CAMWOOD.

BARY'TA, or BARY'TES, or Oxide of Barium (q. v.)—symbol BaO—is the earth present in the minerals *witherite* (carbonate of B.) and *heavy spar* (sulphate of B.). It may be prepared in several ways: 1. By acting upon the carbonate of B. ($BaOCO_2$) by nitric acid (NO_5), which causes the disengagement of the carbonic acid (CO_2), and the nitric acid combining with the B. forms the nitrate of baryta ($BaONO_5$). On evaporating the latter substance to dryness, and igniting the residue, the nitric acid volatilizes, and leaves the baryta (BaO). 2. Another mode of preparing the same substance is to act upon a solution of sulphuret of barium (BaS) by the black oxide of copper (CuO), when an interchange of elements occurs, the sulphur uniting with the copper, producing sulphuret of copper (CuS), and the oxygen with the barium, forming B. (BaO), which remains dissolved in the water, and, on evaporation, deposits crystals in the hydrated condition (BaO,HO). B. belongs to the group of alkaline earths, and has the property of acting like an alkali (q. v.) on coloring matters.

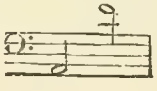
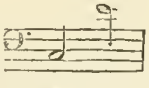
It has a very harsh taste, is highly caustic, and is very poisonous. A solution of B. is used by the chemist as the best indication of the presence of carbonic acid gas in the atmosphere, for when a plate or other vessel containing the solution is exposed to the air, the carbonic acid floating across the surface combines with the B., and forms a film of white carbonate of baryta (BaO,CO_2).

Otherwise, B. possesses little interest, as it is not put to any commercial or medicinal use. The compounds of B. are, however, of considerable importance. The *sulphate of B.* ($BaOSO_3$), otherwise called *ponderous* or *heavy spar*, is found in the mineral kingdom, diffused in fissures or cracks, passing through other rocks, especially in Cumberland, Durham, and Westmoreland, and in the island of Arran. At the latter place, an extensive mine of heavy spar has been worked for many years. In its native condition, the sulphate of B. occurs of a crystalline texture, is sometimes found pure and white, but generally presents a flesh-red color, from the red oxide of iron (rust) incorporated in it. The rust can be got quit of by reducing the sulphate of B. to a fine powder under rollers or traveling-wheels, and subjecting the pulverized material to the action of dilute sulphuric acid, which dissolves the red oxide of iron, and leaves the sulphate of B. as a white dense powder. The principal use of *heavy spar* is as a pigment under the name of *permanent white;* but having little opacity, it cannot be employed by itself, but only when mixed with ordinary white lead. When added to the latter, however, it must be regarded as an adulteration, for the little opacity it possesses renders it of service only as an increaser of the bulk of the white lead. Several mixtures of sulphate of B., and white lead are manufactured, and are known in commerce. *Venice White* contains 1 part Sulphate of B., and 1 part White Lead. *Hamburg White* contains two parts Sulphate of B., and 1 part White Lead. *Dutch White* contains 3 parts Sulphath of B., and 1 part White Lead. The native sulphate of B. has been employed by the celebrated potter Wedgwood in the manufacture of jasper ware, and for the formation of white figures, &c., on colored jars and vessels. The *Carbonate of B.* found native as *Witherite*, and the *Nitrate of B.*, have been previously referred to in this article and that on BARIUM.



Crystal of Sulphate of Baryta.

BA'RYTON (Viol di Bardoni), an old chamber-instrument, somewhat like the viol di gamba in tone: had a broader finger-board, with seven gut-strings, while under the neck there were sixteen strings of brass wire, which were touched with the point of the thumb, to produce a sound, while the gut-strings were acted on by a bow.

BA'RYTON, that species of the human voice which lies between the bass and the tenor, the tone-character of which is more allied to the bass. The compass of a B. is from but the principal notes of the voice are from  ; and these should possess the energetic character of a bass voice, and above all, be produced from the chest, excepting perhaps the highest. In former times, the music for this species of voice was written on a stave with the F clef placed on the 3d line, thus :

BAS, or BATZ, a small island in the English Channel, belonging to France, and situated off the north coast of the department of Finisterre. Its length is about 3 miles, and its breadth 2. It has a light-house, in lat. 48° 45′ N., and long. 4° 1½′ W., on an elevation 223 feet above the sea, and is defended by two forts and four batteries. Pop. above 1000, whose chief occupation is fishing.

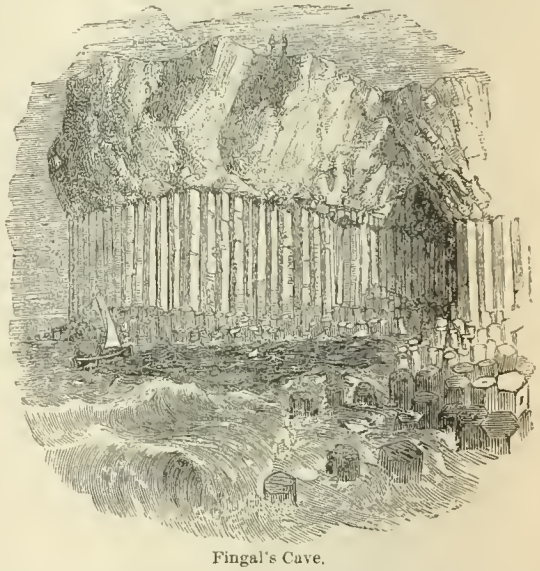
BASA'LT, strictly a variety of trap-rock (q. v.), although some writers use the words as synonymous. It is composed of the same materials as greenstone (q. v.), and other varieties of trap, viz., hornblende and felspar, with a small quantity of iron; but these exist in a state of finer division than in greenstone, showing that the crystalline action has been stopped at its commencement by the more rapid cooling of the mass. To this is owing its sharp conchoidal fracture and its hardness. As the hardness is frequently accompanied with tenacity, it makes B. a valuable material in the making of roads. It is of a more uniform dark-gray color, approaching to black, than the other varieties of trap.

A rock of a similar appearance and structure occurs as a variety of lava in volcanic districts. This Lava-B., differs from the older Trap-B. in the form which the silicates of magnesia and lime assume when crystallizing. In the newer rocks, they appear as augite; in the older, as hornblende. These two minerals can scarcely be distinguished by their chemical composition, the different formulas given by mineralogists being the result of the presence, in the specimen analyzed, of accidental ingredients or impurities. The slightly differing crystallographic angle has been accounted for by the supposed more speedy cooling of the volcanic rocks. Rose, indeed, has shown that the hornblende of melted greenstone, in re-cooling, crystallizes as augite; and we have observed that the same change has taken place in specimens of recrystallized B., obtained from works which existed lately at Birmingham for converting this rock into an opaque glass for various economic uses.

Basalt section.

The remarkable columnar structure which B. frequently assumes, is its most striking characteristic. The columns vary in the number of their angles from three to twelve; but they have most commonly from five to seven sides. They are frequently divided transversely by joints at nearly equal distances. The direction of the columns is always at right angles to the greatest extension of the mass, so that when B. occurs as a bed, either overlying, or interstratified with the regular strata, the columns are perpendicular, while they are horizontal when the B. exists as a dike.

The columnar structure was at first believed to be owing to a modification of the crystalline force. Such a supposition was favored by the external form of the columns; but the total absence of internal structure showed that the explanation must be sought elsewhere. In 1804, Mr. Gregory Watt propounded a theory of the origin of the structure, ascribing it to the pressure of numerous spheres on each other, during the process of cooling, such spheres being produced in planes of refrigeration or absorption. They increase by the successive formation of external concentric coats, until their growth is prevented by the contact of neighboring spheres; and as in a layer of equal-sized spheres, each is pressed on by six others, the result is that each sphere will be squeezed into a regular hexagon. Watt published this theory as the result of his celebrated observations on the cooling of a mass of molten basalt, in which he noticed the production of numerous spheroids, having a radiate structure. Many greenstones, in weathering, present such a structure, giving often to the rock the appearance as if it were composed of a mass of cannon balls, and Watt's experiments satisfactorily explain this phenomenon; but they will not go further. Anxious, however, that they should throw some light on the structure of basaltic columns, he manages it by the following remarkable assumption: 'In a stratum composed of an indefinite number in superficial extent, but only one in height, of impenetrable spheroids, with nearly equidistant centers, if their peripheries should come in contact in the same plane, it seems obvious that their mutual action would form them into hexagons; and if these were resisted below, and there was no opposing cause above them, it seems equally clear that they would extend their dimensions upwards, and thus form hexagonal prisms, whose length might be indefinitely greater than their diameters. The further the extremities of the radii were re-



Fingal's Cave.

moved from the center, the greater would be their approach to parallelism; and the structure would be finally propagated by nearly parallel fibres, still keeping within the limits of the hexagonal prism, with which their incipient formation commenced; and the prisms might thus shoot to an indefinite length into the undisturbed central mass of the fluid, till their structure was deranged by the superior influence of a counteracting cause.' Unfortunately, such dreams too often meet with more acceptance than the drier deductions from observed facts; which must, however, in the end, form the only basis of all geologic science. But there is no occasion here to urge even the most imaginative to resort to hypothesis, for the formation of columns in other substances than B. is quite familiar, and their producing causes evident.

In starch, columns having the external prismatic appearance, and the internal earthy structure, are produced simply from the escape of vapor, and consequent shrinking of parts. We have seen singularly regular joints produced in the argillaceous ironstone at Wardie, near Edinburgh, on its exposure on the beach, the contractions forming the columns evidently resulting from the escape of the moisture retained by the bed while it was covered by other strata. The same occurs in beds of fine clay that have been recently exposed. But the most regular series of columns that have been noticed by us, were produced on bricks which formed the bottom of a public oven. The long-continued and powerful heat to which they had been subjected, though it had not caused fusion, had so effected them as to produce a beautiful series of regular hexagonal prisms. The columns had a diameter of nearly half an inch. Their direction was at right angles to the oven floor. The earthy structure of the brick remained. The columns, in short, were in every respect, except the material of which they were formed, true basaltic columns. It is surely better to look for an explanation of this structure in causes similar to those which have produced the examples adduced, than to find it in such groundless assumptions as are at the foundation of the generally received theory of Watt. The columnar structure of B. seems to have been produced subsequently to the cooling of the mass, by changes in the solid rock, probably from the escape of some volatile matter.

The two best known and most beautiful examples of columnar B. are Fingal's Cave, in the island of Staffa, on the west coast of Scotland, and the Giants' Causeway, on the north coast of Ireland.

BASANTGA'NJ, a walled town of India, in the chief-commissionership of Oude, 55 miles north-west from Allahabad. Pop. 6000, of whom one-half are Mussulmans.

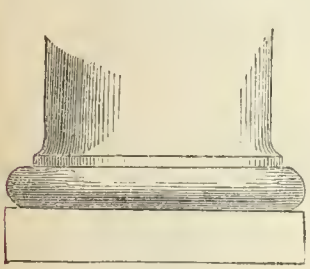
BA'SCINET. See HELMET.

BASE, in Heraldry, the lower portion of the shield is called the B.; there is a dexter base, middle base, and sinister base, marked by the letters G, H, I, in the accompanying diagram, in which for the convenience of the heraldic student, the other points of the escutcheon are also indicated. The *chief* or principal part of the escutcheon is the top, marked A, B, C. The *dexter* or right-hand side is that marked AG; the *sinister* or left-hand side, CI, an arrangement which is explained when we consider that the shield is always supposed to be on the arm of the wearer, and that it is his right and left hands, not those of the spectator, which are kept in view. The *ground* or surface of the shield, on which all the *charges* or figures are depicted, is called the *field*.

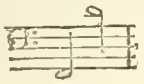
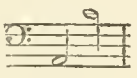
Base.

IN BASE.—When any figure is placed in the B. part of the shield, it is said to be *in base*.

BASE (Fr. and Ital.), the foot or lower member of a pillar, on which the shaft rests. Of the classical orders, the Doric column alone had no base. The height of the B. is usually about half the lower diameter of the shaft; and it is divided into the *plinth*, or flat projecting square block or blocks, immediately above the ground, and the *mouldings* (q. v.), or fillets, which surround the column, and are usually circular. In the early Norman style, the bases of pillars still retained, from the Romanesque, forms closely resembling the Tuscan order. As Gothic architecture advanced, and emancipated itself from the arbitrary rules by which the classical orders were governed, bases became infinitely varied in detail, though something approaching to the original conception of a strong and firm foundation for the column adhered to them throughout.


Tuscan Base.

BASE, in Chemistry, is a term applied to a compound body, generally consisting of a metal united with oxygen. Thus, the metal potassium (K), when it combines with oxygen (O), forms the B. potash (KO); sodium (Na) and oxygen, the B. soda (NaO); lead (Pb) and oxygen, the B. oxide of lead or litharge (PbO). A distinguishing feature of a B. is that it unites with an oxygen acid, such as sulphuric acid (SO_3) to form a *salt* (q. v.). Thus, the B. potash (KO) combines with sulphuric acid (SO_3) to make the salt sulphate of potash ($KOSO_3$); potash with nitric acid (NO_5) to form the salt nitrate of potash, or nitre ($KONO_5$). Occasionally sulphur replaces the oxygen in a base. Thus, the metal potassium (K) unites with sulphur (S) to form the *sulphur* base, sulphuret of potassium (KS), which can unite with a sulphur acid like sulpharsenious acid or orpiment (AsS_3) to make the salt sulpharsenite of potash (KS,AsS_3). The metal half of a B. need not be a simple element, but may be a compound body which, for the time, plays the part of a simple substance. Thus, the compound ethyl (C_4H_5) can combine with oxygen to form ordinary ether ($[C_4H_5]O$); and the B. thus produced can, in its turn, combine with acids to form salts. A base may be soluble or insoluble in water. Thus, the bases potash (KO), soda (NaO), ammonia (NH_4O), baryta (BaO), strontia (StO), lime (CaO), and magnesia (MgO), are more or less soluble in water; whilst the oxide of iron or rust (Fe_2O_3), the red oxide of lead (Pb_3O_4), the red oxide of mercury (HgO), are insoluble in water, but soluble in acids. See CHEMISTRY.

BASE, or BASS (from *basis*, the foundation), in Music, is the deepest or lowest part, by whatever instrument it may be performed. The B., next to the upper part, is the most striking, the freest in its movements, and richest in effect. Its movement downwards is unfettered, unconcealed, and undisturbed, whereas the middle parts are circumscribed and concealed. In respect to harmony, the B. is the most important part in music, containing more frequently the fundamental notes of the chords, while on it is formed that most important and effective figure in music called 'organ-point' (q. v.).—B. is also the name of the lowest and deepest quality of the human voice. The compass of a B. voice is generally from which should all be chest-notes, except, perhaps, the highest. The most useful range, however, is from . In the characteristic use of the B. voice, the old masters were unquestionably the greatest, especially Handel and Bach. The B. voice only begins to show itself at the years of manhood, and is generally a change from the alto voice of a boy.—B. is also the name of an old stringed instrument, with from five to six strings, tuned variously to suit the music, and played with a bow. It was a sort of middle instrument between the contra-bass and violoncello, but is now out of use. Double B. (contra-bass) is the deepest-toned of stringed instruments.

BASE OF OPERA'TIONS, in Military Manœuvres, is some spot or line which the general of an army relies upon as a stronghold and magazine. An army cannot take with it all the food, forage, and ammunition for a long war; the consumption is enormous, and a constant supply is indispensable. Again, the sick and wounded cannot accompany the army through toilsome marches; the commander endeavors to send them back to some place of safety. Furthermore, fresh troops must have some spot from which they can safely advance through the enemy's country. To secure all these advantages, a *B. of O.* is necessary. It may be a port, a stretch of sea-coast, a river, a mountain-range, according to circumstances; but it must be such as to serve as a magazine of supply, a placë for retreat under disaster, and the end of a line of open communication extending to the spot occupied by the army.

When Lord Raglan and Marshal St. Arnaud advanced from the Alma towards Sebastopol, in September 1854, they intended to attack the great fortress on the north side; but the tactics of the Russians prevented this; and the allies, changing their plan, resolved on the celebrated flank-march to Balaklava, by which they secured the whole coast from Balaklava to Kamiesch as a *B. of O.* during the siege of Sebastopol. See BALAKLAVA. In the military contests arising out of the Indian mutiny, in 1857 and 1858, Cawnpore was the chief B. of O. whence Havelock, Outram, and Clyde made those advances towards Lucknow which led ultimately to the suppression of the revolt. In the Italian war of 1859, the Austrian B. of O. was very fluctuating, owing in part to the disaffected state of the Lombard population around the great fortresses of Mantua, Peschiera, &c.; and indeed the only reliable base was furnished by the Eastern and Tyrolese Alps. The French and Sardinian base, in the same war, was virtually Genoa, and the line of country extending thence to the great stronghold of Allesandria.

BA'SE-COURT (*basse-cour*), the outer court of a feudal mansion, which contained the stable-yard and accommodation for servants. It was distinct from the principal quadrangle, and was sometimes constructed of timber.

BA'SEDOW, Joh. Bernh. (properly, Joh. Berend Bassedau, or Bernh, von Nordalbingen, as he is often called), a remarkable educationist of the 18th c., was born, 8th September 1723, at Hamburg, where his father was a peruke-maker. He attended the Johanneum there from 1741 to 1744, and afterwards studied philosophy and theology in Leipsic, from which he went in 1746 as a private tutor to Holstein. In the year 1753, he was appointed a master in the academy for young noblemen at Soröe. In 1761 he was removed from the Gymnasium at Altona on account of heterodox opinions. Rosseau's *Emile* awakened in him, in 1762, the thought of improving the method of education, and of reducing to practice Rosseau's maxims and those of Comenius. Contributions from princes and private persons, amounting to 15,000 thalers (about £2171 sterling), covered the cost of his *Elementarwerk*, which, after the most pompous announcements, appeared as an *Orbis Pictus*, with 100 copper plates by Chodowiecki, and was translated into French and Latin. Therein the young receive a large number of representations of the actual world, whereby B. sought at once to delight the eyes, and to awaken a sentiment of cosmopolitanism, at which his whole method aimed.

As a model school on this method, he established in 1774 the *Philanthropin* at Dessau, to which place he had been called in 1771. His restlessness of disposition, and the quarrels in which he was involved, especially with his active but capricious coadjutor Wolke, caused him to leave the Philanthropin; but he proceeded with as much eagerness as ever in endeavors to give effect to his ideas by educational works, which, however, aimed more at popularity than solidity, until, after many changes of residence, he died at Magdeburg, 25th July 1790. His influence on the public mind of his age, particularly in Germany, was very great. He has been justly reproached with disparaging the ancients, a consequence chiefly of his own want of sound scholarship, and with a multitude of exaggerations, mistakes, and conceits; yet it cannot be disputed that his numerous philosophical and educational works powerfully awakened attention and interest in the much-neglected subject of education, and that he set many excellent ideas and weighty truths in rapid circulation among men.

BA'SEL, or BA'SLE (Fr. *Bâle*), a city and canton of Switzerland. The canton was divided in 1833 into two sovereign half-cantons, called *Basel-city* (Basel-stadt, in French, Basle-ville) and *Basel-country* (Basel-landschaft, in French, Basle-campagne). The half-canton of Basel-city consists only of the city, with its precincts, and three villages on the right bank of the Rhine; the remainder of the canton forms the half-canton of Basel-country. The canton of B. is bounded by France and Baden, and by the cantons of Aargau, Soleure, and Berne, and has, according to different estimates, an extent of from 170 to about 200 square miles. Lying on the northern slope of the Jura, it is a country of hills and valleys. The mountains attain an elevation of from 2000 to 3000 feet. The chief rivers of B. are the Rhine (which flows through the north part of the canton) and its tributaries, the Birz, and Ergloz. The soil is fertile and well cultivated. The climate, except in elevated situations, is very mild. The inhabitants are chiefly employed in agriculture, the cultivation of fruit-trees and of the vine, cattle-husbandry, fishing, salt-works, the manufacture of ribbons (which are manufactured to the value of £400,000 sterling annually), paper, woollens, linens, and leather. The transit trade is very considerable.

The city of B. arose out of the Roman fortified post of Basilia or Basiliana, near Augusta Rauracorum, of which once more important place the little village of Augst, near B., exhibits a few ruins. On the division of the Frank Empire, the district of B. fell to Louis or Ludwig the German. The Emperor Henry I., in the earlier part of the 10th c., rebuilt the town, which had been destroyed. It then became a place of importance, and belonged for a time to Burgundy, but after 1032 formed part of the German empire. It became at an early period the seat of a bishop, who, from the 11th c., shared in the supreme power with the imperial governor, a number of noble families, and the burgesses. Amidst many internal and external disturbances, the power of the nobility was gradually broken, that of the bishop restricted, and the authority of the burgesses extended. Surrounding towns were also destroyed, or conquered, and purchased, along with their territories, so that the city extended its dominion over a country district which until very recently was kept in a state of dependence and subjection. Involved in many feuds with the House of Hapsburg, B. closely allied itself to the Swiss confederacy; and after the peace between the Emperor Maximilian I. and the confederacy, B. formally joined it in 1501. From 1519 onwards, the writings of Luther were printed in B.; and at the end of twenty years from that time, the reformed doctrine had become generally prevalent, the chapter of the cathedral had left the city, and the convents had been suppressed. After the union with Switzerland, the triumph of the burgess party became also more complete, part of the nobility emigrated, and those who remained were placed upon the same level with the freemen of the municipal corporation. Orderly industry, economy, and an external severity of manners, became the characteristics of the citizens; but the peace of the city was not unfrequently disturbed by strifes consequent upon the assertion of what was deemed undue authority by the magistrates. The government of the city, to which the whole canton was subject, was intrusted to a Great and a Little Council, under the presidency of alternate burgomasters and chief wardens of the guilds; but the Little Council, uniting legislative and judicial functions with the highest executive authority, became gradually more and more preponderant. All parties in the city, however, remained always well combined against the country district; and persons belonging to the city were appointed to all offices, civil and ecclesiastical, whilst the depression of the country district was completed by the neglect of a proper provision for education. This state of things caused great dissatisfaction, which repeatedly broke out in fruitless rebellion.

Under the impulse communicated by the French Revolution, equality of rights was conceded in 1798; but in 1814, although the equality of rights remained apparently intact, the new constitution of the canton was so framed, and the representation so distributed, as virtually to make the city again supreme. The discontent of the country district became so great that, after unsuccessful attempts to obtain redress of grievances by petition, civil war broke out in 1831, which did not cease till the troops of the Swiss Confederation took possession of the canton, and the diet recognized the separation of the city and the country district, as sovereign half-cantons, in 1833. The constitutions of the two half-cantons are in most respects similar, and are framed on the basis of the old constitution, modified in accordance with the principle of universal suffrage. According to the census of 1880, the half-canton of Basel-city contained 65,101 inhabitants, of whom 44,236 were Protestants; and Basel-county, 59,271, of whom 46,670 were Protestants. By the federal constitution, proclaimed May 29, 1874, the half-canton of Basel-city sends two, and the half-canton of Basel-country three, members to the National Council. The capital of Basel-country is Liestal. Since its separation from the city, more ample provision has been made for education, and there has been a rapid increase of material prosperity. Both Roman Catholic and Protestant clergy are paid by the state, and the parishes of the Reformed Church have received the right of choosing their own pastors.

The city of B. was much more populous in the middle ages than it is now. Its population in 1880 was 61,399. In the 14th c., the number of its inhabitants was greatly reduced by the plague, or 'black death' (q. v.), which raged in it with terrible severity, and is sometimes mentioned as the 'death of Basel.' It is well-built and clean, but its appearance does not proclaim it the wealthiest city in Switzerland, which, however, it is. Amongst its buildings are a cathedral, founded in the beginning of the 11th c., by the Emperor Henry II., and a bridge over the Rhine, built in 1226. The Rhine divides the city into two parts—Great B., on the south side, and Little B., on the north. B. is connected by railway with Strasburg on the one hand, and Berne, Lucerne, Zurich, &c., on the other. It has many benevolent and educational institutions, among which are an orphan asylum, and an institution for deaf mutes; a university (with 350 students in attendance in the year 1880), founded in 1459, which has a library of about 120,000 volumes, and many MSS., a numismatological collection, a botanic garden, and a museum of natural history; the new museum, in which there are several pictures of the younger Holbein, who was long resident in B. (some accounts say, he was born here); a public library of 70,000 volumes. During the Reformation, the university was a central point of spiritual life, and it has numbered among its professors men of great eminence in learning and science, including Erasmus, who died here in 1536, and the mathematicians Euler and Bernouilli, who were natives of B.; but it is now little frequented. The population of the whole canton in 1876 was 107,063.

BA'SEL, Council of, a memorable and important ecclesiastical council, held in the city of Basel. It was summoned by Pope Martin V., and his successor Eugenius IV., in accordance with an announcement made at the Council of Constance, and was opened on 14th December 1431, under the presidency of the Cardinal Legate Julian Cesarini of St. Angelo. The hall in which it met is still shown at Basel. It addressed itself to the reconciliation of the Hussites with the Roman Catholic Church, and to the reform of abuses in the church itself. But the first attempt to conciliate the Hussites, whom an army of crusaders had in vain sought to subjugate, was met with resistance by the pope, who not only refused his sanction, but empowered the cardinal legate to dissolve the council. The council strongly repelled the pope's pretension of right to dissolve it, and proceeded with its business. His injunctions, that it should remove to Italy, were equally disregarded. It renewed the decree of the Council of Constance, asserting the right of a General Council to exercise authority over the pope him-

self, and on his persevering to issue bulls for its dissolution, caused a formal process to be commenced against him, and cited him to appear at its bar. It assumed the papal powers, and exercised them in France and Germany, where its authority was acknowledged. It concluded a peace, in name of the church, with the Calixtines, the most powerful section of the Hussites, by the Prague Compact of 20th November 1433, granting them the use of the cup in the Lord's Supper. By this, the Emperor Sigismund was much helped in obtaining possession of Bohemia; and he in return sought to reconcile the council with Eugenius IV., who, being hard pressed by insurrections in the States of the Church, and afraid of losing his whole influence in France and Germany, solemnly ratified all its decrees, by a bull dated 15th December 1433. Desirous, however, of limiting the papal prerogatives, the council restored to the chapters of cathedral and collegiate churches the free right of election to stalls and benefices, of which the pope had assumed the right of disposing; and with a view to the reformation of gross abuses, restricted the power of granting interdicts, and prohibited *annats* and other grievous exactions. It left the pope the right to dispose of those benefices only which belonged to the diocese of Rome, and prohibited the bestowal of reversions to ecclesiastical offices. It also appointed punishments for certain immoralities in the clergy; and prohibited Festivals of Fools, and all the indecencies which had been commonly practised in churches at Christmas. It adopted decrees concerning the election of popes, and for the regulation of the College of Cardinals.

Eugenius, exasperated to the utmost, complained loudly to all sovereign princes. At this time, a prospect was opened up of the union of the distressed Greeks with the Church of Rome; and both the pope and the council endeavored to make use of this for the advancement of their own interests and influence. Both despatched galleys for the Greek deputies, but through the intrigues of his agents, the pope was successful, and brought the Greek deputies to Ferrara. The Archbishop of Tarentum, a papal legate at B., circulated an ordinance in name of the council, and sealed with its seal, recommending Udine or Florence as the place of conference. The ordinance was a forgery, and this proceeding put an end to forbearance on the part of the council, which, on July 31, 1437, again cited the pope to its bar; and not only on his failing to appear, declared him contumacious, but on his opening an opposition council at Ferrara, went so far as, on January 24, 1438, to decree his suspension from the functions of the popedom. His party, however, was so strong that this decree could not be carried into effect; and some of those who had been among the most influential members of the council, the Cardinal Legate Julian himself, and the greater number of the Italians, left B., and went over to his side. All the more resolutely did Cardinal Louis Allemand, Archbishop of Arles, a man of most superior understanding, courage, and eloquence, now guide the proceedings of the council, which, on May 16, 1439, declared the pope a heretic, for his obstinate disobedience to its decrees; and in the following session, formally deposed him for simony, perjury, and other offences. On this occasion, the holy relics which were in B. were deposited in the places from which the Spanish and Italian members of the council had disappeared; and the sight of them produced much emotion, and reanimated the courage of the assembly, still consisting of 400 prelates, priests, and doctors, mostly French and German. On November 17, 1439, the council, notwithstanding the still further diminution of its numbers, caused by the plague in B., elected Duke Amadeus of Savoy to be pope, who then lived as a hermit in Ripaglia, on the lake of Geneva. He accordingly styled himself Felix V., but was recognized only by a few princes, cities, and universities. The Emperor Sigismund was dead, and even France and Germany, although they accepted the reforming decrees of the council, thought proper to remain neutral in the question regarding the popedom. The friendship of the Emperor Frederick III. strengthened the party of Eugenius; and the council gradually melted away, till careful only for personal security, its members, after three years of inactivity, held its last session at B. on May 16, 1443, and removed its seat to Lausanne.

Here a few prelates still remained together under the presidency of Cardinal Allemand, till in 1449, after the death of Eugenius, and the resignation of the anti-pope Felix, an amnesty was offered to them by the new pope, Nicholas V., which they joyfully accepted. The B. reforming decrees are contained in no Roman Catholic collection of decrees of councils, and are held to be invalid by the canonists of Rome; yet they are of authority in canon law in France and Germany, where they were included in pragmatic sanctions, although their application has been modified by more recent concordats.

BA'SEL, TREATY OF. Basel gives its name to two important treaties of peace, concluded there on 5th April and 22d July 1795, between the representatives of the French Republic, Prussia, and Spain, by which Prussia withdrew from the coalition against France, took under her protection all the states of Northern Germany which should, like herself, relinquish the war in which the German empire was engaged, and also gave up to the victorious republic her possessions beyond the Rhine; whilst Spain gave up her portion of St. Domingo, and prepared the way for that alliance with France which was afterwards productive of consequences so important.

BASE'LLA, a genus of plants, generally regarded as belonging to the natural order *Chenopodiaceæ* (q. v.), but by some botanists as the type of a distinct order, *Basellaceæ*. The species are all tropical. *B. alba* and *B. rubra* are known in Britain as stove biennials. They are plants with twining stems, in common use as pot-herbs in the East-Indies, and cultivated in China. In the neighborhood of Paris, they are raised on hot-beds, transplanted into warm borders, and furnish a substitute for spinach in summer. *B. rubra* yields a very rich purple dye. The great fleshy root of *B. tuberosa*, a South American species, also with a twining stem, is edible.

BA'SHAN, or BATANÆA, a country of Palestine, stretching from Mount Hermon in the Anti-Libanus on the north, to the brook of Jabbok on the south, and bounded on the west by the Jordan, its eastern limits not being very clearly defined. Ashtaroth and Edrei were its chief cities, and the residence of its kings during the Amoritish dynasty. The last of its Amorite rulers was Og, who with all his sons was killed by the Israelites under Moses, at the battle of Edrei; and the half tribe of Manasseh settled in the land. The men of B. were remarkable for their stature, its pastures for their richness, and its sheep and oxen for their size and fatness. B. belonged to the tetrarchy of Philip, and afterwards to that of Agrippa II.

BASHAW' (Turkish, *basch;* Arabic, *basha*; Persian, *pasha*, the way in which the word is now commonly written) signifies head, or master, a Turkish title of honor given to viceroys, provincial governors, generals, and other distinguished public men. The term B. is also used to characterize a man of an arrogant and domineering disposition.

BASHEE' or BASHI' ISLANDS, a small cluster in the line between Luzon, the chief of the Philippine chain, and Formosa, the lat. and long. being respectively 21° N. and 122° E. Politically, they are a dependency of the Philippines, having been colonized by the Spaniards in 1783. Physically, they form a link in the vast archipelago which, from Formosa to Sumatra inclusive, connects the south-east of China with the west of Malacca. They were discovered in 1687 by Dampier, who called them the Bashi Islands, on account of the popularity among the islanders of an intoxicating liquor of that name. Pop. about 8000.

BASHI-BAZOU'KS are irregular troopers in the pay of the Sultan. Very few of them are Europeans; they are mostly Asiatics, from some or other of the pashalics in Asiatic Turkey. They are wild turbulent men, ready to enter the Sultan's service under some leader whom they can understand, and still more ready to plunder whenever an opportunity offers. During the Russo-Turkish war in 1854, &c. they had many encounters with the enemy in that kind of irregular warfare which the Russians intrust to Cossack horsemen; but the peaceful villagers had almost as much distrust of the B.-B. as of the Russians. When the British government resolved in 1855, to take into pay a Turkish contingent, to aid in the operations of the war, a corps of B.-B. was put in charge of an Indian officer, but the task of reducing them to discipline was not completed when the war ended. Their ferocity was exhibited in the Servian war, but most relentlessly in the massacre of Batak, where, in May 1876, under Achmet Agha, they slew over 1000 defenceless Bulgarians in a church in which they sought refuge.

BASHKIRS. See TURKS.

BASIDO'H, or BASSADO'RE, the principal station for British ships in the Persian Gulf, situated at the west end of the island of Kishm.

BASIE'NTO, or BASE'NTO, a river of Italy, which, rising in the Apennines, west of Potenza, flows in an east-south-east direction through the province of Basilicata to the Gulf of Taranto. Near its mouth are the remains of the once famous city of *Metapontum*, where Pythagoras died.

BA'SIL, surnamed THE GREAT, and called St. B., one of the most eminent and eloquent of the Greek Fathers, was born about 329 at Cæsarea, in Cappadocia; studied under the heathen philosophers at Athens, and became an advocate in his native city, but afterwards founded a monastic society; was ordained a presbyter in 362; and succeeded Eusebius as Bishop of Cæsarea in 370, in which office he continued till his death in 379. He resolutely resisted invitations to the court of Julian the Apostate, with whom he had contracted an intimacy as a fellow-student at Athens, and displayed great constancy when the Emperor Valens began to persecute him, on account of his opposition to Arianism. He was engaged in most of the controversies of his time, but conducted controversy in a peaceful and generous manner. His rules of monastic life are still followed in the Greek and other oriental churches.

in which he is highly honored as one of the greatest of saints. In the Roman Catholic Church, also, they are followed in a few convents, styled of the order of *Basilians*. The influence of B. was greatly felt in the promotion of monasticism throughout the West as well as the East, and to him is ascribed the introduction of the three universal monastic vows of obedience, chastity, and poverty. The best editions of his works are that of the Benedictines (3 vols., Par. 1721—1730, fol.), and that of the brothers Gaume (3 vols., Par. 1835—1840, 8vo.); but the authenticity of many of the moral and ascetic pieces is doubtful. His anniversary is celebrated in the Greek Church, on the 1st of January—the day of his death; in the Latin Church, on the 14th of June—the day of his ordination.

BA'SIL I., the Macedonian, Emperor of the East, was born in the village of Macedonia, in 813 A.D., or, according to others, in 826. His early life is differently related, but his biographers agree that he came to Constantinople when still a young man, and was appointed chamberlain to the Emperor Michael in 861. Subsequently, the Emperor made him his colleague in the sovereignty. B. now used his influence to restrain Michael from committing those excesses which rendered him hateful to the people; but when he found his remonstrances unavailing, he headed a conspiracy against him, the result of which was the assassination of the emperor in 867.

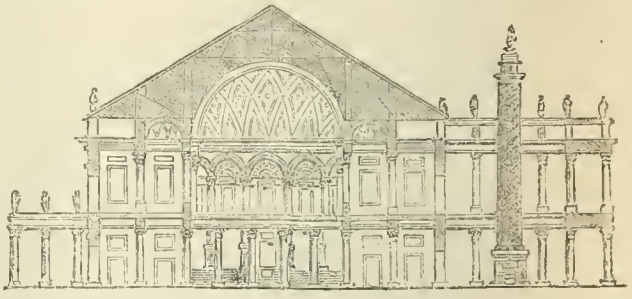
His first care was to heal the wounds both of the church and the state. He replaced Ignatius upon the patriarchal throne, and dismissed Photius, whom, however, he re-established in his authority the year after. His valor made him the terror of the Saracens, from whom he reconquered Asia Minor. The prodigality of Michael had exhausted the public treasury; by a wise economy, B. refilled it. All extortioners, moreover, were sought out and punished. The profligate companions of the late monarch were condemned to disgorge one half of the largesses which Michael had showered upon them. B. also entered into a treaty of alliance with the Russians of Kiew, to whom he sent missionaries to preach the gospel, and who, from that time, began to embrace Christianity, and acknowledge the authority of the Greek Church. He died in 886, from wounds which he received while hunting a stag. Several letters of his are still extant, besides a book full of wise advice addressed to his son.

BA'SIL (*O'cymum*), a genus of plants of the natural order *Labiatæ* (q. v.). The species are all natives of the tropics, or of the warmer temperate parts of the world, and are generally characterized by a pleasant aromatic smell and taste. They are reckoned among *sweet herbs*.—SWEET B. (*O. Basilicum*) is an annual plant, a native of the East Indies, about one foot high, with ovate or oblong leaves, and flowers in whorls of six, which has long been cultivated in Europe for culinary purposes, being used as a seasoning. It has also enjoyed the reputation of being a palliative of the pains of childbirth.—Bush B. (*O. minimum*), also a native of the East Indies, is cultivated for the same purposes, and possesses the same qualities. It is a plant about six inches high, with an orbicular bushy head. In Britain, the seed of both species, obtained from the south of Europe, is generally sown on a hot-bed, from which the plants are afterwards removed to the open ground.—A native British plant of the same order (*Clinopodium vulgare*) bears the name of WILD B., and another (*Acinos vulgaris*, formerly *Thymus Acinos*) is known as B. THYME. Both are fragrant and aromatic.—B. Vinegar is made in the same manner as Mint Vinegar, by steeping the leaves in vinegar. It is used for seasoning, in winter, when the fresh plant cannot be obtained.

Basil (*Ocymum Basilicum*).

BASI'LICA, a code of laws of the Grecian empire, the compilation of which was begun in the reign of the Emperor Basil I., the Macedonian, who died in 886—from whom it is generally supposed to have derived its name; completed by his son Leo, the Philosopher; and revised, in 945, by order of Constantine Porphyrogenitus, the son of Leo. There is some doubt whether the work has come down to us as completed by Leo, or as revised by Constantine, and unfortunately we do not possess the whole of the sixty books of which it originally consisted. It was very much an adaptation of the code of Justinian to altered circumstances, and is of great value for the interpretation of the *Corpus Juris*. The principal editions are that of Fabrott (7 vols. fol., Par. 1647), and the recent one of Heimbach (vols. 1—5, Leip. 1833—1850), which includes portions discovered since Fabrott's time. The B. has been the subject of many commentaries.

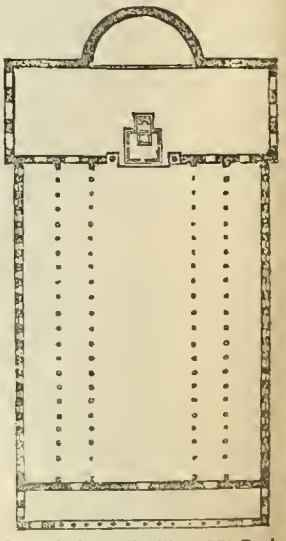
BASI'LICA (Gr. *Basilike*, from *Basileus*, a king). Originally, the B. seems to have been the hall or court-room in which the king administered the laws made by himself and the chiefs who formed his council. When monarchy was abolished at Athens, the second of the magistrates who succeeded to the kingly power was called the Archon-basileus, the first being styled the Archon by pre-eminence; and it is as the court or hall (stoa) in which the Archon-basileus administered justice, that the B. first appears in



Section of Trajan's Basilica, Rome.

authentic history. But it was amongst the Romans that the B. attained its chief importance; and in addition to its original use as a court of justice, became a market-place, an exchange, a place of meeting for men of business generally. It was not till a comparatively late period, however, that a B. was erected at Rome. The first we hear of is the B. Porcia in 182 B.C. From this period till the time of Constantine, they were constructed in great numbers. Some twenty are known to have existed in Rome and latterly, every provincial town, even those of small extent, had each its B., as that of Pompeii which is now the most perfect example, still testifies. The most frequented part of the city was always selected for the site of a B.; and as this was almost always the Forum, the words Forum and B. are occasionally used as synonymous by ancient writers.

The earliest basilicas were entirely open to the external air. It was usual, for this reason, as well as for the convenience of those who might be compelled to frequent them in bad weather, to select for them a sheltered and convenient position. Latterly, an external wall was substituted for the peristyle of columns with which the original basilicas were surrounded; the external columns, if continued at all, being used only as a decoration, and confined generally to the vestibule. It was in this form that the B. suggested the idea of the Christian church, as has already been explained under Apse (q. v.); and the readiest mode of explaining the structure of the B. to a modern, is to imagine the process which was then performed reversed, and in place of converting the B. into a church, to convert the church into a basilica. This will be effected by simply removing the roof from the *nave*, the aisles remaining covered, and even being frequently furnished with galleries, as in Protestant churches. The judge's seat was generally in a circular portion of the building which protruded from its further end, in which the altar was afterwards placed (see APSE), the great entrance to the B. fronting it, as the western door of a cathedral fronts the high-altar. The space required by the prætor for his court was separated by a railing from the other portions of the building, which were devoted to the various purposes we have mentioned. It must not be supposed from this description, that the form of the B. was always the same. Sometimes there was no hemicycle or apse, as in the B. at Pompeii, in which case the tribunal was cut off from the nave; sometimes



Ground-plan of Basilica of St. Paul, Rome.

there were two, as in the B. of Trajan. Again, the B. was sometimes entered, not from the end, but from the sides, where the transepts of a modern church are situated; and at the end opposite that in which the tribunal was placed, there was often a row of small chambers, the uses of which do not seem to be very accurately ascertained, and probably were not invariable. In the plan of the B. of Pompeii, there was an outside stair which led to the upper gallery, which in this case passed entirely round the building. The gallery was the place to which loiterers usually resorted for the purpose of watching the business proceedings below; and the one half of it is said to have been devoted to men, the other, to women. Of the vast size of some of these buildings, we may form a conception from the accommodation which must have been required for the tribunal alone, where, in addition to the curule chair of the prætor, and space required by the suitors and their advocates, seats had to be provided for the *judices* or jurymen, who occasionally amounted to as many as 180.

Many of the principal churches in Italy, and particularly in Rome, are still called Basiliche.

The term B. was also applied in the middle ages to the large structures erected over the tombs of persons of distinction, probably from their resemblance to small churches; thus, the tomb of Edward the Confessor, in Westminster, is called a B. (see chronicle of the Mayors of London, quoted by Parker).

BASILICA'TA, or as it is also called, POTENZA, a province in the south of the kingdom of Italy, includes nearly the same territory as ancient Lucania. Foggia and Avellino bound it on the N.; Bari and Lecce, on the N.E. and E.; the Gulf of Taranto and Cosenza, S.E. and E.; and Salerno and the Mediterranean, on the W. Its area is 4000 squaremiles. Pop. (1881) 524,485. The capital is Potenza; the other chief towns are Francavilla and Tursi. B. lies mainly on the east side of the main ridge of the Apennines, between it and the Gulf of Taranto. The interior is wild and mountainous, and though there are some large forests in the province, the general aspect is bare and barren. Four considerable rivers—the Basiento, Brandano, Agri, and Sinno—flow through it from the west in an east-south-east direction, forming as many valleys, which slope gradually into an exceedingly fertile plain, varying in breadth from 4 to 10 miles. Here corn is raised in abundance, also wine, hemp, tobacco, and liquorice. Swine, sheep, and goats are reared in the mountainous districts, and silk forms a product of the valleys. B. is greatly in need of good roads, and is much subject to earthquakes.

BASI'LICON (Gr. 'royal,' or of great virtue), a name given to an ointment composed of yellow wax, black pitch, resin, and olive oil. Hence it was called *Unguentum Tetrapharmacum* (*tetra pharmaka*, four drugs). The resin, wax, and pitch are melted together over a slow fire; the oil is then added, and the mixture, while hot, strained through linen. The straining is directed in consequence of the impurities which resin often contains. B. ointment, or resin cerate, as it is sometimes called, is much used as a gently stimulent application to blistered surfaces, indolent ulcers, burns, scalds, and chilblains.

BASI'LICON DO'RON (Gr. royal gift), a celebrated prose work of King James VI. of Scotland, written for the instruction of his son, Prince Henry, a short time previous to his accession to the English throne. It consists of three books. The first treats 'Of a King's Christian Duty towards God;' the second, 'Of a King's Duty in his Office;' and the third, 'Of a King's Behavior in Indifferent Things.' It was first published in 1599; afterwards in London in 1603, 8vo.; and translated into Latin by Henry Peacham, who presented it, richly illuminated, to the prince. This Latin version was published in London in 1604, 8vo. A French edition appeared at Paris in 1603, 8vo., and another in 1604, 16mo. Like the royal author's famous work on *Demonology*, and his *Counterblast to Tobacco*, the *B. D.* is now only considered as a literary curiosity.

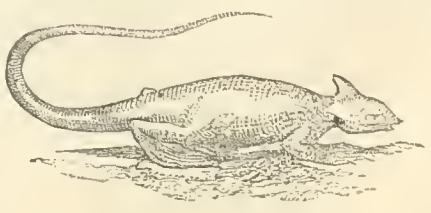
BASILI'DES, an Alexandrian Gnostic, who flourished during the reigns of Trajan, Hadrian, and Antoninus Pius. Regarding his life, little is known. He is said to have taught in Antioch; afterwards in Persia; and, finally, in Egypt, where he is supposed to have died shortly before the middle of the 2d c. He was a disciple of one Glaucias, not elsewhere mentioned in history, but whom he terms an interpreter of St. Peter, and from whom he alleges that he had received the esoteric faith of that apostle. B. probably considered himself a Christian, but his fantastic speculations bore a greater resemblance to the doctrines of Zoroaster, and in some points to the Indian philosophy, than to the religion of Christ. According to the system of B., there are two eternal and independent principles—the one, good; the other, evil. Whatever exists, emanates from these. The good principle—i. e., the Supreme God, or Father—constitutes, with his seven perfections, viz., the Mind, the Word, the Understanding, Power, Excellences, Princes, and Angels, the blessed ogdoad (combination of *eight*). These seven perfections, or powers, in which the Supreme God is reflected, are in their turn themselves reflected, but more feebly, in seven other angelic powers, which emanate from them; and so on through the whole circle of emanations, which amount to 365, the mystic number so often inscribed on the symbolic stones in the Gnostic schools (see ABRAXAS STONES). Each of these angelic powers governs a world. There are, consequently, 365 worlds, to each of which B. gave a name. The head of the 365th, or lowest world, rules the material universe, which, along with other angels, he also created. He is the God or Jehovah of the Old Testament, and when the earth was divided among the rulers of the material universe, the Jewish nation fell to the share of himself, who was the prince of the lowest class of angels.

But wishing to absorb all power himself, he strove against the other angels, and to make them subject to his 'chosen people,' the result of which was war, strife, division in the world, together with the loss of the true religion, to restore which the Supreme God sent the first Æon (*Nous*, or Intelligence), who united himself to the man Jesus at his baptism, and so taught men that the destiny of their rational spirit was to return into God. This *Nous*, however (who was the true Christ), did not really suffer crucifixion, for, changing forms with Simon of Cyrene, he stood by *laughing* while Simon suffered, and afterwards returned to heaven. B. also taught the doctrine of a purgatorial transmigration of souls in the case of the wicked. His disciples (Basilidians) were numerous in Egypt, Syria, Italy, and even in Gaul, where they continued to exist till the 4th c. They were accused by their enemies of Antinomianism and 'magic,' but whether on good grounds or not, cannot be ascertained.

BA'SILISK, according to ancient and medieval authors, a terrible creature, which, however, may be regarded as entirely fabulous—the fables concerning it being so many and so monstrous, that it is vain to seek for any foundation of truth, or to inquire if any of them originally had reference to any particular creature whatever. The ancients, as Dioscorides, Galen, and Pliny, describe it as a serpent: in the middle ages, it was generally represented as more of a lizard appearance, but provided with eight instead of four feet. It appears to have been at last pretty completely identified with the Cockatrice (q. v.), which was believed to be generated in a very wonderful manner, being produced from an egg laid by an extremely old cock, and hatched by a toad; for which reason we find the B. sometimes figured with something like a cock's head. The B. was the king of dragons and serpents, all of which left their prey to it whenever it approached; whence its name, *basiliscus* (Gr.), diminutive of *basileus*, a king—sometimes exactly translated into Latin by *regulus*. It had some prominences on its head, which, when it was figured in books, assumed very exactly the appearance of a crown. It inhabited the deserts of Africa, and, indeed, could only inhabit a desert, for its breath burned up all vegetation; the flesh fell from the bones of any animal with which it came in contact, and its very look was fatal to life; but brave men could venture into cautious contest with it by the use of a mirror, which reflected back its deadly glance upon itself.—These things are still necessary to be mentioned, were it only on account of the allusions to them by poets and other writers.—The blood of the B. was, of course, extremely valuable to magicians. It occupies an important place in some of the legends of the saints, and Pope Leo IV. is said to have delivered Rome from a B. whose breath caused a deadly pestilence.

The word B., and its equivalent *regulus*, are sometimes used in the Latin Vulgate, where the authorized English version of the Old Testament sometimes has *adder*, and sometimes *cockatrice;* but no trace of any of the marvels concerning the B. is to be found there.

BA'SILISK (*Basiliscus*), in modern Zoology, a genus of saurian reptiles of the family of *Iguanidæ* (see IGUANA), differing from the iguanas in the want of the dewlap or appendage of skin under the throat, and of the series of pores on the inside of each thigh; also in having a continuous elevated crest along the back and tail, capable of being erected or depressed at pleasure, and apparently intended to aid the motions of the animal in water like the corresponding fin of a fish.—The basilisks are remarkably adapted both for climbing trees and for swimming. Their feet are not webbed, their toes rather long. They are perfectly harmless creatures, very active and lively, and it is difficult to say why they should have received the name of the fabulous monster of antiquity, unless because their appearance is far from agreeable to those unaccustomed to it, and perhaps because an appendage at the back of the head may have been thought to represent the crown of the dragon king. This appendage is most conspicuously developed



Hooded Basilisk.

in the Mitred or Hooded B. (*B. mitratus*), a native of the tropical parts of America, and consists of a hood or membranous bag, capable of being dilated with air, and then about the size of a pullet's egg, which is supposed, notwithstanding its extremely different situation, to have a use somewhat analogous to that of the air-bladder of fishes. The mitred B. is from 25 to 30 inches long, including the long and very tapering tail.—Another and larger species, of a generally greenish color (*B. Amboinensis*), inhabits the islands of the Indian Archipelago, and is much used there for food. Its flesh is said to be very white and tender. It is often seen on the branches of trees above water, into which it drops when alarmed.

BA'SIN, a geographical term of considerable importance. The *B.* of a river is the whole tract of country drained by that river, and is, of course, more or less concave. The line or boundary which separates one river-basin from another is called the watershed. By tracing these water-sheds, the whole of a country or continent may be divided into a number of distinct basins; and this is one of the most instructive elements in the physical geography of a country. The *B.* of a lake or sea, again, is made up of the basins of all the rivers that flow into it.

BA'SIN, in Geology, is a term applied to depressions in the strata, in which beds of a later age have been deposited. Thus, the London B., consisting of tertiary sands and clays, occupies a hollow in the chalk, which is bounded by the North Downs on the south, and by the chalk-hills of Berks, Wilts, Bucks, and Herts on the north. The term has also been applied to synclinal depressions of strata, which have been produced by the elevation or depression of all the strata contained in the B., as the coal-B. of South Wales.

BA'SINGSTOKE, a town in the north of Hampshire, 46 miles west-south-west of London. It is a place of much activity, being situated at the junction of five main roads to London from the south and west of England. The country around is fertile and wooded. The chief trade is in corn, malt, coal, and timber. Near the town is a tract of 108 acres, on which every householder has the right of pasturage. There is also, not far from the town, an ancient camp, surrounded by an irregular oval embankment, 1100 yards in circumference, with an entrance on the east and west sides. Basing House Castle, belonging to the Marquis of Winchester, long withstood the forces of the Commonwealth, but Cromwell at last took it by storm, and burned it to the ground in 1645. Pop. (1881) 5574.

BA'SKERVILLE, JOHN, a celebrated English printer and letter-founder, was born in 1706 at Wolverley, in Worcestershire. He became a writing-master in Birmingham, and afterwards carried on the business of japanning there with great success. He began about 1750 to make laborious and costly experiments in letter-founding, and succeeded in making types which have scarcely yet been excelled. He printed an edition of Virgil at Birmingham in 1756, which was followed by other Latin classics, a few English and Italian authors, and a New Testament (Oxf. 1763), much admired as specimens of printing, although not otherwise possessing high merit. His services to the art of printing met with little encouragement and no requital. He died in 1775. He was a man of obliging disposition, but of a gloomy temperament, and condemned all religious service as superstition. B. was buried in a tomb of masonry in the shape of a cone, under a windmill, in his garden; but the ground becoming valuable for building purposes, his remains were exhumed in the summer of 1821, and deposited in the vaults of Christ Church, in the neighborhood of the spot where they were originally interred. Baskerville editions of works are now prized by persons of taste.

BA'SKET (Welsh, *basged*, or *basgawd*, a netting or weaving of splinters), a domestic utensil, usually made of willows, reeds, or chips, interwoven, although sometimes the materials are gold, silver, iron, glass, &c. Baskets have been in use from very early ages. The Israelites were commanded (Deuteronomy xxvi. 2) to offer unto the Lord, as soon as they came into the possession of the land of Canaan, 'the first of all the fruit of the earth' in a *basket*. The baskets used on such occasions by the rich Jews were made of gold and silver, and were returned to the offerers; but those used by the majority of the people were of barked willow, and were retained by the priests. The ancient Britons were remarkably expert in the manufacture of baskets, which were much prized by the Romans for their neatness and elegance. The process of B.-making is very simple, and appears to be well known among the rudest peoples—even among the aborigines of Van Diemen's Land. In this country the willow is chiefly used in the manufacture of baskets. In several parts of England and Scotland, great attention is paid to the cultivation of the willow; and judging from the statements of some of the cultivators, the returns yielded are very satisfactory. One calculates his profits at £18 10s. per acre, and another at £10 per acre. The tools required being few and inexpensive, a large number of poor persons are engaged in the manufacture of baskets, that are hawked about the streets by their wives and children. B.-making also forms a part of the industry of almost all blind asylums. Baskets are of all shapes and sizes, and their uses are so well known to all as to obviate the necessity of description here. Baskets to the value of £30,000 or £40,000 are annually imported from the continent.

BASNAGE DE BEAUVAL, JAQUES, the most distinguished of a distinguished French family, mostly supporters of the Protestant cause, was the son of Henry Basnage, an able advocate in the parliament of Normandy, and was born at Rouen, August 8, 1653. Having studied theology at Geneva and Sedan, he became pastor of the reformed church in Rouen (1676). That church being interdicted in 1685, B. obtained leave to retire to Holland, where he finally settled as stipendiary minister of the Walloon Church in the Hague, having gained the friendship of the Grand Pensionary Heinsius. Here, while zealously discharging his religious duties, he was called upon to take an active part in state affairs, particularly in negotiating the defensive alliance concluded between France, England, and the States-general, 14th February 1717. Amid all these duties and distractions, B. cultivated literature with ardor, and was no less distinguished for his extensive learning than for the polish of his manners and the integrity of his character. B., who commanded in a singular degree the esteem both of Protestants and Catholics, died on the 22d September, 1723.

His chief works, which have been frequently laid under contribution without being named, are *La Communion Sainte* (Rott. 1688), a work approved even by Catholics, and often reprinted; *Traité de la Conscience* (Amst. 1696, 2 vols.); *Histoire de l'Eglise* (Rott. 1699, 2 vols. fol.); *Histoire des Juifs* (Rott. 1706, 5 vols.), one of B.'s best productions, and translated into English by Th. Taylor (Lond. 1708); *Dissertation Historique sur les Duels et les Ordres de Chevalerie* (Amst. 1720).

BASQUE PROVINCES, a district of Spain, in lat. 42° 25′—43° 28′ N., and long. 1° 44′—3° 25′ W., and comprising the three provinces of Biscay, Guipuzcoa, and Alava, which constituted the ancient *Cantabria*. They form a sort of triangle, the base of which is the Bay of Biscay on the north, and the apex the town of Logrono in the south; the boundary-lines of Navarre on the east, and Santander and Burgos on the west, forming the two sides. Area of the three provinces (without Navarre, often reckoned with them), 3000 sq. miles; pop. (1877) 450,352. The surface of the B. P. is very mountainous, particularly that of Alava, which is everywhere cut up into deep narrow valleys by offsets from the main chain of mountains. The rivers of Biscay and Guipuzcoa, none of which are important, empty themselves after a short course into the Bay of Biscay; those of Alava flow down the opposite slopes into the Ebro, which carries their waters to the Mediterranean. The climate in all the three provinces is, on the whole, mild and salubrious. The general aspect of the country is very picturesque, the hills in most cases being covered with wood to the very summit. The principal trees are oak, beech, and chestnut. The fruit of the chestnut forms an article both of diet and of export. The soil in the valleys and plains, though not very rich, has been rendered productive by the energy of the people, who spare no labor in the cultivation. But as yet, science and machinery have done little or nothing to assist nature and manual exertion. A spade, or prong-fork, is the chief mechanical aid the Basque peasant has. The farms are small, usually only about four or five acres, and rarely more than can be managed by the farmer and his family. Notwithstanding, the roads and agriculture of these provinces contrast very favorably with those of Spain generally. The products are wheat, barley, maize, flax, hemp, &c.; the wheat, however, only ripening in the most favored localities. Iron is found in abundance; also copper and tin, marble, porphyry, and jasper. The fisheries on the coast are productive.

The Basque race is not confined to the B. P., or to the southern side of the Pyrenees. The greater part of the inhabitants of Navarre (q. v.) are pure Basques. And on the French side of the Pyrenees, three cantons of the department Basses Pyrénées, with a pop. of 145,000, are inhabited by Basques, who, though they retain their own tongue, have not so fully preserved the characteristics of the race as their Spanish brethren.

The Spanish Basques are a simple, brave, and independent people, willing to undergo any hardships rather than surrender their mountain-freedom. None of their many invaders were ever able to effectually subdue or expel them. The B. P. retained till 1876 a separate constitution, guaranteeing them many political and fiscal privileges not possessed by the rest of Spain (see FUEROS). But on the suppression of the Carlist insurrection, which had all along its stronghold in the B. P. and in Navarre, the old immunities were abolished. The Basques are even prouder than Spaniards, and the mere fact of being born in their territory secures the privilege of 'universal nobility.' *Euscaldunac* is the name the Basques give themselves; their country they call *Euscaleria;* and their language, which is peculiarly their own, *Euscara*—the prefix

Eusc being 'the old *Osc, Vesc, Vasq* of Italy and Iberia.' The origin of the Basques is doubtful. Humboldt considers them descendents of the ancient Iberi, who once occupied the whole of the peninsula, and spoke the language now confined solely to the B. P.; while Mr. Borrow's opinion is, that the language is of Tatar origin. The Basques are fond of music, and on their chief holiday, Sunday, they indulge in singing, dancing, and single-stick, which they enjoy immensely. For a more particular account of the B. P., we would refer to that excellent manual, *Ford's Hand-book of Spain*.

BAS-RELIE'F. See ALTO-RILIEVO.

BASS. See BASE.

BASS ROCK, a remarkable rock island near the mouth of the Firth of Forth, about 2 miles from Canty Bay, Haddingtonshire, opposite the ruined castle of Tantallon. It is composed of hard granular greenstone or clinkstone, and is about a mile in circumference, nearly round, and 400 feet high. It is inaccessible on all sides except the south-west, where it shelves down to the water, and there the landing is difficult, and almost impossible, when there is any swell. On the west, north, and east, the precipices rise perpendicularly out of the sea, to a great elevation. These are the abode of immense numbers of solan geese (it is estimated that 10,000—15,000 of these fowls resort here annually) and other aquatic birds, which give to the surface of the precipices a snowy appearance in the distance. A cavern traverses the rock from west to east, and is accessible at low tide. There is a spring on the island, and a few sheep are pastured on it, the mutton of which is much prized. How early the Bass was tenanted, is doubtful; but there is a tradition to the effect that St. Baldred resided on it as early as the 7th c. It is also not very certainly known when the Bass was first fortified, but it formed a retreat for the son of Robert III., afterwards James I. of Scotland, before his nineteen years' captivity in England. James VI. visited the Bass in 1581, and was anxious to obtain it for state purposes; but its owner, 'Lauder of the Bass' refused to part with it. The Registers of the Church of Scotland were sent to the Bass in 1651, for preservation from Cromwell; but the Protector forced their surrender in the following year. In 1671, Charles II. purchased the rock for £4000, and within its dreary dungeons many of the most eminent of the Covenanters were confined during that and the following reign. It is a somewhat curious fact, that the Bass was the last spot in the British Islands which held out for the Stuarts.

A mere handful of adventurers in the Jacobite interest, 24 in number, had the address to capture the island, and to retain it in name of King James, from June 1691 till April 1694, against all the forces which the government of William III. sent against them; at last, the spirited little garrison surrendered on honorable terms, and only from a consciousness of failing provisions. For an account of this romantic incident, see *Pictorial History of England*, vol. iv. p. 16, new edition. In 1701 the fortifications were demolished by order of William III. Five years afterwards, the Bass passed into the possession of Sir Hew Dalrymple, to whose lineal descendant it now belongs. The king of the Belgians (then Prince Leopold) visited the rock in 1819, and, three years afterwards, George IV., on passing it on his voyage to Scotland, was honored with a royal salute from some guns then on it. It has also been visited by the Prince of Wales. The Bass is let to a 'keeper,' who pays a considerable sum for it annually, the rent being made up by young geese, which are used as food; by eggs, feathers, and oil; also by fees exacted from visitors to the rock. There is an interesting volume on the Bass, historical, geological, and botanical, the joint production of Dr. M'Crie, jun., Hugh Miller, and Professors Fleming and Balfour.

BA'SSA, or BA'FFA, an excellent port on the Grain Coast, Guinea, formerly much resorted to by trading-vessels for coarse pepper; latterly, for slaves. The country around produces lemons oranges, and bananas in abundance.

BASSA'NO, a town of Italy, in the province of Vicenza, 19 miles north east of the city of Vicenza, on the Brenta—population (1871) 7769. It is situated on a rising-ground in an extensive plain, and has a considerable trade in wine, olives silk, leather, &c., as well as a great printing establishment. It has 30 churches, and a number of fine palaces. One of its gates, the work of Palladio, is greatly admired. It is famous for a victory of Bonaparte over the Austrian field marshal, Wurmser, on 8th September 1796, and was the scene of other battles between the French and Austrians in the wars of that period.

BASSA'NO (or, more properly, GIACOMO DA PONTE), an artist of great eminence, was born at Bassano, in the north of Italy, in 1510. He was first educated in the principles of his art by his father, Francesco da Ponte, who was himself a painter of considerable merit, and afterwards visited Venice, where he became a pupil of Bonifazio Veneziano. Here he enjoyed opportunities of studying the designs of Parmegiano, Titian, Tintoretto, and others. The earlier stages of his professional career clearly indicate that these great painters had kindled a rich and emulative enthusiasm in B., for his works display a loftier genius, both as regards conception and execution, than at a later period. His principal efforts belonging to this higher epoch, is a fresco painted on the front of the house of the Michelli family. It represents Samson destroying the Philistines; the figure of the mighty Israelite being considered not unworthy of Michael Angelo. After his father's death he returned to Bassano, where he devoted himself to a simpler style of art. From this time, however, dates his celebrity. He may even be said to have founded a school, whose peculiarity was the delineation of common things, markets, fairs, country inns, farm-yards, &c. He had a passion for introducing cattle into his pictures, even under the most inappropriate circumstances. The special merits of this lower style, into which B. finally lapsed, are its vigorous and picturesque coloring, and its accurate imitation of nature. B.'s landscapes, however, betray a comparative ignorance of perspective. Occasionally, during his later years, B. showed that his early love of the sublime was not wholly extinguished, by painting several altar-pieces, which exhibit a noble grandeur of execution, such as the 'Entombing of Christ,' in the church of St. Maria, Padua; a 'Nativity,' now in the Louvre, Paris; 'St. Roche interceding with the Virgin for a People infected with the Plague,' at Vicenza; 'The Wise Men's Offering,' and the 'Seizure of Christ in the Garden.' His rural pictures are abundant in the Italian galleries and in English collections. B. also painted heads of several of his contemporaries, Tasso, Ariosto, &c., and was in high favor with the Emperor Rudolph II., for whom he also executed several works. He died in 1592. He left four sons, who all followed their father's profession, but were not marked by any special originality of manner.

BASSE (*Labrax*), a genus of sea-fishes of the Perch (q. v.) family, distinguished from the true perches (*Perca*) by having the tongue covered with small teeth. The species are found on the shores both of Europe and America. The only British one is the Common B. (*L. lupus*), a fish which in its fins, scales, &c., much resembles a perch, but has a more elongated and salmon-like form. It is pretty abundant on some parts of the British coasts, and is not unfrequently taken by angling from the rocks, or by small seine-nets on sandy shores; often, also, by the hand-line and by the long line. It is a strong, active fish, and was well known to the ancients; *labrax* is its Greek name; the Romans called it *lupus* (i. e., wolf), from its remarkable voracity. It is much esteemed for the table. It sometimes attains a large size, fifteen pounds or more in weight, but is generally much smaller. It not unfrequently ascends rivers to some distance, and the experiment of keeping it in a fresh-water pond has even been tried with success.—The Striped B., or Rock-fish of the United States (*L. lineatus*), very nearly resembles the common B., but attains a larger size, and is marked by seven or eight longitudinal black lines. The name Stone B. is given to the *Polyprion cernium*, a fish very rare on the coasts of Britain, but abundant in more southern parts of the Atlantic Ocean, as far as the Cape of Good Hope, and found on the American coasts and in the Mediterranean. In general appearance, it resembles the common perch more nearly than the B., but differs from both in having only a single elongated dorsal fin. It sometimes follows ships of which the bottom is covered with barnacles, is easily taken, and is esteemed excellent for the table.

BASSE-CHANTANTE, in Music, the higher of the two basses in a score, partaking of more melody and performed by the violoncello.

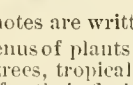
BASSE-CONTRAINTE, a French term in music, meaning a bass melody of a few bars repeated throughout the piece, while the other parts vary.

BASSEI'N, the name of two cities in India.—1. B., *in Pegu*, the capital of a district of the same name, stands on the left bank of an arm of the Irrawaddy, which joins the Bay of Bengal a few miles to the south of Cape Negrais. It lies in lat. 16° 45′ N., and long. 94° 50′ E.; and though it is 90 miles from the sea, yet it is easily and safely accessible to the largest ships. In a military view, also, the place is important, as it completely commands the navigation of the stream. It was captured by the British in 1852. Pop. (1872) 20,688. The district of B. has an area of 8954 sq. m., and a pop. of (1872) 316,833.—2. B., in the *presidency of Bombay*, is situated on an Island of the same name; lat. of the island, 19° 20′—19° 28′ N., and long. 72° 48′—72° 54′ E. It appears to be the mere wreck of former grandeur, having been found by Bishop Heber, in 1825, with many churches and convents, to be altogether uninhabited and desolate. In 1534, it was ceded to the Portuguese; in 1765, after a possession of 231 years, it was wrested from them by the Mahrattas; in 1780, it surrendered to the British, after a regular siege of twelve days. The island, which contains about 35 square miles, is separated from the continent by a narrow channel, which, as a shelter for shipping, constituted its value in the eyes of the Portuguese. Historically, B. is of some interest,

having been promised, though never delivered, as part of the dowry of Carles II.'s Portuguese consort.

BA'SSES, two ledges of rocks to the south-east of Ceylon, distinguished as the *Great* and *Little*—the former group being more to the south-west, and the latter more to the north-east. They lie in N. lat. 6° 11'—6° 26', and in E. long. 81° 40'—81° 59'. Their importance arises merely from their position, which is in a great thoroughfare of traffic.

BASSE-TERRE, a French term, equivalent to the English *Lowlands*, or, rather, *Lowland*, appropriately applied to several localities in the West Indies.—1. The capital of St. Kitt's, on the west coast, in lat. 17° 17' N., and long. 62° 42' W. It is a low, hot, dusty place, standing at the outlet of a lovely valley of the same name. Its population is about 9000; and its trade, as the port of the island, is considerable. The designation of the valley and town is a memorial of the former occupation of the half of St. Kitt's by the French.—2. The capital of Guadeloupe, giving its name to the larger of the two islets into which Guadeloupe is divided by an arm of the sea, known as Salt River. B. stands on the south-west coast, in lat. 16° N., and long. 61° 44' W., having nothing worthy of the name of harbor, but merely a roadstead. It contains about 13,000 inhabitants.—3. The chief town of Marie Galante, a dependency of Guadeloupe, which is about 12 miles to the north-west. It is otherwise ambitiously called Grand Bourg.

BA'SSET HORN (corno di basetto), the richest and softest of all wind-instruments, invented in Passau, in 1770, improved by Lotz in Presburg, in 1782. It is similar to a clarionet in tone and fingering; its compass is two and a half octaves, the notes written for it being from  but the instrument sounds a fifth lower than the notes are written.

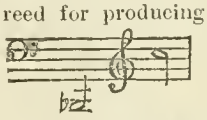
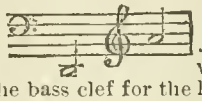
BA'SSIA, a genus of plants of the natural order *Sapataceæ* (q. v.). The species are trees, tropical or sub-tropical, the flowers of which are remarkable for their fleshy corolla, and for the abundance of oil or butyraceous fat which the seeds contain, and which is used for many purposes by the inhabitants of the countries to which they are indigenous. The fruit has a pulpy rind, and 3 or 4 1-seeded cells. The ovary has 8 cells; but some of them are always abortive. The BUTTER-TREE, described by Mungo Park as growing in the interior of Africa, in the country of Bambara, has been supposed to belong to this genus, and named *B. Parkii*. According to the eminent botanist Robert Brown, however, the seed of the butter-tree, as figured by Park, scarcely belongs to the genus B., but rather to the nearly allied genus *Vitellaria* or *Lucuma*. It produces the *Galam Butter*, also called *Shea Butter* (i. e., Tree Butter), which is highly valued, and forms an important article of internal commerce in the interior of Africa. The seeds of the fruit, which resembles an olive, are dried in the sun, or in a peculiar kind of oven, and the kernels are then boiled in water, in order to obtain the butter from them, which not only keeps for a whole year without salt, but is also whiter, more solid, and more pleasant to the taste than the butter of cows' milk. This butter is used both as an article of food and of medicine. It has been supposed that the introduction of this tree might be of great importance in other tropical countries. —The MADHUCA, MAHWA, or MAHOWA Tree of the East Indies (*B. latifolia*), is described as resembling a good oak in size, and is a valuable timber-tree. It is found in the mountainous parts of the Circars, Bahar, Bengal, &c. Its flowers are eaten raw, and a kind of arrack or spirit is distilled from them.

The seeds yield, by expression, a considerable quantity of a concrete greenish-yellow oil, which is used for lamps, and occasionally for frying articles of food.—The Indian BUTTER-TREE, or PHULWARA or FULWA Tree (*B. butyracea*), is found in some of the more mountainous parts of India, and attains a height of 50 feet. Its timber is light and of no value. The leaves are 6—12 inches long. The fruit is of the size of a pigeon's egg, and although eaten, is not much esteemed; but from the seed, a concrete oil or butter is obtained, by expression, of a delicate white color, much valued for medicinal uses, and as an unguent.—The seeds of the ILLUPIE-TREE, or Indian OIL-TREE (*B. longifolia*), a native of Coromandel, yield a large quantity of oil, which is used for lamps, for soap-making, and in cookery. The flowers are much esteemed for eating; and the wood is almost as hard and durable as teak.

BASSIM, a town of India, in the district of that name in the province of Berar. Pop. in 1872, 8531.

BA'SSINET See HELMET.

BASSOMPIERRE, FRANÇOIS DE, Marshal of France, was born in 1579 at Harnel, in Lorraine. Belonging to one of the oldest French families, he came, at the age of 20, to the French court, where he gained the favor of Henry IV. After the murder of Henry IV., he attached himself to the party of the queen, who appointed him colonel of the Swiss Guards; but on the murder of Concini, he sought to establish himself in the favor of the young king, and when the quarrel broke out betwixt mother and son, he particularly contributed to the overthrow of the former. He was raised to the rank of Marshal of France in 1622; was sent on embassies to Spain, Switzerland, and England; was actively employed in the siege of La Rochelle; took the pass of Susa by storm in 1629; and commanded for a little while the troops raised in Languedoc against the Huguenots. He became, however, an object of suspicion and dislike to Richelieu, who caused him to be cast into the Bastile in February 1631, from which he was not liberated until the death of Richelieu, in 1643, after he had been twelve years imprisoned. He died in 1646. He was an accomplished courtier, extravagant, and excessively addicted to gallantries. At the time of his arrest, he destroyed 6000 love-letters. His *Mémoires* (2 vols., Cologne, 1665; 4 vols., Amst. 1723), written in the Bastile, are rendered interesting by their spirited style.

BASSOO'N (Ital. *Fagotto*), a well-known wind-instrument of the reed species, made of maple-wood or plane-tree. The B. is an Italian invention; its name fagotto, meaning *a bundle*, probably from its being made in different pieces laid one against the other. The French call it *Basson de hautbois;* the Germans retain its Italian name. Its invention is attributed to Canonicus Afranio, in 1539. In the middle of the 16th c., it had already reached great perfection. Sigmund Schnitzer, in Nürenberg, who died in 1578, was a celebrated maker. The B. consists of a bored-out tube of wood in several pieces, fixed together alongside each other, so as to bring the holes and keys within the reach of the fingers of each hand. The B. has, in general, not less than 8 holes and 10 keys. In the narrow end of the wooden tube is fixed a small tapering brass tube in the form of an S, on the end of which is placed the reed for producing the tone. The compass of the B. is from  but the best tones are those from  . The lowest C sharp, and B natural, are wanting. The notes for the B. are written on the bass clef for the lower part, and on the tenor clef for the higher. The best keys for the B. are E flat, B flat, F, C, G, D, and A; all the other keys are more or less difficult. For military bands there are different sizes of bassoons—one a fourth lower; another, the contra B., an octave lower; and a third, the tenor B., a fifth higher—all of the same construction. The best instruction books for the B. are by Almenräder, Fröhlich, Ozi, and by the Paris Conservatorium. B. is also the name of an organ-stop, the pipes of which are made to imitate the tones of the instrument.

BASSO'RA, BUSSORA, or BASRAH, a town of Asiatic Turkey, pashalic of Bagdad, is situated on the western bank of the Euphrates, here called the Shat-el-Arab, about midway between the mouth of the Tigris and the Persian Gulf, from which it is 70 miles distant. Lat. 30° 30' N., long. 47° 34' E. There are many gardens within the walls of the city, and many plantations of roses around it, but it is very dirty. The river, which is navigable up to B. for ships of 500 tons, is there divided into a number of channels, and by evaporation and frequent overflowing, makes the climate very unhealthy. The inhabitants, once 150,000, now only 5,000 in number, are for the most part poor Arabs and Persians; the officials and military alone are Turks. Commerce is in the hands of Armenians. Most of the houses are low huts, built of unburned bricks. An extensive trade is carried on in the exchange of the productions of Turkey and Persia with those of India, and also in European goods, particularly articles of British manufacture. Amongst the exports are strong and beautiful horses, and dates, which are grown in great abundance. Caravans travel to Persia, and also by Bagdad and Aleppo to Constantinople. It has steam communication with Bombay and Bagdad. To guard against the incursions of the Arabs, a wall of about 94 miles in length has been erected in the neighboring desert, at all the gates of which a watch is maintained. B. was founded in 636 by the Calif Omar, and soon became one of the most famous and opulent cities of the East. The possession of it has been the subject of many contests between the Turks and the Persians. It is a place of great note in the history of Arabic literature.

BASSORA GUM, a whitish or yellowish-opaque substance resembling gum-arabic, but differing from it by being mostly insoluble in water. Its source has not been satisfactorily ascertained.

BASSO-RILIE'VO. See ALTO-RILIEVO.

BASS'S STRAIT separates Tasmania from Australia. It contains many islands, chiefly in its southern section, and is greatly beset by coral-reefs. It runs almost due east and west, has an average breadth of about 200 miles, and is pretty nearly bisected by the parallel of 40°.

B. S. deservedly bears the name of its explorer, who, without having been professionally a seaman, is entitled to a very high place among maritime discoverers. After having made shorter excursions from Port Jackson, in a mere wherry of 8 feet in length, Mr. Surgeon Bass resolved to settle, in a whaling-boat, the question as to the connection or separation of New Holland and Tasmania. In his frail craft, he penetrated as far as Western Port, near the entrance of Port Phillip, where, from the trending of the land and the swell of the sea, he inferred that he had most probably reached the open ocean. He did not rest contented, however, until, in a tiny bark of 25 tons, he actually circumnavigated Tasmania. The discovery, so deliberately prosecuted, and so satisfactorily completed, soon proved to be fertile of results; for in 1802, only four years after the exploration of Bass, Port Phillip was entered; in 1804, Tasmania was colonized; and now the strait is the highway for a trade of more than a million sterling between Victoria and Tasmania—a trade which has very recently received an additional impetus from the laying of a telegraphic cable between the two colonies at their joint expense.

BAST, or BASS, also called *Inner Bark*, *Liber*, or *Endophlæum* (see BARK), the fibrous inferior layer of the bark in the stems of exogenous plants, which is particularly conspicuous in exogenous trees, as a peculiar substance interposed between the true bark and the wood. It consists in great part of sap-vessels (laticiferous vessels, see LATEX and SAP) lying close together, and assuming the appearance of tough fibres. In a fresh state, it has generally a whitish color; and it is often composed of several layers, to which, however, the collective name of B.-layer is very often applied. The uses of this part of plants in the arts are very numerous; the fibres of hemp, flax, jute, &c., are nothing else than bast. The name B., however, is more commonly applied to the inner bark of trees, and is originally Russian, designating the inner bark of the lime-tree (q. v.) or linden-tree, which is employed for making a coarse kind of ropes, mats well known as B.-mats, and a kind of shoes much worn by the Russian peasantry. The trees are cut when full of sap in spring. For B. to be plaited into shoes, young stems of about three years old are preferred; and it is said that two or three are required to make a single pair of shoes. Trees of six or eight years old are cut down for the better kind of mats, which are exported in large quantities from Russia, and particularly from the port of Archangel, and so much used for packing furniture, for covering tender plants in gardens, supplying strands with which plants are tied, &c.

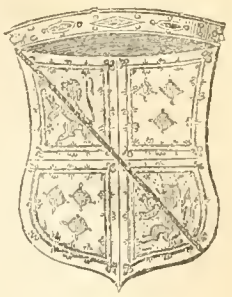
The trees from which the B. is taken are very generally burned for charcoal. After the bark is dried, its layers are easily separated by steeping in water. The finest layers are the inner, and the coarser are the outer ones.—The manufacture of B-mats is nearly confined to Russia and Sweden. Not fewer than 3,500,000 are annually exported from Russia, and from 500,000 to 800,000 are annually imported into Britain. A few are made in Monmouthshire. Lime-tree B. is used in the south of Europe for making hats. The name B.-hat is, however, very often given to a hat made of willow-wood planed off in thin ribbons, and plaited in the same manner as straw-hats. The inner bark of *Grewia didyma*, a tree of the same natural order with the lime-tree, is used for making ropes in the Himalaya Mountains.

BA'STARD BAR. In popular speech we frequently hear of a *Bar-sinister*, as a mark of bastardy. But a bar-sinister, strictly speaking, is an impossibility, inasmuch as the Bar (q. v.) is not formed of diagonal but of horizontal lines. A Bend-sinister (q. v.), which, by the French, is called a bar, has with more reason been confused with the true mark of illegitimacy, and has on that account been avoided even by heralds. But the real B. B. differs very essentially from the bend-sinister, being half of the scarp, which again is half of the bend-sinister. 'The half of the scarp,' says Nisbet, 'with the English, is called a Batton-sinister; by the French, Baston-sinister; it is never carried in arms but as a mark of illegitimation, commonly called the Bastard-barr.' In modern practice, the baton does not touch the extremities of the shield, or of the quarter in which the paternal arms are placed, but is *couped*—that is, cut short at the ends. In this form the baton, when used as a mark of illegitimacy, is placed over the paternal coat of the bastard, whether used singly or in a quartered shield.

Bastard Bar.

Nisbet informs us that the baton-sinister, both in England and Scotland, is comparatively of modern invention, natural children in earlier times not having been permitted to assume the arms or even the names of their fathers. 'The unlawful children of John of Gaunt, Duke of Lancaster, begot of Katharine, daughter of Sir Payen Roat Guyn, King of Arms, did not carry the arms of their father the king, though nobilitate, with a baton-sinister, as now used; . . . but after the legitimation of these three natural sons by act of parliament, they then assumed the sovereign ensigns of England, within a bordure gobbonated, argent and azure.'

According to the practice of France, which probably was followed in England also, the bastard could not cancel or alter the baton without the consent of the chief of the family, or the authority of the sovereign. Even where the baton was not removed, it was common for the sovereign to grant his permission to carry it *dexter*, in place of sinister. Charles VII. of France allowed John, the Bastard of Orleans, for his valor against the English, to turn his sinister traverse to the dexter, with which he and his issue afterwards *bruised* the arms of Orleans, as dukes of Longueville. The same privilege was granted to James, Earl of Murray, natural son of King James V. of Scotland, by his sister Queen Mary, and he thenceforth carried the Lion and tressure of Scotland thus bruised, quartered with the feudal arms of the earldom of Murray. The general practice of the milder heraldry of our own day is to substitute the gobbonated bordure for the B. B., not only in the case of the legitimate children of bastards, but of bastards themselves. See GOBONG.



Earl of Murray's Arms.

BASTARD EIGNÉ is the name given in English law-books to an eldest son illegitimate by birth, but whose father and mother were subsequently married, and had other children born in wedlock. See BASTARDS AND BASTARDY.

BA'STARDS AND BA'STARDY. Bastards, as described by Blackstone, are such children as are not born either in lawful wedlock, or within a competent time after its determination. The Scotch lawyers, again, true to their peculiar law of marriage, define a bastard as a child born of a woman, who was not married to the father at the time of conception, *and who was never therafter married to him*. It was at one time the law of England, when divorces *a mensa et thoro* were adjudged by the ecclesiastical courts, that if the wife had children during the legal separation occasioned by the former kind of divorce, such children were *primâ facie* bastards—for the law presumed the parties to live conformably to the sentence of separation. But in modern times, the presumption has changed, and now always favors legitimacy.

Bastards are incapable of inheriting real property; nor can they claim any share of personal estate as next of kin to a party dying intestate. They are said to be *filii nullius*, or *filii populi*, the sons of nobody, or the sons of the people, having no inheritable blood in them. As laid down, however, in many authorities, and amongst others in the last (4th) edition of Stephen's *Commentaries*, there is an exception to this rule in the case of a bastard *eigné* and *mulier puisné*, and where, it may be observed, the principle of the Scotch law of legitimation appears to some extent to be admitted. Thus, where a man has a bastard son, called a *bastard eigné* (q. v.), and afterwards marries the mother, and by her has a legitimate son, who, in the language of the law is called a *mulier puisné*—if the father dies, and the *bastard eigné* enters upon his land, and enjoys it to his death, and dies seized thereof, whereby the inheritance descends to his issue, the *mulier puisné*, and all other heirs are totally barred of their right, because the laws of England pay such a regard to a person in the situation of the *bastard eigné*, that after the land had descended to his issue, they would not unravel the matter again, and suffer his estate to be shaken. But this indulgence was shown to no other kind of bastard; for if the mother was never married to the father, such bastard could have no colorable title at all. And the above exception would almost appear to be the law of England at the present day. But the recent statute renders this opinion somewhat doubtful, for by the 3 and 4 Will. IV. c. 27, s. 39, it is enacted that no *descent cast*, after the 31st day of December 1833, shall defeat any right of entry or action for the recovery of land. By descent cast is meant an heir of a party who had contrived illegally to enjoy the land without challenge during his life, and was thereby enabled to transmit it to his heir, who thenceforth had a title which could not be impeached either by the original rightful owner, or by any of his descendants. The above statute, however, has cut off the rights in this behalf of all such descents cast, and the true owner can now, under the provisions of the act, always recover. But is the son of a *bastard eigné* such a 'descent cast' as is contemplated by the 3 and 4 Will. IV. c. 27? It may be doubted whether he is. The expression 'descent cast' is generally applied in law-books to the case of a *stranger* who, under a forcible, wrongful, and illegal entry on the land, had succeeded in diverting the inheritance from the direct and original channel. But such is not the position of a *bastard eigné*. He is not, in any sense of the word, a stranger; nor is the above privilege or favor allowed him and his family at all in respect of his position towards, or of anything that can be called his title to the *land*, but such privilege and favor are given him solely because of his *peculiar bastardy*.

In fact, it is just because he is *not* a stranger, but his father's eldest

son by birth, that the law from ancient times decided that he should not be altogether deprived of what otherwise would have been his natural rights. The rule, as we have suggested, appears to be founded on the principle of the Scotch law of subsequent legitimation; and the intention probably was to give effect to the good feeling of the second or other legitimate son, who, from a regard to his mother's character, as well as his brother's position, might find himself excused from asserting his claims. Whether the above statute can, by its general terms, be understood arbitrarily to alter such a reasonable and natural law of family succession, is a question for lawyers and law-courts. The point, however, is important for popular explanation. In all other cases, the law of England appears to be as distinct as it is severe. It has even been decided that a child born before wedlock in a foreign country, and according to whose law such child was legitimate, could not inherit land in England where his bastardy was indelible.

There can be no collateral succession through bastards; for as they cannot be heirs themselves, so neither can they have any heirs but those of their own bodies. A bastard is not entitled to the name either of his reputed father or of that of his mother, though he may acquire himself a surname by reputation; nor can he take property by the mere description of *child* of his reputed parent, until he has acquired the reputation of standing in that relation to him. Nor does a bastard follow, as legitimate children do, his father's place of parochial settlement under the poor-laws, but he has and follows the settlement of his mother until he attains the age of 16, or until he acquires a settlement of his own right, and after that age his primary settlement is in the parish where he was born. Another peculiarity of the status of bastardy is, that a bastard being *filius nullius*, the consent of his father or mother to his marriage is not required, and is of no avail; but a guardian may be appointed by the Court of Chancery for the purpose, or a license may be granted upon oath made that there is no person authorized to give consent. To this may be added, that although in general a father may by deed or will appoint a guardian for his infant child, in the event of his decease, he has no such privilege if the child be illegitimate.

Such may be stated to be the principal peculiarities attaching to bastardy in the law of England. In other respects, a bastard is very much in the same position as a legitimate person. Thus, he can hold land in fee-simple, and can dispose of it as he may think proper, making an unlimited alienation of it; and of course he can make a will bequeathing his whole estate; a simple and reasonable privilege, however, which, strange to say, was not conceded to bastards in Scotland dying without lawful issue, till the year 1836, when an act of parliament was passed, the 6 Will. IV. c. 22, which, on the preamble that 'it is just, humane, and expedient,' empowered bastards in that country to dispose of their personal property by testament or will in like manner as other persons might do, any law or practice to the contrary notwithstanding! In regard to his whole estate, although the crown is entitled to such in the case of a bastard dying intestate, the royal claim is not strictly enforced; but upon petition, the crown's right will be transferred to the nearest member of the deceased bastard's family. In the Scotch law, also, the crown may, by what is called a *gift of bastardy*, grant not only the personal, but the real estate of an intestate bastard to the 'donatory,' or person similarly entitled, as in the case of personal property in England. It is also to be observed, that the prohibitions as to marriage which extend to collaterals, and to those related by the half-blood only, also apply, although one of the parties be bastard. Again, the laws relative to incest apply to a bastard with equal force as to others; the principle of the two latter points being that, although the bastard be *filius nullius* as to many civil consequences, his relationship to his natural parent is recognized for moral purposes. Of course, it need not be added that a bastard may be made legitimate by an act of parliament for all purposes, even for that of inheriting land, 'as was done,' says Blackstone, 'in the case of John of Gaunt's bastard children by a statute of Richard II.'

The paternity of a bastard or illegitimate child in England is ascertained by several statutes—7 and 8 Vict. c. 101, 35 and 36 Vict. c. 65, 36 and 37 Vict. c. 9; and the father is bound to make a proper allowance for the child's support till sixteen. But it is on the mother herself that the maintenance of the child in the first instance devolves. She is for this purpose entitled to its custody in preference to its father; and she is bound to maintain it as part of her family while she remains unmarried, or until the child attains the age of 16, or gains a settlement in its own right, or (being a female) is married; and in the event of the mother's marriage, the same liability attaches to her husband. If the mother be of sufficient ability to maintain the bastard, while he is so dependent on her, and neglect that duty, so that he becomes chargeable to a parish, she is liable, by 7 and 8 Vict. c. 101, s. 6, to be punished under the provisions of the *Vagrant Act*. Whether the mother is of sufficient ability or not, she can, by affiliation proceedings, compel the father to pay a sum not exceeding five shillings a week till the child is sixteen (35 and 36 Vict. c. 65).

Besides the points in the Scotch law to which we have adverted, it is to be observed that in that system, the maintenance, or 'aliment,' as it is called, of illegitimate children, is a joint burden upon both parents. The mother is entitled to the custody of the child, but it does not appear whether she is to have such custody for any fixed time. It is in the discretion of the Court of Session to determine this, and it would seem that the period may vary according to circumstances, from seven to fourteen years. During this time, the father is bound to contribute his proportion of the expense; and if neither the father nor mother can support the child, it must be maintained by the parish in which the mother has a settlement.

There is a nice and curious difference in the laws of England and Scotland as to the mode of ascertaining the paternity of a bastard child. According to the statutes we have referred to, that fact may be proved in England by the evidence of the mother, provided her statement is supported in 'some material particular' by her testimony. But in Scotland, the order of the inquiry is reversed; the woman's evidence in that country being taken *last*, and only where the other and independent evidence amounts to what is called a *semiplena probatio*—that is, such evidence as induces a reasonable belief, although not complete evidence, in which case she is admitted to give what is called her *oath in supplement*.

Both in England and Scotland, the widow of a bastard, whether there be issue or not of the marriage, is entitled to dower, terce, *jus relictæ*, and all the other legal rights of widows. See Legitimacy, Separation, Divorce, Marriage, Inheritance, Fee-Simple, Succession, Ultimus Hæres, Vagrants, and Semiplena Probatio.

BA'STARDY, Gift of. See under the preceding article.

BA'STARDY, Declaration of. This is a suit which may be instituted in the Court of Session in Scotland, for having it declared that the lands or effects which belonged to the deceased bastard, belong to the donatory in virtue of the gift from the crown. The 'defender,' or person against whom the suit is formally brought, is the party who would have succeeded to the bastard, had he been legitimate. B. can also be judicially declared by a similar mode of proceeding at the suit of a party who has any other interest, or, indeed, any interest whatever, to have such illegitimacy determined.

By a recent act of parliament, the 21 and 22 Vict. c. 93, the same conclusion may be substantially obtained by the English proceeding, directed by the act in the Court for Divorce and Matrimonial Causes. The act in question, it is declared, may be cited for all purposes, as the 'Legitimacy Declaration Act, 1858.'

BASTI'A, the former capital of Corsica, is picturesquely situated on the slope of a mountain, rising from the sea in the form of an amphitheater, in the north-eastern part of the island, in lat. 42° 42′ N., and long. 9° 27′ E. It has (1872) 15,580 inhabitants. The streets are narrow and crooked. It has a harbor suitable for small vessels, defended by a mole, at the mouth of which is a rock resembling a lion couchant, and designated 'Il Leone.' There is a considerable trade in leather, skins, wine, oil, figs, and pulse; and many stilettos and daggers are manufactured here, which are principally exported to Italy. Until recently, the printing-presses of B. were actively employed in the production of Italian publications that would not have been permitted to appear in that country itself. B. was founded in 1380 by the Genoese Leonel Lomellino. During last century, it was oftener than once taken by the British. It was made, in 1791, the capital of the French department of Corsica, which rank was afterwards transferred to Ajaccio. It is the seat of the highest courts of the island.

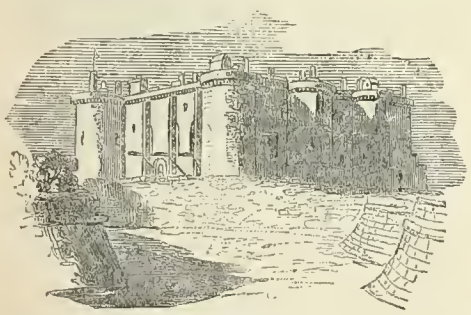
BASTIAT, Frédéric, an eminent political economist, was born at Bayonne on the 29th of June, 1801. His father was a merchant, and educated his son with a view to the same profession. After completing his studies, B. entered the commercial house of one of his uncles, established at Bayonne, and employed his leisure hours in the study of political economy. Circumstances called him into Spain and Portugal in 1840, where he took advantage of the opportunity afforded him to study the customs and institutions of these two countries, which have still much to learn before they can be on a footing of equality with other nations in matters of finance and political economy. His first appearance as an author was in 1844, when he published, in the *Journal des Economistes*, an article 'On the Influence of French and English Tariffs on the Respective Futures of the two Peoples.' It contained in germ B.'s theory of political economy, who, from that moment, was a decided opponent of the system of protection. Subsequently, in the same journal, he combated the economic fallacies of Socialism and the rights of labor. During a visit to England, he made the acquaintance of Cobden, and on his return to France, he translated (1845) the speeches of the free-traders, which he published with an introductory preface, entitled *Cobden and the League, or the English Agitation in Favor of Free Trade*, in which he gathered up into one solid mass the inconveniences of the

protective system. B. now went to reside in Paris, where he continued to propagate his views with considerable success; he became secretary of the societies, and chief editor of the journal, established to vindicate the principles of free trade. After the revolution of 1848, he was elected successively a member of the Constituent and Legislative assemblies. In 1850, he came forward as the antagonist of the Socialist writer, Prudhon. Suffering from pulmonary disease, he repaired to Italy for change of climate, but died at Rome on the 24th December, 1850.

Besides the writings mentioned, B. published *Sophismes Economiques—Propriété et Loi, Justice et Fraternité—Protectionisme et Communisme, Harmonies Economiques*, and several other important tractates, all of which exhibit extensive knowledge of the subjects discussed, convincing logic, and a power of sprightly and biting satire. The *Harmonies Economiques* has been translated into English by P. J. Stirling (*Harmonies of Political Economy*, Murray, Lond. 1860). The soundness of the principles which the writings of B. uphold, notwithstanding the protectionist tendencies of the government, is now generally acknowledged in France.

BASTIDE, Jules, a French journalist and politician, Minister of Foreign Affairs in 1848, and member of the Constituent Assembly, was born at Paris in 1800. In 1821, he became one of the first members of the French Carbonari; and after the July revolution, he was conspicuous among the writers of the radical opposition. On the reconstitution of the National Guard, B. was elected commandant-in-chief of the legion of artillery, in which the republicans were grouped, and took part in two insurrectionary movements, for the second of which—the *émeute* at Paris, 5th June 1832—he was condemned to death, but escaped to London. Pardoned in 1834, he returned to Paris, and again devoted himself to politics in the columns of the *National*. B., however, being one of those Neo-catholic republicans who regarded the Church of Rome as the religious synonym of democracy, could not heartily sympathize with the tone of that newspaper on religious topics, and in 1847 he founded the *Revue Nationale*, in which he advocated his peculiar opinions. During the revolution of 1848, he was a supporter of General Cavaignac, and an opponent of Socialism. In 1858, he published *La République Française et l'Italie en* 1848; and in 1859, *Guerres de Religion en France*. He died 3d March 1879.

BA'STILLE was, in France, a general term for a strong fortress, defended by towers or bastions (q. v.), and in this sense it was used in England also after the Norman Conquest. The famous prison to which the name latterly was appropriated, was originally the castle of Paris, and was built by order of Charles V., between 1370 and 1383, by Hugo Aubriot, Prévôt or Provost of Paris, at the Porte St. Antoine, as a defence against the English. Afterwards, when it came to be used as a state-prison, it was provided, during the 16th and 17th centuries, with vast bulwarks and ditches. On each of its longer sides the B. had four towers, of five stories each, over which there ran a gallery, which was armed



The Bastille.

with cannon. It was partly in these towers, and partly in cellars under the level of the ground, that the prisons were situated. The unfortunate inmates of these abodes were so effectually removed from the world without as often to be entirely forgotten, and in some cases it was found impossible to discover either their origin or the cause of their incarceration. The B. was capable of containing 70 to 80 prisoners, a number frequently reached during the reigns of Louis XIV. and Louis XV. Though small compared to the number which an ordinary prison contains, these numbers were considerable, when we reflect that they rarely consisted of persons of the lower ranks, or such as were guilty of actual crimes, but of those who were sacrificed to political despotism, court intrigue, ecclesiastical tyranny, or had fallen victims to family quarrels—and were lodged here in virtue of *lettres de cachet* (q. v.)—noblemen, authors, savans, priests, and publishers.

On the 14th of July 1789, the fortress was surrounded by an armed mob, which the reactionary policy of the court had driven into fury, and to the number of which every moment added. The garrison consisted of 82 old soldiers and 32 Swiss. The negotiations which were entered into with the governor led to no other result than the removal of the cannon pointed on the Faubourg St. Antoine, which by no means contented the exasperated multitude. Some cut the chains of the first drawbridge, and a contest took place, in which one of the besieged and 150 of the people were killed, or severely wounded; but the arrival of a portion of the troops which had already joined the people with four field-pieces, turned the fortune of the conflict in favor of the besiegers. Delaunay, the governor—who had been prevented by one of his officers, when on the point of blowing the fortress into the air—permitted the second drawbridge to be lowered, and the people rushed in, killing Delaunay himself and several of his officers. The destruction of the B. commenced on the following day, amid the thunder of cannon, and the pealing of the Te Deum. This event, in itself, apparently of no great moment, leading only to the release of three unknown prisoners—one of whom had been its tenant for thirty years—and four forgers, and which it is said only the 654 persons whose names now appear on the column in the Place de la Bastille, took part, nevertheless finally broke the spirit of the court-party, and changed the current of events in France.

BASTINA'DO (from the Fr. *baston* or *bâton*, a cudgel), the name given by Europeans to the punishment in use over the whole East, which consists in blows with a stick, generally upon the soles of the feet, but sometimes upon the back.

BA'STION, in Fortification is one of the principal defence-works in a fortified place. It is a kind of tower, very broad in relation to its height. The plain wall, called the *curtain*, which often surrounds a fortified town, is usually a polygon of many sides; and in that case, bastions occupy all, or nearly all, the salient angles. Bastions are mostly five-sided; the two outermost sides are the *faces*, meeting in an angle towards the enemy; the two on either side of these are the *flanks*, meeting two curtains or portions of wall; and the fifth side, open to the interior of the fortified place, is the *gorge*. Bastions may be regarded as projections, which enable the defenders to watch the approach of the enemy to the foot of the wall, and to frustrate them by a flanking fire. Taking the average range of modern ordinance and muskets as a basis, engineers decide on a distance of 300 to 400 yards between B. and B. The length of each face and flank of a B. is so regulated, that two bastions can defend each other and the intermediate portion of wall. The main substance of a B. is an immense mound of earth, capable of supporting heavy guns, and of receiving the fire of the enemy; but it is faced and strengthened in many parts with brick and stone. The top is broad enough to allow room for the large guns, and for infantry and artillery soldiers. A *hollow* B. has the space within it kept down to the level of the town or natural ground; but a *solid* B. filled up to the top with firm materials, is considered to be the best defensive construction. Vauban devised the plan of having large *detached* bastions opposite the chief angles of the place, with a ditch behind each; a tower or small B. being placed at the real angle of the wall behind. See Fortification, Siege.

BASUTOS are a south African race belonging to the great Bantu stock, and closely allied to the Betjuans (q. v.) or Bechuanas, if really not a sub-divison of the latter people. The Bantu stock, as distinguished from negroes on the one hand and Hottentots and Bushmen on the other, is that to which the Kaffirs also belong. The B. are superior to the Kaffirs in intelligence and industry, but rank below them in bodily development and warlike energy. Unlike the Kaffirs, the B. keenly appreciate and imitate civilized customs and arts. Basutoland, a rugged territory lying along the headwaters of the Orange River and among the ridges of the Drakensberg, was proclaimed British territory in 1868, and incorporated with Cape Colony in 1871. The B. have, since 1848, lived under a British semi-protectorate.

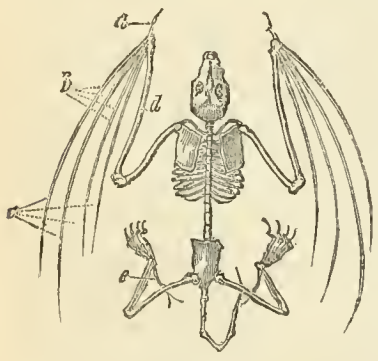
BA'SYLE is the name given by chemists to a simple or compound substance which can unite with oxygen to produce a base (q. v.). Thus, all the metals are examples of simple basyles, and ammonium (NH_4), ethyle (C_4H_6), methyle (C_2H_3), &c., represent compound basyles. Another property which a B. possesses is, that it can unite with a salt radical (q. v.), like chlorine or cyanogen, to form salts. Thus, the B. sodium (Na) combines with chlorine to produce a salt—in fact, common salt (NaCl); and mercury (Hg) unites with cyanogen (Cy) to form the salt cyanide of mercury (HgCy).

BAT, the common name of all animals of the class *Mammalia* which are furnished with true wings, and so are capable of really flying or propelling themselves in the air. They were all included by Linnæus in the genus *Vespertilio* (old Latin name), now subdivided and forming the family *Vespertilionidæ*, which is very generally regarded as of precisely equal extent with the sub order *Cheiroptera* (Gr. hand-wing*ed*), although some naturalists still fol-

low Cuvier in regarding the *Galeopithecidæ* (Colugos or Flying Lemurs) as another family of Cheiroptera. But besides other characters which connect the Colugos with Lemurs rather than with bats, they greatly differ from bats in having a mere extension of the skin of the flanks attached to the limbs—as in the Flying Squirrels and Petaurists or Flying Phalangers, and in the Flying Dragon among saurian reptiles—capable of sustaining them in the air like a parachute in a very extended leap, but not of being expanded and closed by a succession of strokes for true flight. The power of true flight, bats, on the contrary, possess; and some of them not only fly rapidly, but wheel about very nimbly in the air, in pursuit of their insect prey.

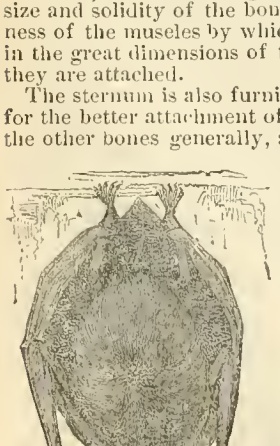
Long-eared Bat (*Plecotus auritus*).

It is very interesting to compare the organs of flight in bats with those of birds, both as to the points in which they agree, and those in which they differ. They beat the air, as birds do, with their anterior members; but the requisite extension of surface is not obtained by quills, but by a great elongation of the arms and fingers, upon which a thin membrane is stretched, folding close to the body by means of their joints, when the wing is not in use. A little attention to the accompanying figures of the skeleton of a bat and of a bat flying, will make plainer than mere words can the relation of the bones of a bat's wing to the bones of the human arm and hand, or to the ordinary bones of the anterior extremities in quadrupeds which have fingers or toes. The thumb, *a* (in figure of skeleton), is short, armed with a strong nail, and not at all included in the wing-membrane, nor used in flight. The bones most elongated of all are the metacarpal bones, or bones of the hand, *b;* the true finger-bones, *c*, are not so much so. The fore-arm, *d*, has not two bones (radius and ulna), but only one (the ulna), with a sort of rudiment of the other; the rotatory motion, of which these two bones afford the means, being not only unnecessary to bats, but at variance with the purpose chiefly designed in this part of their structure, of a powerful stroke in one particular direction. For a similar reason 'the fingers of this strange hand are incapable of closing towards the palm, as ours do, when grasping an object: their only movements are such as fold up the wing against the side of the body, by laying the fingers close along the side of the fore-arm, as in closing a fan.' Great strength, however, was requisite in the shoulder; and, accordingly, we find an analogy to birds in the size and solidity of the bones in this part, as well as in the thickness of the muscles by which the wings are moved, and still more in the great dimensions of the sternum, or breast-bone, to which they are attached.



Skeleton of Bat.

The sternum is also furnished with a medial ridge, as in birds, for the better attachment of the muscles. The ribs are large; but the other bones generally, as those of the head and of the pelvis, are delicate, and appear designed for lightness. —The wing membrane of bats extends along the flanks to the hind-legs, although these aid little in flight; but it is attached to them so as to leave the feet free, which are much like the feet of ordinary small quadrupeds with toes and claws, and are employed along with the thumbs of the anterior limbs in creeping upon the ground, in climbing perpendicular rough surfaces, or for hanging with the head downward in that remarkable posture of repose in which bats pass great part of their lives, and in which they differ from all other animals.



Bat in repose.

In the greater number of species of B., the wing-membrane extends not only to the hind-legs, but beyond them to the tail, which is included in it, a peculiar bone (*e* in fig. of skeleton) also arising from each heel to afford further support to this part of it, which seems to serve purposes analagous to the tail of birds, acting as a rudder, and enabling the animal to make those rapid evolutions in the air, which it is so pleasing to see as bats flit about in the summer evening. The fruit-eating bats of tropical regions, which have no need to perform such evolutions, are destitute of this interfemoral part of the membrane; and according to the habits for which each species has been designed, the tails are long or short, entirely included in the membrane, or only for part of their length, or produced a very little beyond it, and terminating in a hard tip, so that the tail is capable of being used to aid in creeping or climbing, evidently possessing considerable power, and being curved and moved in a manner which suggests a slight analogy to the prehensile tails of monkeys.

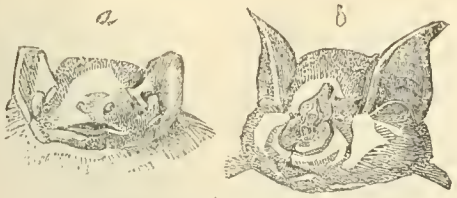
Bats were placed by Linnæus in his order *Primates*, along with monkeys and lemurs, with which they agree in their pectoral teats and in other characters, particularly of the organs of reproduction. In one genus (*Dysopus*), there is an additional resemblance to the Primates in the partially opposable thumbs of the hind-feet, and a trace of this character is to be found in the fore-thumbs, already noticed. Bats are now, however, generally placed by naturalists in the order *Feræ* or *Carnaria*, although, like many other animals of that great order, most of them are by no means exclusively carniverous. The greater part of them feed chiefly on insects, some chiefly on fruits. They exhibit considerable variety both in the number and character of their teeth, as might be expected in animals which differ so much in their food. All of them have four rather large canine teeth; the incisors vary much in size and form, as well as in number. The digestive apparatus exhibits a variety corresponding with that of the teeth; the intestinal canal of the Vampyres (q.v.), which live by sucking the blood of animals, proceeding almost in a straight line from one extremity of the body to the other, whilst that of some of the frugivorous bats, as the Kalong (q. v.) (*Pteropus*) of Java, is seven times as long as the body.

Head of Pteropus.

Except in the power of flight and things essential to it, bats present no resemblance to birds. The old English name *Flittermouse*, and the German *Fledermaus*, indicate an early popular recognition of their true place in creation. They are generally nocturnal animals, or, at least, prefer the twilight, although one of the British species may occasionally be seen pursuing insects during winter at mid-day. They generally spend the day in caves, hollow trees, and other dark recesses, often under roofs of houses, and in crannies of ruined or deserted buildings. They are found in almost all parts of the world, except the very coldest, but are most numerous and of greatest size in the tropics. Those of temperate climates generally spend the winter in a state of torpidity, in which, although circulation continues very languidly, respiration does not ordinarily take place. The whole number known to Linnæus amounted to a very few species, not half so many as are now known to inhabit Great Britain alone.

Upwards of 130 species have been described, and there is great probability that the actual number existing is very much greater. It is not unlikely that some exaggerated accounts of the great bats of warm climates gave rise to the fable of the Harpies, which Virgil introduced into the *Æneid*. The bats of Europe are all small; the body of the largest British one is not so large as a mouse, and the fullest stretch of its wings about 15 inches, whilst the common British species are much smaller; but in the Kalong, already mentioned, the stretch of wing is 5 feet. Of British species, the largest is the Noctule B. (*Vespertilio noctula*), a very local species, found chiefly in the south of England; the Pipistrelle B. (*V. Pipistrellus*) is perhaps the most common. It was long confounded by British naturalists with the common B. of the continent of Europe (*V. murinus*), which is much larger, and very rare in Britain. In some parts of the country, the Long-eared B. (*Plecotus auritus*) is very common. It is distinguished by its enormously large and very beautiful ears, which, when it is asleep, are folded up in a remarkable manner under the arm, the long *tragus* then resembling a slender ear. This great development of the ears is characteristic of certain genera of B., that part of the ear called the *tragus* attaining also a remarkable size, so that it seems like a smaller ear in front of each large one. In many species, only two of which are found in Britain, there is a still more remarkable membraneous or leaf-like appendage on the nose, which in some is simple, in some, complex, and often of large size, giving an extraordinary appearance to the face. Some of the larger species, having a nasal crest, are called Spectre Bats (q. v.). Only two species of B. (*Rhinolophus*), possessing such an appendage, are found in Britain, both of them very rare; from the form which it assumes, they are called Horseshoe Bats. It is supposed that this

nasal appendage is of use as a very delicate organ of touch, perhaps also of smell; as the great ears may be of use both for touch and hearing. These senses must often guide bats when that of sight cannot be employed; and the sense of touch appears to be possessed in no ordinary degree even by the wing membrane. By supposing it to be affected by the pulsations of the air, Cuvier accounted for the power displayed by bats which had been cruelly deprived of sight, of avoiding objects amongst which they flew, without the necessity of ascribing to them, as Spallanzani had done, the possession of a sixth sense.



a, Great Bat or Noctule Bat (*Vespertilio noctula*).
b, Greater Horseshoe Bat (*Rhinolophus Ferrumequinum*).
Both British.

It deserves to be here noticed that, amongst the peculiarities which distinguish certain genera of bats, is the absence not only of the upper cutting teeth in the East Indian and African genus *Megaderma*, but even of the bone in which these teeth are usually placed; and that another tropical genus, *Nycteris*, of which the species are found in Africa and Java, have the skin attached to the body only at a few points, and capable of being blown up like a bladder, at the pleasure of the animal, by means of air which is inhaled through the nostrils into cheek-pouches communicating by small apertures with the general skin-bag. The use of this is wholly unknown.

Bats walk or creep awkwardly upon the ground, one side of the body being jerked forward, and then the other, yet they run with considerable celerity. There is a common notion, that they cannot rise easily from a level surface, but must find some eminence from which to throw themselves. Of the fallacy of this, any one will soon be convinced who gets a B. and places it upon the floor. —Bats commonly produce one or two young at a birth.—Some of the species are very gregarious; others often fly about in pairs; great numbers, and of different species, are often found congregated in their places of hybernation or repose.—Some of the species, are easily tamed, and become very familiar; but their odor is disagreeable, and it is generally found difficult to keep them long alive.

Bat walking (*Plecotus auritus*).

Fossil remains of *Cheiroptera* are occasionally found in eocene rocks, but owing to the delicacy of the bones, great difficulty has been experienced in the determination of the genera and species.

BAT, or BÂT (Fr.), in military matters, was originally the name of a kind of pack-saddle; and hence a bat-horse was a baggage-horse bearing a bat or pack, and a bat-man was a servant in charge of the horse and bat. By a modification of meaning, a bat-man is now any soldier allowed to act as servant to an officer. When British troops are sent on foreign service, bat-horses or mules are provided (if carriages are not forthcoming) for carrying the regimental books, the kettles and tents, the medicine-chest, the veterinary medicine-chest, intrenching tools, armorers' stores, saddlers' stores, &c.—about 20 such horses or mules to each battalion. Bat-horses and bat-men are also provided for carrying officers' camp-equipage. An allowance for procuring these accommodations is usually called Bat-money.

BATA'NGAS, a seaport town of the Philippines, island of Luzon, and capital of the province of the same name. Lat. 13° 45′ N., long. 121° 5′ E. Distance from Manilla, 50 miles S.; founded 1581. Pop. of town and district, 27,000. B., which is well built, and has an elegant appearance, is finely situated on an extensive bay which opens into the Strait of Mindoro. Considerable advantage is taken of its facilities for commerce.

BATARDEAU′, a strong wall of masonry, built across the outer ditch of a fortress, to sustain the pressure of water when one part of the ditch is dry and the rest wet. It is built up to an angle at the top, and is armed with spikes, to prevent the enemy from crossing; and sometimes a stone tower is provided to strengthen the defence. There is a sluice-gate to regulate the admission of water.

BATA'TAS, or SWEET POTA'TO (*Convolvulus Batatas*, or *Batatas edulis*, the genus *Batatas* having recently been separated from *Convolvulus* [q. v.], chiefly upon account of the four-celled ovary), a perennial plant with long creeping stems, heart-shaped leaves on long stalks, and variously lobed, large purple flowers much resembling those of the best known species of Convolvulus, and very large oblong acuminated tubers. It is a native of the East Indies, but is now cultivated in all tropical and sub-tropical countries for its tubers, which are highly esteemed as an article of food, and are eaten either roasted or boiled; they are sweet, wholesome, and nutritious, but somewhat laxative. The B. forms, next to maize, the principal food of the poorer classes in some parts of America. Its cultivation is very easy; it is readily propagated by tubers or by cuttings of the stem, requires little attention, and soon produces its tubers. In hot-houses in Britain, these are without difficulty obtained of 1 lb. to 2 lbs. weight. The cultivation of the B. has been introduced into the south of Europe. In America, it is little cultivated to the north of New Jersey, and even there is inferior. The leaves are used as a boiled vegetable. It is the B., or sweet potato, which is usually meant by the older English writers, when they mention potatoes. Its tubers were imported into England by way of Spain, and sold as a delicacy, before the potato was known.—*Batatas paniculata*, or *Convolvulus paniculatus*, a nearly allied species, is cultivated in the same way as the common B., and its tubers are similar in quality.—To the new genus *Batatas*, has been referred also the plant formerly known as *Ipomœa macrorhiza*, now *Batatas jalapa*, so called from supposed purgative qualities of the root, which, however, it is found not to possess, being white, insipid, saccharine, and farinaceous, and of great size, 50—60 lbs. in weight. The plant inhabits sandy soils in Georgia and Carolina.

Batatas.

BATA'VI (or, according to some MSS., VATAVI), the name of a German people, who anciently inhabited a part of the present Holland, particularly the island which was called after them, Batavia, formed by the branch of the Rhine, which falls into the sea at Leyden, the Waal, and the Meuse. Their country, however, extended across the Waal, but its boundaries cannot now be precisely determined. According to Tacitus, they were originally a branch of the Chatti, who emigrated across the Rhine. They were conquered by Germanicus; became subject to the Romans, and served them so well, that they obtained the honorary title of friends and brothers of the Roman people; were exempted from taxes and assessments, being only required to provide a proportion of troops; and were permitted to choose their commanders from amongst themselves. Their cavalry were particularly good, and were often employed by the Romans. The first who terms the insular district inhabited by these Gauls, Batavia, is Zosimus, who also informs us that in the time of Constantius (358 A.D.) it had fallen into the hands of the Salii, a Frankish tribe.

BATA'VIA, properly the name of the island occupied by the ancient Batavi, became at a later date the Latin name for Holland and the whole kingdom of the Netherlands. The name BATAVIAN REPUBLIC was given to the Netherlands on their new organization of 16th May 1795, and they continued to bear it till they were converted into the kingdom of Holland, under Louis Bonaparte, 5th June 1806.

BATA'VIA, the capital of the empire of the Netherlands in the East Indies, stands on the north-west coast of Java, at the mouth of the Tjiliwong, frequently called the Jaccatra, from the former native town, on the ruins of which the present city was built. There is good anchorage for large ships in the offing, and it is navigable for smaller vessels towards the interior. The influence of a vertical sun on this Holland in miniature led it to become proverbial as the grave of Europeans. Latterly, however, the climate has been greatly improved by draining. The temperature, though not extreme, is oppressive from its uniformity, the mean of winter being 78·1° F., and that of summer only 78·6°. The latitude is 6° 7′ 40″ S., and the longitude 106° 52′ E. Pop. (1880) 103,000. Notwithstanding the growing prosperity of Singapore, B. continues to be the commercial emporium of the far East. Its markets present at once all the productions of Asia,

and all the manufactures of Europe. In 1811, while Holland was under France, B. was taken by the English, but was restored to its former owners in 1816. Latterly, B. has found Singapore a formidable competitor for the trade between East and West. The Dutch government has laid a telegraphic cable of 600 miles from B. to Singapore. There is a railway from Batavia to Buitenzorg, 36 miles.

The province of Batavia is low, but rises gently towards the south. The forests have all been cut down for the use of sugar factories. It is well adapted for fruit-trees and vegetables, which are cultivated by Chinese gardeners. The province of Batavia, including Buitenzorg, has a pop. of near a million, of whom 6500 are Europeans, 70,000 Chinese, and the remainder mostly natives. The peculiar character of the people has been lost by the influx of and intermarriage with strangers from all districts of the Indian archipelago. The language is a mixture of Sundanese, Malay, and other tongues, and is called low Malay. The largest estates are held by Europeans, the smaller by Chinese and natives. The religion is chiefly Mohammedan. There are good post-roads and some canals. The industries continue to increase, and chiefly consist of factories for making machinery for distilling and for sugar works; distilling arrack, copper and tin work, dyeing, &c. The nutmeg, cacao, and cocoa-nut tree are successfully grown. The stock consists of buffaloes, horses, and cattle.

BA'TENBURG, a town of the Netherlands, in the province of Gelderland, situated on the right bank of the Maas, 9 m. W. of Nymegen. It is worthy of notice only on account of its association with the Romans, whose *Oppidum Batavorum* it was.

BATH, the chief city in Somersetshire, England, is beautifully situated in a wooded valley in the north-east part of the county, on the Avon, 20 miles from its mouth, and 106 miles west of London. The houses are built wholly of white freestone—'Bath oolite,' worked in the neighboring quarries—bricks being entirely discarded. The city has a finer appearance than any other in England, the variety of level giving very commanding sites for its fine and regular streets, crescents, and public buildings. The beauty and sheltered character of its situation, the mildness of its climate, and especially the curative efficacy of its hot chalybeate springs, have long rendered B. a favorite fashionable resort. The springs, which are four in number, were known to the Romans, who built baths on the spot in the 1st c., of which extensive remains were discovered in 1775. The temperature of the springs varies from 97° to 117° F.; they rise near the river bank, in the center of the city, and discharge 184,320 gallons of water daily. The water is most useful in bilious, nervous, and scrofulous complaints, palsy, rheumatism, gout and cutaneous diseases. Though the gaiety of B. has greatly waned since the days of the Prince Regent, there has been a great general improvement in the city, but the population somewhat diminished during the thirty years 1851—1881.

It has two parks, and many public walks and open places; theater, concert-rooms, and other places of amusement; subscription library, museum, club-house, educational institutions, &c. The Abbey Church is a cruciform structure in the latest perpendicular style, with a fine roof in the style of Henry VII.'s chapel, and a central tower 150 feet high. About a mile to the north-west is Beckford's Tower, built by the eccentric author of *Vathek*, but now a cemetery chapel. It is 154 feet high. B. returns two members to parliament. Pop. (1881) 51,790, at times much increased by visitors. B. has no manufactures of any note. Coal is found in the neighborhood. The Great Western Railway from London to the west passes through the city. B. is of great antiquity; it was a Roman station called *Aquæ Solis*, at the intersection of the great Roman ways from London to Wales, and from Lincoln to the south coast of England. Richard I. granted B. its earliest extant charter, which was subsequently confirmed by Henry III., and greatly extended by George III. A greater number of Roman remains have been found in and near B. than elsewhere in Britain; in 1881, a complete Roman bath was uncovered.

Collar and Badge of the Bath.

BATH, KNIGHTS OF THE. The name of this order is derived from the ceremony of bathing, which used to be practised at the inauguration of a knight, as an emblem of the purity henceforth required of him by the laws of chivalry. The ceremony is of unknown antiquity, and is spoken of by writers of the 13th c. as an ancient custom. See KNIGHT. The earliest authentic instance of its observance which we have in this country, is in the time of Henry IV., who, in preparing for his coronation, made forty-six knights at the Tower of London, who had watched all the night before, and bathed themselves.

The last knights of the B. created in the ancient form were at the coronation of Charles II. in 1661. From that period till the accession of the House of Hanover, the order fell into oblivion. It was revived by George I. in 1725, and is now the second order in rank in England, the first being the Garter. By the statutes then framed for the government of the order, it was declared that besides the sovereign, a prince of the blood, and a great master, there should be thirty-five knights. At the conclusion of the great war, it was thought expedient, with a view to rewarding the merits of many distinguished officers, both military and naval, to extend the limits of the order, which was effected on the 2d January 1815. But the order was still purely military, and it was not till 1847 that it was placed on its present footing by the admission of civil knights, commanders, and companions. The following is its present organization.

Star of the Bath.

First Class.—Knights Grand Cross (K. G. C.); the number not to exceed, for the military service, 50, exclusive of the royal family and foreigners; and for the civil service, 25.

Second Class.—Knights Commanders (K. C. B.); military, 102, and civil, 50, exclusive of foreigners. These, like the first, have the title *Sir*, and take precedence of Knights Bachelors.

Third Class.—Companions (C. B.); military, 525, and civil, 200. They take precedence of Esquires, but are not entitled to the distinctive appellation of knighthood. No officer can be nominated to the military division of this class unless his name has been mentioned in the *London Gazette* for distinguished services in action; and the order has never been conferred on an officer below the rank of a major, or commander in the navy.

BATH, BA'THING. By bathing is usually understood the immersion of the body, or a part of it, in water. In a more extended signification, it means the surrounding of the body with any medium differing in nature or temperature from its usual medium; thus, we speak of a blood-bath, a vapor-bath, a cold-air bath, a compressed-air bath (q. v.), an earth bath. A fourfold division may be made of baths: 1. According to the substance with which the body is surrounded—into water, oil, milk, gas, sand, and other baths; 2. According to the manner of application—into river, slipper, plunge, shower, dropping, vapor, and douche baths; 3. According to the parts of the body subjected to the application—into whole, half, sitz, foot, hand, and eye baths; and 4. According to the temperature of the substance applied—into cold, tepid, warm, and hot baths.

The practice of bathing undoubtedly reaches back to the earliest times in the existence of the human race, and the most ancient historical accounts as well as popular myths make mention of it. Among the Egyptians, the bath was practised as a religious rite; and, in general, we find the opinion prevailing throughout antiquity, that purification of the body induced or signified moral purity. Man, it was thought, ought to present himself pure in body and soul, when he engaged in the service of his god, or in any transaction that brought him into immediate contact with that being. In making the bath a religious ordinance, Moses may have had in view the prevention or more speedy cure of those skin-diseases so prevalent in the East. The Mosaic Law prescribes expressly, in some cases, the use of running water, which has given rise, through a misunderstanding, to the deleterious cellar-baths of the Jews. In Palestine, the wealthier Jews had private baths in their houses, and ponds in their gardens, an arrangement which prevailed in all the civilized parts of the East, and which does so still. There were, besides, public bath-houses among the Jews, as among other nations. Among the Greeks, also, bathing was very early in use. The practice is often alluded to in Homer. Bathing, among the Greeks, as among other nations, was counted a religious rite, and was connected with the preparations for sacrifice, for the reception of oracles, for marriage, &c. We possess, however, no detailed accounts of the construction and arrangements either of private or of public baths in Greece, which last were mostly connected with the gymnasia. The men bathed together; that there were public baths for women, appears probable from various indications.

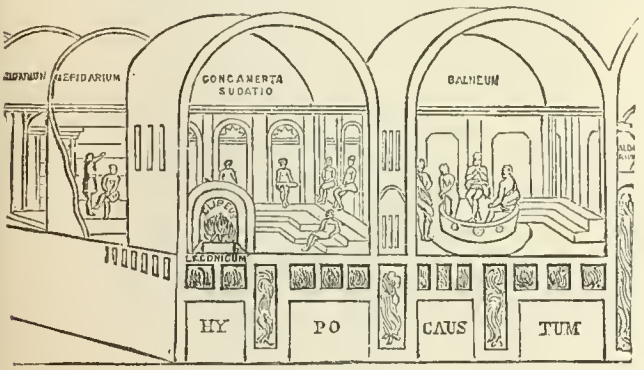
Among the Romans, although warm-baths (*thermæ*) were in use from the earliest times, yet it was only at a late period that they

were so extensively adopted; and then the increase and universal spread of luxury had driven the primitive object of bathing into the background, so that the public baths were looked upon as places of general resort for pleasure. The most of these public baths were built under the emperors. They were numerous in Rome and in the provincial cities. Their construction may be gathered from their numerous remains, and from the descriptions of them given by Roman writers; they resembled the Turkish and Russian baths.

The essential parts of a Roman bath were as follows.—1. The *hypocaust*, or stove, in the basement-story, for heating both the bath-rooms and the water. The water was contained in three receptacles or boilers, so arranged that the undermost, immediately over the fire, contained the hot water; the one in the middle, the tepid water; and the uppermost, the cold water. These vessels were so connected by pipes, both with the bath-rooms and with one another, that the hot water that flowed from the lowest boiler was replaced by tepid water from the one above; and that, again, by cold from the uppermost.—2. The *apodyterium*, or room for undressing.—3. The *frigidarium*, a room with a basin for cold bathing.—4. The *tepidarium*, the purpose of which cannot be exactly determined, but which seems to have been intended for bathing in tepid water, and also for allowing the body to cool down in a mild temperature.—5. The *caldarium*, in which sometimes the *sudatio*, or sweating-bath, and sometimes the real hot-water bath, were taken. This room had hollow walls, and the floor rested on low pillars over the hypocaust, so that it was surrounded on all sides with heated air. The *laconium*, which is spoken of as a part of the caldarium, was probably a kind of stove that was heated from the hypocaust, and contributed to raise the temperature.

In the bath-rooms there were basins (*alvei*) for holding the water, and round the walls were benches or seats, which, in the caldarium, were raised as in an amphitheater, in order to give the bathers the choice of the higher temperature of the upper part of the room, or of the more moderate of the lower. The caldarium contained also a *labrum* or vase of several feet diameter, filled with cold water, into which the bathers dipped after the hot bath. With these essential parts of a bath, there were usually connected an *unctuarium* or *elæothesium*—i. e., an anointing-room, and often gardens, covered walks, rooms for games, &c.

The process of bathing was this: After undressing in the apodyterium, the bather was anointed in the elæothesium with a cheap



Walls of the Thermæ of Titus at Rome.

coarse oil, and then proceeded to a spacious apartment devoted to exercises of various kinds, among which games at ball held a prominent place (hence the hall was called *sphæristerium*). After exercise he went into the caldarium, either merely to sweat or to take the hot bath; and during this part of the process, the body was scraped with instruments called *strigiles*. Being now dried with cloths, and slightly anointed all over with perfumed oils, he resumed his dress, and then passed a short time successively in the tepidarium and the frigidarium, which softened the transition from the great heat of the caldarium into the open air.

The public baths for women were of similar construction, and were much frequented even by the most respectable. The women bathed in company, like the men. The irregularity of men and women bathing together is also alluded to by ancient writers; and in later times, the baths in general became the scenes of all sorts of debauchery, as was the case at Baiæ.

The most remarkable remains of Roman baths are those of the baths of Titus, of Caracalla, and of Diocletian in Rome, and the recently excavated thermæ at Pompeii: remains of the kind are also to be found in Germany, France, and England. The extent and magnificence of those edifices it is difficult for us now to conceive. Speaking of the baths of Caracalla, Mr. Fergusson, in his *Hand-book of Architecture*, says: 'St. George's Hall, at Liverpool, is the most exact copy, in modern times, of a part of these baths. The hall itself is a reproduction, both in scale and design, of the central hall of Caracalla's baths, but improved in detail and design, having five bays instead of only three. With the two courts at each end, it makes up a suite of apartments very similar to those found in the Roman examples. The whole building, however, is less than one-fourth of the size of the central mass of a Roman bath, and therefore gives but little idea of the magnificence of the whole.'

The ancient Germans seem, according to Tacitus and otherwriters, to have been the fondest of the cold river-bath. When Roman luxury was driven out by German habits, and the north of Europe got the upper-hand of the south, baths ceased to be of public importance, and amid the tempestuous irruptions and fluctuations of the different nations, those splendid edifices fell into ruins. Christianity, however, by the institution of baptism, had preserved for the bath its religious signification; and in the middle ages, among the ceremonies preceding the solemnity of conferring the honor of knighthood, the bath was held essential. The Arabians and the Mohammedans generally had more completely adopted bathing into their manners and customs. Islam enjoins on the believer the careful preservation of corporal purity; and for this purpose prescribes repeated daily ablutions. Besides these, certain circumstances and times make the use of the B. ritually obligatory on both men and women. For this end, not only did the rich erect splendid baths in their houses and gardens, but bath-houses for the people in general were established in every town in which there was a mosque. The public baths of the Turks of the present day are a copy of those ancient Arabian baths. The construction of those oriental baths, imitations of which are now to be found in some European cities, is as follows: The building is of stone, the bath-rooms have a floor of marble, which is heated from below, and tubes in the walls conduct the heat in all directions. The bather undresses, wraps himself in a blanket, puts on wooden slippers, to protect him from the heat of the floor, and enters the bath-room. Here a general perspiration soon breaks through the skin, which is washed off with cold water.

The body is then rubbed with woollen cloths, and smeared with a soap or salve beneficial to the skin. This is generally accompanied by the operation of 'kneading.' The bath-attendant stretches the bather on a table, pours warm water over him, and then begins to press, squeeze, and twist his whole body with wonderful dexterity. Every limb is straightened and stretched, and when he has finished one side, he begins on the other. He kneels upon the bather; he seizes him by the shoulders, makes his backbone crack, and every vertebra quiver, or applies soft blows to the fleshy parts. He then takes a hair-cloth, and rubs the whole body, rubs off the hard skin of the feet with pumice-stone, anoints the bather with soap and perfumes, and finishes by cutting his hair and beard. This treatment lasts some three-quarters of an hour; and the feeling after it is as of being born anew. An inexpressibly delicious sensation of comfort pervades the body, and soon ends in a sweet sleep. After bathing, people repose in a cooler room, stretched on couches, and finally partake of coffee, sherbet, or lemonade. In England, France, and Germany, public establishments for bathing were long unknown. It was during the Crusades, which brought the East and West into contact, that Europeans first became acquainted with the baths of the Asiatics; and the want of such institutions came to be more sensibly felt from the leprosy and other skin-diseases which intercourse with Asia introduced into Western Europe. The evil was at first sought to be met by establishing hospitals; but as these were found insufficient, baths and bath-rooms were erected, which gradually became public establishments.

Besides the kinds of baths already described, there are now to be found in the larger cities of Europe, generally in connection with water-baths, imitations of the vapor-baths which have been long in common use in Russia. The RUSSIAN BATH consists of a small apartment built of wood, with broad benches running round it, on which the people lie undressed. By throwing water upon glowing hot pebbles, a dense hot steam is produced, which envelops the bathers, and throws them into such a heat, that the perspiration breaks out over the whole body. In this atmosphere of steam, the thermometer often rises to 112°—140° F. After they have sweated for some time, and from time to time cooled themselves again, by having cold water poured over them, the skin is rubbed with soap, and with towels made of inner bark, or with brushes; they are flogged with softened birch-twigs, and then washed with tepid, and afterwards with cold water; and at last have cold water dashed over them. A bather will also go direct from the sweating-bath, and plunge into a river or a pond, or roll himself in the snow. These baths are a necessary of life in Russia, and are to be found in every village. The German vapor-bath differs in this, that the steam is produced in a boiler, and that the bather remains for some time in an adjoining room of moderate temperature, wrapped in blankets, to allow the perspiration to go on, and the blood to become calm. A ruder kind of sweating-bath,

in a hole in the earth, or in a baking-oven, is practised among many nations; among the Finns, the natives of Mexico and South America, &c.

As regards detergence, the vapor-bath is the only kind of bath that is really effectual. Seated naked in a room filled with hot vapor (which produces no inconvenience in breathing), the scurf, which, notwithstanding all sorts of previous ablutions, has accumulated on the skin, is gradually softened and loosened, and is rubbed off in a surprising manner by the hands of the bath-man who is in attendance at these establishments. As in the Turkish bath, the person is cooled down by being dashed with tepid and cold water. After this kind of bathing, the sensation is exceedingly agreeable. The process just mentioned may be said to resemble that in use by the Romans; the hands of the operator having much the same effect as the *strigiles* of the ancients. Few of the ordinary bathing establishments in Great Britain have vapor-baths, at least not on a proper footing; and the great value of this species of bath as a purifier of the skin is little known.

Bathing is a very important agent in the preservation and restoration of health. Besides promoting cleanliness, the refreshing and invigorating effects of cold bathing in its various forms have always been more or less understood, as have also the soothing effects of the warm bath. But the virtues of water as a curative agent have been more fully developed in modern times, since the rise of the system of therapeutics known as the water-cure or hydropathy. With that exaggeration which is incident to everything new, the first promoters of this system gave it out as a panacea 'for all the ills that flesh is heir to.' But now that these quackish pretensions are all but universally given up, it is very generally admitted that water is capable of a large range of effects some of them apparently of the most opposite kinds; while the mode of action is nothing mysterious, but capable of explanation on the recognized principles of physiology. The fuller exposition of this part of the subject will be more conveniently considered under HYDROPATHY.

A MEDICATED BATH is one in which some substance, intended to act as a medicine, has been mixed with the liquid. This is one of the most important methods known to medical art of bringing remedies to bear upon the system. The skin is by no means impervious to foreign substances; and no other organ presents at once so large a surface to the matter to be imbibed; at times, also, the other channels by which remedies are introduced into the body cannot be used. Baths of this kind are partly imitations of natural mineral waters, and partly other remedial mixtures. The mineral substances used are common salt, chloride of lime, nitric acid, corrosive sublimate, potash or soda caustic or carbonated, ashes, soap, iodine, sulphur, iron, &c.; the vegetable are wine, vinegar, solutions of essential-oils, infusions of thyme, rosemary, lavender, wormwood, willow, oak, and Peruvian bark, &c.; such animal substances as milk, blood, bouillon of meat, &c., are also sometimes employed as baths, with a view to impart nourishment, but whether much is taken up into the system, is doubtful. In the case, also, of vapor-baths, medicaments are added to the water with good effect; these must, of course, be volatile. If the whole body is to be immersed in the vapor, nothing must be used that might injure the organs of respiration; when the application is partial, and by a special apparatus, this precaution is less necessary. In connection with this may be mentioned the so-called SMOKE-BATHS, or medicated fumigations, in which the whole body, with exception, of course, of the head, or particular parts of it, are brought in contact with the vapors of dry medicinal substances. Resinous aromatic substances, incense, myrrh, benzoin, amber, sulphur, cinnabar, and mercury are used for this purpose. The application must be made in what is called a fumigating-box, in which the particular part of the body alone is enclosed along with the vapor, in order that the respiratory organs may not be incommoded. The utmost precaution is requisite with the vapors of sulphur and mercury, as they are apt to occasion serious accidents.

Another species of vapor-bath is what is called an ANIMAL BATH, which was known to the ancients, and was in great reputation for lameness. Either the whole body of the patient is wrapped in the skin of a newly slaughtered animal, or an opening is made, and the diseased limb inserted into the breast or belly of the animal while yet alive, or into the newly drawn blood. Sometimes smaller animals are killed, split up, and immediately applied to the diseased part.

Of GAS BATHS, the most generally used are those of sulphuretted hydrogen and carbonic acid gas, which are to be had at certain mineral springs. The first, mixed in small quantity with atmospheric air, lowers the irritability of the air-tubes, and affords relief in many diseases of the respiratory organs. A stronger mixture of it, brought in contact with the outer surface, is of use in disorders arising from depression of the functions of the skin. Carbonic acid gas gives a gentle stimulus to the skin, promotes menstruation, and is much used in many places in the form of half-baths. In recent times, at Ischl and other places, the vapors that arise from the mineral springs loaded with saline particles, are received in close rooms, in which the patients walk about, and allow the vapors to act upon the lungs and skin.

The terms *water-bath* and *sand-bath* have been adopted in chemistry, to signify a contrivance by which vessels that are to be heated to a certain temperature are not brought into immediate contact with the fire, but receive their heat through the medium of hot sand or water, so that the heating takes place uniformly, and overheating is avoided.

BATHS AND WA'SH-HOUSES, PUBLIC. The last few years have witnessed the erection of a number of public establishments, at which the masses may enjoy a bath for the merest trifle of their weekly earnings. Where steam-engines are employed in connection with cotton-factories or other works, there is usually a certain quantity of waste steam or waste hot water at disposal, which could, at an insignificant cost, be directed into baths for the use of the workmen of the establishment. We are aware of one instance, where seven baths were comfortably fitted up at the small expense of £80, in which the men and women bathe on alternate days, to the number of from thirty to eighty a week—paying a mere trifle to the keeper, who attends an hour and a half each evening, and finds towels, soap, &c., nothing being charged by the proprietors for the original outlay. But this is only a small part of the cure for a great evil. Where the masses are densely packed in lanes and alleys, where house-accommodation is dear and limited, where the necessaries of life have to be continually struggled for, and these conventional evils increased, in too many instances, by improvidence—the house is but a night-shelter, affording little or no convenience for the necessary operations of the housewife. Independent of this, a public wash house is, in point of economy, preferable to any number of isolated efforts. By co-operation superior accommodation, better apparatus, and a cheaper and more satisfactory result can be obtained; and thus the public wash-house, where self-paying and self-supported, may be classed among the co-operative arrangements which characterize the social features of the age.

Mrs. Catherine Wilkinson of Liverpool, in a year of cholera, bravely offered the use of her small house, and the value of her personal superintendence, to her poorer neighbors, to facilitate the washing of their clothes at a time when cleanliness was more than usually important. The success attending the exertions of a single individual led to the formation of a benevolent society, and ultimately to important municipal arrangements.

In 1844, a public meeting was held at the Mansion House, attended by many persons of wealth and influence, to encourage the formation of B. and W. in London; hence resulted an 'Association for Promoting Cleanliness amongst the Poor.' Independently of this movement, a reform had already been commenced by a 'Committee for the Houseless Poor,' who, among other things, purchased or rented an old roomy building in Glasshouse Yard, surrounded by the poor and dense population of the London Docks district. A bath-house and a wash-house were fitted up; baths, cisterns, boilers, cold and hot water, towels, soap, soda, were provided; and the poor were invited to come in, and wash and bathe without expense to themselves. There were also provided pails, brushes, and whitewash, to those who would take the trouble to give a little cleanliness to their poor dwellings. This was effected mainly through the benevolent exertions of Mr. Bowie, a surgeon, who applied himself with earnestness to the subject. The association, afterwards founded at the city meeting, sought two objects—to induce a wish for cleanliness among the poor; and to render public B. and W. *self-paying*, as a guarantee for their permanency. Having obtained plans and estimates from architects, the association built a model establishment in Goulston Square, Whitechapel; but the outlay unfortunately reached £26,000. In the meantime, another society had succeeded in establishing B. and W. in George Street, Hampstead Road, favored by a liberal arrangement on the part of the New River Company in the supply of water: this establishment was opened in August 1846. In the same year, parliament passed an act to enable borough-councils and parish vestries to establish public B. and W., supported by borough and parish rates, if the householders should sanction such a proceeding. In 1847, another act strengthened the former; and the two together contain the necessary clauses for defining the details of the plan (see the following article). The parish of St. Martin's-in-the-Fields was the first to take advantage of the new act; and before the close of 1852, six parishes had erected public B. and W. At the beginning of 1856, the list had nearly doubled. The original free but humble building in Glasshouse Yard has been abandoned; and so likewise has the establishment in the Hampstead Road; but the model building in Goulston Square still remains. There were, in 1877, more than twenty of these public and parochial B. and W. in the metropolis.

It is not to be supposed that these efforts have been confined to London. Liverpool took precedence in date, and has since worthily maintained her interest in the matter. Manchester, Oldham, Hull,

Bristol, Birmingham, Preston, Bath, Wolverhampton, Coventry, Plymouth, Chester, Sunderland, Bolton, Macclesfield, Oxford, Maidstone, Exeter, Rotherham, Colchester, South Shields, Dublin, Belfast, Glasgow, Dundee, Aberdeen, and other towns, have since adopted a similar course; and it may safely be predicted that borough and parochial B. and W. will increase in number year by year; for if they do not actually pay their full expenses at the low tariff charge, the deficiency will be so small as to be practically unfelt by ratepayers.

When the legislature took up the subject, the purpose of the committee appointed in 1844 was in great part answered; but that committee continued to exist until 1855; and the exertions of its members were attended with very beneficial results, in drawing the attention of influential persons in various countries to the advantages of public B. and W. The French government voted 600,000 francs to assist the promotion of such institutions in France, after the plan of the model establishment; and a scheme was set on foot for erecting fourteen establishments in Paris, for which 2,000,000 francs would be required. The municipality of Venice marked out an expenditure of £33,000 in the erection of B. on the same plan. The Norwegian government applied to the committee for the plans, &c., of their wash-house at Goulston Square, as a guide for the erection of one at Christiania; and a subscription was made for the erection of B. and W. at Copenhagen. The Belgian government, and the authorities at Hamburg, Turin, Munich, Amsterdam, Lisbon, New York, and other places, were in like manner furnished with information on the subject.

In nearly all the London establishments, which may also be taken as types of those in the country, the characteristic features are as follows: The B. for males and females are on the opposite sides of the building. The separate B., in large well-lighted and well-ventilated rooms, are shut in by walls, generally of slate; and the B. themselves, supplied with fifty or sixty gallons of water for each bather, are either of zinc or enamelled iron. There are two, three, or four classes of B., charged differently according to the amount of accommodation afforded. At the St. Martin's establishment, where there are only two classes of B., it has been found that the second-class bathers are thrice as numerous as the first. Arrangements, slightly varying in different establishments, afford means for conveying hot and cold water to every bath. In some instances, there are tepid as well as cold swimming or plunging B., while two or three of them afford facilities for shower and vapor baths. The washing-rooms, in most of these establishments, are provided with numerous small compartments, doorless and roofless, each for one person. Each compartment contains a boiler and a wash-tub, with taps for hot water, cold water, waste water, and steam: all unlimited in quantity, wilful waste of course being guarded against. An American washing-board assists the operations; and a rack-work stand protects the feet.

The steam from all the compartments is carried upwards to one great ventilating shaft. The 'wringing' of the wet washed linen is effected by putting the articles into a sort of perforated cylinder, which is then rotated with great velocity; the centrifugal force drives out the water through the perforations and interstices, leaving the linen, though damp, much drier than it can be made by the familiar laundry process. The clothes are then taken to the drying-room, where they are hung on frames or 'horses' in small chambers heated with hot air to about 200° or 210°. 10,000 articles of washed clothing can now be dried with about £1 worth of fuel, or much less in the towns of the north. In some of the improved establishments, there is a drying compartment belonging to each washing compartment, effecting a manifest saving of time to the washers; in some of them, too, there is an ironing-board to each compartment; but the general plan is to have a large ironing-room, well provided with irons, ironing-blankets and boards, and heating arrangements. The charge is from 1*d*. to 2½*d*. per hour, according to the class and the accommodation.

One particular establishment at Manchester may usefully be described more in detail, as a type of the general class of B. and W. There is a men's swimming-bath, 70 feet by 25, with a pavement of polished York stone on a foundation of concrete and cement; the sides are of porcelain tiles laid in cement. There are 32 enclosed dressing-closets. Over these, on iron pillars, are 17 men's warm baths, each 8 feet by 7. Separated from this gallery by an open passage are 5 extra first-class baths, larger in size, and having shower-baths. There is a second-class swimming-bath nearly like that for the first-class; with its gallery of small baths over. The women's baths, in a different part of the building, comprise 4 first and 7 second class. The laundry is at one end of the building. The washing-room is 64 feet by 38; it comprises 6 first-class and 30 second-class compartments, each of the former provided with three tubs, and each of the latter with two. There is provision for drying any amount of clothes in twenty minutes after the washing and wringing are completed. All the women have access to two patent wringing-machines. There is an ironing-room adjoining, fitted up with stoves. The water-tank has a capacity of 3000 gallons; the baths, if all full, would hold 50,000 gallons.

Since the taking up of this subject by the municipal authorities of various towns, there have been few reliable statistics obtainable relating to the extent to which these valuable establishments are used; but it is known that the B. and W. established by the several parishes either pay their working expenses wholly, or approach so near to it as to encroach very little on the parish rates.

One satisfactory feature connected with the system is, that when the local authorities are slow to establish B. and W., wealthy manufacturers or townsmen often take up the matter as their own expense, and then leave the ratepayers nothing more to do than to provide the small balance of annual working accounts. As an example of free baths for men and boys (without wash-houses), may be cited the establishment opened at Derby in June 1873, and presented to the corporation by Mr. Ball, M.P. for the borough. It comprises two swimming-baths, one for men and one for boys, each 100 feet long by 50 in width. There are 57 half-closed dressing-boxes around the men's bath, and 72 open boxes around the boys'. The two baths together hold 260,000 gallons of water, which is renewed once a week.

The least satisfactory part of the system in its practical operation, is that which relates to the wash-houses. Laundresses, boarding and lodging house keepers, and families in the middle ranks of life, use these W. rather than really poor families; they do so because the expense is very low, not because they are unable to pay higher. It is sometimes believed that those for whose benefit the system was established are ashamed to bring their scanty, coarse, and much-worn apparel to a place where it may meet the eyes of others: if this be so, surely a remedy might be applied!

BATHS AND WASH-HOUSES, ACTS REGARDING. The establishment of public B. and W. is regulated in England and Wales by two acts of parliament—the 9 and 10 Vict. c. 74, and 10 and 11 Vict. c. 61—which are to be considered as one act. The sanitary regulations so legalized are merely permissive, and in no respect made compulsory on the public; but their wisdom, benevolence, and consideration for the health of the people, strongly recommend their adoption. The provisions of the act may be adopted for any incorporated borough, or for any parish not within any such incorporated borough; subject, however, in the case of a parish, to the approval of one of Her Majesty's principal secretaries of state. In the case of a borough, the adoption of the act is left to the discretion of the council of the borough; and the expense is to be charged upon the borough fund, the council being empowered to levy, either as part of the borough rate, or by a separate rate, such sums as may from time to time be necessary. In the case, again, of a parish, it is left to the vestry, with the sanction of one of the secretaries of state, to decide on the adoption of the act; and in such case, the vestry shall appoint not less than three, and not more than seven persons, rate-payers, to be *Commissioners* for carrying out the provisions of the act. Regulations for the proceedings of these commissioners are prescribed in the act. The expense is to be charged upon the poor-rate. The vestries of any two or more parishes may concur in carrying out the act.

The act contains numerous other provisions and regulations relating to the facilities required for the operations of the borough councils and parish commissioners: thus, they may borrow money with the approval of the Treasury; they may have money advanced to them by the Public Works Loan Commissioners; they may avail themselves of the Railway Companies Clauses Consolidation Act of 1845 for certain limited purposes, such as borrowing money on mortgage, the accountability of officers of the company, the making of by-laws subject to other provisions, and the recovery of damages and penalties

After these preliminary facilities, the act proceeds to specify the powers of the borough councils and parish commissioners, as to erection or purchase of buildings, &c., for the purposes contemplated. Among other things, it is provided that the number of baths and the number of washing-tubs for the laboring-classes shall not be less than twice the number of those for any higher class or classes.

The council and commissioners respectively are empowered to make by-laws for regulating the use of the B. and W., which, however, shall not be enforced until they have been approved by a secretary of state. These by-laws must make sufficient provision for a variety of purposes specified in the schedule (A) to the act 9 and 10 Vict. c. 47; the scope of those purposes being to secure order, cleanliness, and decency. The charges for the use of the B. and W. are regulated by another schedule attached to the act 10 and 11 Vict. c. 61. In the baths for the laboring-classes, a single cold bath is not to exceed one penny; a single warm or vapor bath is not to exceed twopence. B. for any higher class are not to exceed three times the charges for those of the laboring-classes. In the wash-houses for the laboring-classes, the use of a single wash-

ing-tub, and other conveniences, is not to be charged more than one penny for one hour, or threepence for two hours together.

The various Local Management Acts, passed since the above-cited acts of 1846 and 1847, have strengthened the powers of town-councils, &c., for the establishment of B. and W.; but the principle of operation remains nearly uniform—viz., that any surplus outlay, beyond the receipts from bathers and washers, shall be defrayed out of the rates. It may safely be asserted that no item in house-rate is more wisely applied than this. So great is the importance attached by medical men to bathing, that the Metropolitan Board of Works has been urged to establish free public swimming-baths in the metropolis, to supplement the parochial B. and W.; but the question is still undecided.

BA'THGATE, a town in the center of Linlithgowshire, 17 miles west-south-west of Edinburgh. The old town lies on a steep slope, and the new on a more level site. Freestone, coal, and carboniferous limestone, are wrought in the vicinity. In 1663, King Charles II. granted B. a charter, since which time it has been a free burgh of barony. In the vicinity is the site of an ancient castle, which Margaret, daughter of Robert the Bruce, brought as a part of her dowry to her husband, Walter, great steward of Scotland, who died here. The celebrated gas coal called Torbane-hill Mineral, which has been the subject of so much litigation, and of discussion and difference of opinion among scientific men, is worked here. B. has manufactures of cotton goods, but mining is the chief occupation of the inhabitants. Pop. (1881) 4887.

BA'THORI, ELIZABETH, the niece of Stephen Bathori, king of Poland, and wife of Count Nadasdi, a Hungarian nobleman, was born in the latter half of the 16th century. Her diabolical cruelty has condemned her memory to eternal infamy. By means of large bribes, she induced an old man-servant and two female servants to kidnap and convey to her, either by stratagem or force, young girls from the neighboring country, whom she slowly put to death in the dungeons of her castle by the most horrible tortures. It is related that on a certain occasion, having violently struck one of her victims, the blood spirted up into her own face, and, as she fancied, left the skin whiter when it was wiped off. An infernal idea instantly possessed her. She invited to a grand banquet all the young girls round about, and caused 300 of them to be put to death, being under the impression that a bath of blood would renew her youth. So monstrous a story is probably exaggerated, but it at least shows that she was conceived capable of it. Inquiry was at length made into the appalling rumors, when it was discovered that this female fiend had murdered, in cold blood, not fewer than 650 maidens. The domestics who assisted her were either beheaded or burned alive; but the countess, whose crimes merited infinitely the greater punishment, was merely imprisoned for life in her fortress of Esej, where she died in 1614.

BA'THOS (Gr. *bathos*, depth) is a term employed by critics to designate a ludicrous descent from a lofty thought to a mean one, or a sinking below the ordinary level of thought in a ridiculous effort to aspire. See CLIMAX. It is of the essence of B. that he who is guilty of it should be unconscious of his fall, and while grovelling on the earth, should imagine that he is still cleaving the heavens. A good example of B. is the well-known couplet:

And thou, Dalhousie, the great god of war,
Lieutenant-general to the Earl of Mar!

BA'TH-STONE, a building-stone extensively used in England on account of its beauty, is obtained from quarries in the lower Oolite, in Wiltshire and Somersetshire. It is fine grained, of a rich cream color, and is composed of about 94½ per cent. of carbonate of lime, and 2½ per cent. of carbonate of magnesium, but is free from silica. It is easily wrought in the quarry, some beds cutting almost as readily as chalk, and hardens on exposure to the air, but is not very durable. Within twenty-five years after the reparation of Henry VII.'s chapel, in Westminster Abbey, with this stone, it had begun to decompose. The name is derived from the neighborhood of several of the quarries to Bath.

BA'THURST, EARL (HENRY BATHURST), an eminent Tory statesman, born 22d May 1762, son of second earl (Lord Chancellor from 1771 to 1778), was in 1804 appointed Master Worker of the Mint. In 1807, he became President of the Board of Trade, and was Secretary of State for Foreign Affairs from 11th October to 6th December 1809. Appointed, 11th June 1812, Secretary for the Colonies, in the administration of the Earl of Liverpool, he held that office for sixteen years. In 1828, in the Wellington administration, he became President of the Council, which office he retained till the resignation of the ministry in 1830. He died 26th July 1834. At the time of his death, he was a teller of the Exchequer, clerk of the Crown, and elder brother of the Trinity House, K.G., D.C.L., F.R.S., F.S.A., &c. He was much esteemed by his party. His son, Henry George, succeeded as fourth earl. He died in 1866, and was succeeded by his brother, William Lennox, fifth earl.

BA'THURST, a name applied to various localities in honor of Earl Bathurst, Colonial Secretary at the time.—1. B. *in New South Wales*, the first county that was settled beyond the Blue Mountains (q. v.), long believed to be impassable. It was not before 1813 that a practicable route was formed; and in April 1815 Governor Macquarie crossed the range by the newly made road with his lady and a numerous retinue, in order to mark with becoming 'pomp and circumstance' so important an epoch in the growth of the colony. B. has been still further distinguished in the history of New South Wales as the seat of its gold-fields. As early as 1844, the precious metal had, on geological grounds, been supposed to exist in Australia; but it was only on 12th February 1851 that Mr. Hargreaves, a digger of California experience, washed the glittering prize out of a tin dish of gravel on the B. Plains. The county is bounded on the N.E. by the Macquarie, and on the S.W. by the Lachlan. The whole district is admirably adapted to pastoral pursuits. It is well watered, and, being 1970 feet above the level of the sea, it has a moderate temperature. Its chief town, which is now the third in New South Wales, is a handsome city with numerous elegant public buildings, and was erected into a municipality in 1862. Pop. (1881) of city and district, 17,391.—2. B. Island *off North Australia*, about lat. 12° S., and long. 130° E. It is fully 2° due west of Port Essington, with Melville Island between. Its area may be estimated at 1000 square miles. Excepting the west end, which is barren, the island is densely wooded.—3. B., the principal settlement of the British colony on the Gambia. It is situated on a small island at the mouth of the river, in lat. 13° 28′ N., and long. 16° 32′ W. Pop. about 3000, chiefly negroes. The principal buildings are the government house, an hospital for liberated Africans, and Wesleyan schools. The exports consist of gum, wax, hides, ivory, gold, tortoise-shell, rice, cotton, teak, palm-oil, and native cloths.—4. B., in Upper Canada, a district on the right bank of the Ottawa, here the boundary between the two Canadas. It contains the Rideau River and Canal, thus occupying an important position with regard to the inter-provincial trade. The removal, in 1858, of the seat of government to Ottawa, tended still further to promote the prosperity, of the district.—5. An island in the Arctic Ocean, intersected by the 100th meridian, and situated immediately beyond the 75th parallel. Sherard Osborn here found the vertebræ of an ichthyosaurus—one of the few instances of organic remains occurring on the American side of the polar basin. See ARCTIC OCEAN.

BATIGNOLLES, a thriving town of France, in the department Seine, north-east of Paris, of which city it forms a suburb.

BATJAN. See BATSHIAN.

BATLEY, a Yorkshire town, near Dewsbury (q. v.).

BATN-EL-HA'GAR (Womb of Rocks), a stony district, stretching along the Nile, in lat. 21°—22° N., and long. 30° 40′—31° 10′ E. The Nile, in the upper portion of the district, is often forced by the approaching rocks into a very narrow channel, and its navigation is frequently interrupted by small islands, rocks, and cataracts. The district is peopled by Bednins, and other Arabs, who go naked and derive a scanty subsistence from beans and the fruit of a wild shrub called *kerkedan*.

BA'TON—variously written Battoon, Batune, and in old French Baston—is the figure in healdry commonly known as the Bastard Bar (q. v.).

BA'TON is the name of a short staff, presented by the sovereign to each field-marshal, as a symbol of his newly bestowed authority. It is also the name of the long staff carried by the drum-major of an infantry regiment.

BATON ROUGE, a city on the east bank of the Mississippi, 129 miles above New Orleans, and formerly capital of the state of Louisiana. As far back as 1838 it was the seat of a college. Its population in 1870 was 6498. B. R. contains a national arsenal and baracks, a military hospital, an asylum for the deaf and dumb, State university, State penitentiary, an elegant state-house, 4 churches, and 2 newspaper offices. The district is very fertile, producing large quantities of cotton, sugar, and maize. B. R. was more than once the scene of important operations during the Civil War.

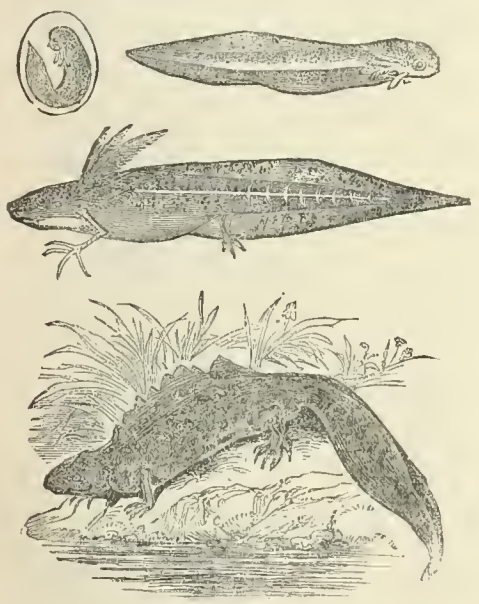
BATRA'CHIA (from Gr. *ba'trachos*, a frog), in Zoology, nearly synonymous with *Amphibia*, the name of what is now generally regarded as a distinct class of the sub-kingdom *Vertebrata*, intermediate in many respects between Fishes and Reptiles (q. v.). The B. used often to be treated as one of four orders into which the Reptiles were divided. The most important difference between the B. and the Reptiles is that the young B. undergo metamorphoses, and breathe by gills alone, in the earlier part of their life; whilst in their adult state they either breathe by lungs alone, or possess at once both lungs and gills. The body is also covered with a soft naked skin, through which water is imbibed, and through which the aëration of the blood appears to be in part carried on. The B. are all oviparous; their eggs are not covered

with a hard shell, but merely with a soft membrane. Fecundation commonly takes place after the eggs have been deposited. It is sometimes given as a distinctive character of B., that, in their adult state, they have limbs, but in some genera these are very rudimentary, and they are altogether wanting in *Cæcilia* (q. v.), a genus which is now decidedly referred to this order, because it has been found to undergo the metamorphosis from a gill-breathing to a lung-breathing state, and which Cuvier, with hesitation, placed among serpents, because the fact of its metamorphosis had not been then ascertained. The ordinary number of limbs is four, but in the *Siren* (q. v.) there are only two.—Another character frequently given as distinctive of the B., that their feet are destitute of claws, is in like manner only general, and not universal.

In the earlier period of life, the form of the B. is fish-like, of which the common tadpole, the young of the frog, is a familiar example; and this form some of them retain with comparatively little modification, whilst some of them ultimately acquire a form resembling that of lizards, with which the newts were indeed ranked by Linnæus as species of the same genus; and others, as frogs and toads, assume a peculiar quadruped form, the tail entirely disappearing, except in the elongated coccygeal bone which represents it to the anatomist.

In their anatomy, the adult B. present some important points of resemblance to fishes; in some important points, they differ both from fishes and from other reptiles. The skull resembles that of fishes in its general form, although rather agreeing with other reptiles in the parts of which it is composed. Teeth are often entirely wanting, sometimes they are present only in one jaw; when present, they are generally small and numerous, either in a single row or aggregated. In some of the fossil genera, however, which are referred to this order, the teeth are of large size.—The B. have either no ribs, or they have mere rudimentary ribs. They have, however, a breast-bone, often in great part cartilaginous, to which some of the most important muscles are attached. They breathe air by a sort of gulping.—The heart of the B. was long believed to have only one auricle and one ventricle, but the apparently single auricle is now known to consist of two divisions. As in the class Reptiles, only a part of the blood received from the circulating system is sent to the organs of respiration, and another part returns immediately into the circulation. See REPTILES.

In the wonderful transformations which the B. undergo, the circulation of the blood is changed in accordance with the change in the organs of respiration. These, in the earliest stage, are external gills, which appear as long colored fringes, hanging loosely upon each side of the neck. In some B., these external gills, which resemble those of the aquatic mollusca, remain till the lungs are sufficiently developed for respiration; in some, as the Axolotl (q. v.), of which a description and figure have already been given in this work, they are permanent during the whole of life. In the greater part of the B., however, the external gills soon disappear, and are replaced by internal gills, when the tadpole exhibits its most perfectly fish-like form, its mode of progression also corresponding with that of fishes. Its respiration is carried on essentially as in fishes, water entering the cavity of the mouth, and being forced out through the gill openings, so as to come in contact with the minute filaments of the gills. The gills are attached, as in fishes, to arches connected with the hyoid bone. In this stage of existence, the large arterial trunk which proceeds from the ventricle of the heart, sends forth, from a bulbous enlargement which it forms, as in fishes, an artery to each of the gills, and the blood after being aërated in them, is collected into an aorta, and proceeds into the general circulation.



Newt, in successive stages.

But an artery is also provided on each side for the conveyance of blood to the lungs, both the lungs and their arteries being at first rudimentary, but increasing, whilst the gills, on the contrary, diminish along with the blood-vessels connected with them; and the gill-breathing is gradually transformed into a lung-breathing animal, no longer perfectly aquatic, as at first, or capable of existence only in water, but amphibious, or almost entirely terrestrial, and incapable of remaining long under water without coming to the surface to breathe.—Whilst these changes take place, others no less extraordinary are also going on. The tadpole which subsisted on vegetable food, and possessed a mouth adapted to the purpose of feeding on it—a small horny beak—acquires a mouth fitted for seizing and swallowing small insects, slugs, &c., upon which the adult B. chiefly or exclusively feed, and its habits change accordingly. The mouth of the *Siren*, however, always retains a character somewhat similar to that of the tadpole.—In the course of transformation, a pelvis is formed, and limbs sprout forth, which in some B., as frogs, become very perfect and powerful. Whilst the limbs grow, with all their bones, joints, muscles, blood-vessels, and nerves, the vertebræ, in many B., diminish in number, and the tail gradually shortens and disappears.

The extremely different characters of the adult B. suggest the idea of an arresting of the metamorphosis at different stages; but whilst this idea may be helpful to our understanding of the close affinities which really pervade the whole order, it must be remembered that it does not equally apply to all parts of the animal system; and that even as to those which have been particularly mentioned in the brief account above given of the metamorphosis of the B., some in their perfect state appear to have one part in what, for convenience, may be termed a more advanced state than another; whilst all are adapted with equal perfection to the situations in which they are appointed to live, both with reference to the wants of their own existence and the preservation of that of their species.

If the limbs of the tadpole or the frog are injured or destroyed during their growth, the loss is wonderfully repaired. This power of reproducing lost limbs continues to be possessed in an extraordinary degree by the adult newt (q. v.).

B. are generally inhabitants of warm or temperate climates. Those which inhabit temperate climates generally become torpid during winter. They are either almost entirely aquatic or are found in moist situations. The British species are very few. In some of the Scottish isles they are unknown.

B. are commonly divided into two sub-orders—*Caducibranchiata*, in which the gills (*branchiæ*) disappear (are *caducous*), and *Perennibranchiata*, in which they are persistent (*perennial*). The Perennibranchiate B. are comparatively few. Axolotl, Siren, and Proteus are examples. The Caducibranchiate B. are subdivided into *Tailless* or *Anourous*, as Frogs, Toads, &c.; and *Tailed*, as Newts, Salamanders, &c. The largest known B. are the *Sieboldia maxima* of Japan, and *Protonopsis horrida* of the Ohio, both creatures of the newt form, the former of which is more than two feet long. An approved classification of the *Amphibia*, treated as a section of the vertebrate class *Ichthyopsida*, divides them into (1) *Urodela* (tailed); (2) *Anura* (tailless); (3) *Gymnohpiona;* (4) *Labyrinthodonta* (which are extinct). See ZOOLOGY.

Fossil remains and footprints in rock attest the existence, in former geological periods, of B. of large size. 'It is only in tertiary and post-tertiary strata that extinct species referrible to still existing genera or families of this order have been found.' These occur both of the tailed and tailless forms. One of them has been a subject of particular interest, because its remains, when first discovered by Scheuchzer, in the beginning of the 18th c., were mistaken for the remains of a human being, and the discoverer enthusiastically urged them upon the attention of his contemporaries as a proof of the deluge. To this salamandroid fossil the name *Andrias* (from the Gr. for man) *Scheuchzeri* has been given.—Footmarks in the sandstones and shales of the coal-measures in Pennsylvania seem to have belonged to B. resembling frogs or toads, but of great size, some of the footprints being two inches in diameter, and a breadth of nearly four inches between the right and left footprints.—Some of the older batrachian fossils differ so widely from all existing types, that new sub-orders have been formed for them. Those of the sub-order *Ganocephala*—of which *Archegosaurus* (q. v.) is the best known—are remarkable for having the head covered with bony plates; those of the order *Labyrinthodontia*, for the labyrinthic structure exhibited in the transverse section of the teeth. See LABYRINTHODON.

BA'TRACHOMYOMA'CHIA (the War of the Frogs and the Mice), a Greek mock-heroic poem, erroneously ascribed to Homer, with whose works it has been generally printed. Pigres of Caria,

who lived in the times of the Persian wars, was named amongst the ancients as its author. It is a parody of the *Iliad*, in which the military preparations and contests of beasts, with single combats, intervention of the gods, and other Homeric circumstances, are described with much humor.

BA'TRACHUS. See FROG-FISH.

BATSHIA'N (correctly BATJAN) one of the Moluccas, lies west of Gilolo, between 0° 13′—0° 55′ S. lat., and 127° 22′—128° E. long. It belongs to the Dutch residency of Ternate, is formed of two peninsulas and has many mountains. B. produces gold, copper much coal, sago, cocoa-nut trees. rice, cloves, and fine timber. There are sulphur springs. Area, 900 sq. miles. Pop. 1800, a mixed race of Portuguese, Spaniards, Dutch, and natives. Chief town, Batjan, with 200 houses, on the east coast.

BA'TTA, in relation to the British army in India, is an allowance in addition to the ordinary pay of officers. The pay is fixed; but the B. varies according to the part of the country in which the troops are placed, and also depends on the circumstance of their being in the field or in cantonments. If in the field, or more than 200 miles from the presidential government cities, the officers receive full B.; if in garrison, or in cantonment within that distance, half batta. During the troubles of 1857 and 1858, the government was frequently embarrassed in determining whether particular officers were entitled to full or half B., owing to the confusion into which the whole military system was temporarily thrown.

BATTA'LION is the unit of command in infantry. It comprises the largest number of men who, when drawn up in array, can conveniently hear the word of command from an officer. In whatever ways the armies of Europe differ in other particulars, they seldom depart very far from a mean *war*-strength of 1000 men per battalion. Two or more of those units combine to form a *regiment* (with exceptions presently to be noticed); and those regiments are further aggregated into *brigades*, *divisions*, and *corps d'armée*, or other large groupings. The unit, or B., is divided into *wings*, and these into *companies* and *squads*. The continental regiments are for the most part so large as to comprise several battalions each; but the British infantry regiments, in time of peace, have mostly only one B. each. The usual way of increasing the British infantry in war-time is, not by creating new regiments, but by increasing the number of battalions per regiment, and of companies per battalion. In 1878, there were 110 regiments of line-infantry; of these. 83 had only 1 battalion each, 25 had 2 battalions, and 2 had as many as 4. The full complement of a B. is usually 12 companies; and when these are drawn up on parade, two ranks in depth the two choice companies, called the 'grenadier' and the 'light-infantry' companies, are placed at the right and left extremities of the whole line; the other eight companies, each designated by a number or letter, being between them. In this form, the front of a B. of 1000 men is about 390 yards in length.

An English B. of 900 private soldiers approaches near 1100 strong when the officers, &c., are included. The following may be taken as the component elements, under the average *war* arrangements of the British service: 10 regimental staff-officers (lieutenant-colonel, 2 majors, adjutant, instructor in musketry, surgeon, paymaster, and quartermaster); 36 company officers (captain, lieutenant, and sub-lieutenant); 1 warrant officer (regimental school-master); 10 non-commissioned staff-officers (staff and chief sergeants); 50 non-commissioned company officers (color-sergeants and sergeants); 900 rank and file (50 corporals, 850 privates, and 24 drummers.)

A general order issued in 1881 announced changes in the organization, titles, and uniform of infantry regiments of the line and militia. These regiments are hereafter territorial regiments, each of four battalions for England, Scotland, and Wales, and five battalions for Ireland. The first and second battalions are line battalions, the remainder militia. The regiment bears a territorial designation indicating the locality with which it is connected. See REGIMENTS, &c.

BATTAS, or BATAKS, a non-Mohammedan people inhabiting the part of Sumatra south of Atchin. The B. are light brown, of middle stature, have somewhat prominent features, and long hair. The men are lazy, and engage in hunting, while the women grow rice, collect pepper for trade, weave and dye cloth. Their houses are of wood, and the villages have earthen walls. The B. are nominally governed by the rajahs of Bata, Simamore, Salindong, and Butar. The language is a Malay dialect, written on bamboos, in a peculiar alphabet, from the bottom upwards, but laid horizontally, and read from the left. A man may have many wives, paying a dowry of ten buffaloes for a chief's daughter, and five for one of lower rank. Cannibalism still prevails (except in Dutch territory), the victims being only murderers, prisoners of war, and adulterers. Women were never eaten.

BATTASZE'K, a market-town of Hungary, county Tolna, on the west of the Danube. Pop. (1880) 7095.

BA'TTEL, TRIAL BY, or WAGER OF BATTEL. This relic of our legal barbarism is happily of the things of the past, having been abolished by act of parliament, the 59 Geo. III. c. 46, and might have been passed over with a brief notice, had it not been for a circumstance which we shall presently mention, and which affords a curious and striking illustration of a principle peculiar to the character of English law, as distinguished from the legal systems of other countries.

The trial by B. was a proceeding by way of appeal, and it obtained in civil and criminal cases, and also in military matters, to which, indeed, it was more appropriate. It consisted of a personal combat between the parties in presence of the court itself; and it was grounded on the impious idea of an appeal to Providence, the expectation being, that Heaven would give the victory to the innocent or injured party. In civil cases, the B. was waged by champions, and not by the parties themselves; but in criminal cases, the parties fought in person, unless the appellor were a woman, a priest, an infant, or a man of the age of sixty, or lame, or blind, all of whom might refuse the wager of B., and compel a trial by jury. Peers of the realm also could not be challenged to wage B., on account of their personal dignity, nor, by special charter, could the citizens of London, fighting being considered foreign to their education and employment. Whether by champions or in person, the mode of proceeding was the same. The appellee, or defendant, as he might be called, threw down his glove, and declared that he would prove his right, or defend himself with his body. The appellor, or prosecutor, in accepting the challenge, took up the glove, and replied that he was ready to make good his appeal, body for body; and thereupon the parties, holding each other's hands, joined issue before the court in a very formal and solemn manner. The weapons used were batons or staves an ell long, and a four-cornered leathern target, and the combatants were obliged to swear that neither of them would resort to sorcery or witchcraft! The B. lasted till the stars appeared in the evening, and the party who by that time had either killed or got the better of his opponent, was considered the successful suitor of justice. In a charge of murder, if the accused was slain, it was taken as proof of his guilt, and his blood was attainted; and if so far vanquished as not to be able or willing to fight any longer, he was adjudged guilty, and sentenced to be hanged immediately!

So late as the year 1818, this barbarous proceedure was solemnly decided by the Court of King's Bench to be a valid and legal mode of trial, which the king's subjects were free to adopt! Of course, the principle was, that all laws, no matter how unsuitable to the times, could be enforced, unless expressly repealed by act of parliament. As a matter of curiosity, we may give the names of the parties (they were of the laboring class) who seriously submitted their contention in the above form before Lord Chief-justice Ellenborough and his brother-judges of the period. The case is that of Ashford *v.* Thornton, and is reported in the first volume of Barnwall and Alderson's *Reports*, p. 405. As we have stated, the court decided in favor of the validity of the trial, one of the judges remarking that sufficient had not been stated to induce their lordships to refuse the B., and another more plainly and unequivocally observed that the defendant was 'entitled to this his *lawful* mode of trial.' But Lord Ellenborough put the matter more clearly by stating, that 'the general law of the land is in favor of the wager of B., and it is our duty to pronounce the law as it is, and not as we may wish it to be; whatever predjudices, therefore, may justly exist against this mode of trial, still, as it is the law of the land, the court must pronounce judgment for it.' Happily, the pugnacious litigant who obtained this judgment was induced to go no further, and the above statute, the 59 Geo. III. c. 46, was passed, by which the shocking ordeal was wholly abolished.

In Scotland, we believe the matter would have been differently disposed of; for the judges there, following the doctrine of the Roman law, would have held the proceeding to have been in desuetude and obsolete, and there the matter would have ended. Mr. Rush, the then American envoy to the British court, thus justly remarks on this case in his *Residence at the Court of London* (published 1833). 'To repeal laws belongs to the legislature. Courts expound and apply them. Free government is complex, and works slowly; tyranny is simple, and does its work at once. An absurd law may sleep in a free code, because overlooked; but whilst there, it is the law. It is so, I suppose, that we must reason; and generally, the reason would be right. Yet it might have been thought that, in a case like this, long disuse added to obvious absurdity, would have worked the silent repeal of the law, according to the doctrine of desuetude under the Roman code.'

Montesquieu, in his *Spirit of Laws*, book 28, chapters 20 and 22, very ingeniously and plausibly deduces the modern practice of duelling and the so-called laws of honor from the above barbarous judicial combat. See ORDEAL.

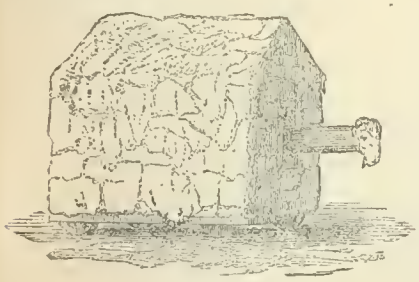
BA'TTEN, or LAY, or LATHE, is the swing utensil of a loom, by which the weft or woof is struck home, and in which the

shuttle runs. B. and lay are synonymous, B. being the English name, and lay the Scotch. See WEAVING.

BA'TTENS, a species of sawn fir timber, of smaller dimensions than the kind called planks. B. are usually from 12 to 14 feet long, 7 inches broad, and 2½ inches thick. Cut into two boards (1¼ inch thick), they are used for flooring; cut into three boards, they are put on roofs below slates; in narrower pieces, they are put upright on walls for fixing the laths for plastering. The best B. are brought from Norway, and sold wholesale by wood-merchants.

BA'TTER, in Architecture, used as a verb to express the manner in which the walls of towers, which are smaller at the top than the bottom, slope inwards. The walls of wharfs, and those built to support embankments and the like, usually batter.

BA'TTERING-RAM, an engine of war used in ancient times, and in the middle ages. It consisted of a beam of wood, with a mass of bronze or iron on one end, resembling the head of a *ram* (in Lat. *aries*). In its simplest form, it was borne and impelled by the hands of the soldiers; afterwards, it was suspended in a frame, and made to swing. Another form moved on rollers. The alternating motion was communicated by ropes. To protect those working it, a wooden roof (*testudo*) was constructed over it, and the whole was mounted on wheels. The beam of the ram varied from 60 to 120 feet in length, the head sometimes weighed above a ton, and as many as 100 men were employed in impelling the machine. When the blows were long enough continued, hardly any wall could resist. When or where it was invented, is unknown. It is mentioned by Ezekiel. The Romans derived it from the Greeks.



Battering-ram.

BA'TTERSEA, a south-west suburb of London, situated in Surrey, on the south bank of the Thames, at the bridge to Chelsea, which is nearly opposite. It lies in B. parish, which is partly laid out in market-gardens for London, and has many manufactories. The church has a monument to the celebrated Lord Bolingbroke. The flats, called B. Fields, once famed as a rich botanical station, are now formed into a public park. Adjacent to the park, the Thames is crossed by B. Bridge (lately rebuilt), Albert Bridge, Chelsea Suspension Bridge, and a railway bridge. The first asparagus raised near London was grown by the market-gardeners of Battersea; but railways have much changed the locality.

BA'TTERY, in criminal law, means the beating or wounding, or, more correctly, an assault by beating or wounding of another. Violence or force is not a necessary element in this offence, but the least touching, however trifling, of another's person in an angry, rude, insulting manner, is a B.; for the law, says Blackstone, cannot draw the line between different degrees of violence, and therefore totally prohibits the first and lowest stage of it, every man's person being sacred, and no one having a right to meddle with it in any the slightest manner. The remedy for an injury of this kind may be either by a civil action, as for damages, or by indictment, as for a misdemeanor. Where the B. is on a man's wife, the former may sue for damages by action of trespass, and it must be brought in the names of the husband and wife jointly; but if the maltreatment be so serious as to have deprived the husband for any time of his wife's company, the law then gives him a separate remedy, by an action in which he may recover special damage, on the ground of the loss of his wife's society, whilst suffering from the beating. By the Common Law Procedure Act, the 15 and 16 Vict. c. 76, the remedy for such ill usage is further varied, for by section 40 of that act, it is provided, that in any action brought by a man and his wife for an injury done to the latter, it shall be lawful for the husband to add thereto claims in his own right, and separate actions brought in respect of such claims may be consolidated, if the court or a judge shall think fit.

It is a good defence to prove that the alleged B. happened by accident, or that it was not in anger, or that it was merely the correction which a parent or master is entitled to use to a child, or scholar, or servant, or that it was done in self-defence, or in defence of a wife, a husband, a parent, a child, a master, or a servant; or that it was such personal force as a proper officer was entitled to employ, or that the defendant has already been summarily proceeded against under the 24 and 25 Vict. c. 100, by sections 44 and 45 of which act it is provided that further proceedings shall be barred where the complaint has been disposed of by two justices either by conviction or dismissal of the case, provided, in the former case, the defendant has paid the penalty, and suffered the imprisonment awarded; and, in the latter, the magistrates have dismissed the case, because it was justified, or so trifling as not to merit punishment, and this be forthwith certified under their hands.

In the Scotch law, there was what was called a B. *pendente lite*, which consisted in assaulting an adversary in a lawsuit during its dependence. This peculiar offence was created by two old Scotch statutes passed respectively in 1584 and 1594—and which curiously provided as a punishment the loss of the cause to the offender—but they were repealed in 1826 by the 7 Geo. IV. c. 19.

BA'TTERY, in military language, has two meanings: the one relating to field-operations; the other, to fortification. A battery in Field-operations consists of from 4 to 8 (in the British army, usually 6) pieces of ordnance, together with the necessary gun-carriages, ammunition-wagons, horses, artillerymen, and officers. A B. of foot-artillery (see ARTILLERY, ROYAL REGIMENT OF) is usually called a *field*-B., as distinguished from a *horse*-B. There are also *heavy* and *light* batteries, according to the weight of the ordnance. The term B. is also applied in a narrower sense to the *personnel*, or complement of men and officers attending such a set of guns. The designation for this used to be, in the foot-artillery, a *company*, and in the horse-artillery, a *troop;* but by an order issued in 1859, both these terms are now nearly superseded by the word B., thereby giving complexity to a term already used in two different meanings. The personnel of a field-B. of six 12-pounder rifled guns, is thus composed: 1 major, 1 captain, 3 lieutenants, 1 surgeon, 1 battery sergeant-major, 1 battery quartermaster-sergeant, 6 sergeants, 4 corporals, 4 bombardiers, 66 gunners, 2 trumpeters, 1 farrier and carriage-smith, 3 shoeing-smiths, 2 collar-makers, 1 wheeler, 61 drivers (privates)—in all, 158. In war, gunners and drivers would be added till the total strength of the battery became 277. Two batteries together form the command of a lieutenant-colonel, and have the services of a veterinary surgeon between them.

The *matériel* for a 12-pounder B. of 6 guns comprises 6 carriages for the guns, 1 spare gun-carriage, 3 store-wagons, 1 store-cart, 1 forge-wagon, 1 rocket wagon, 12 gun-ammunition wagons, and 6 wagons for small-arms ammunition, for the use of the infantry. To draw these guns and vehicles are required in war about 212 horses, together with 35 saddle-horses, and eight baggage-horses. The vehicles and boxes are prepared for the reception of 1284 rounds of ammunition for the guns, 150 rockets, and 98,280 rifle cartridges. There is also carried a supply of empty cartridges, port-fires, fires, fuses, quick match, slow match, and an immense number of tools and small articles, besides stores for the wheelers, shoeing-smiths, and collar-makers. Nearly all these supplies are equally divided, so as to make each independent of the others; but some of the stores are in reserve, for the use of the whole battery.

A battery, in Fortification, is a row of large guns of any number from two to twenty or upwards, mounted on an earthwork or other platform. It differs from an artillery or field B. in having no horses or vehicles immediately belonging to it. Siege-guns are mostly placed in or on such batteries; and when an army is preparing to resist the occupation of a particular place by an enemy, a B. of position is frequently one of the defensive means adopted. On the other hand, the fortifications on and within the walls of a stronghold generally obtain other names than that of B.; although particular rows of guns in certain places may be so called. Military engineers distinguish many different kinds of batteries according to the nature of the duty which they are to fulfil, or of the ground on which they are placed. An *elevated* B. has the parapet raised above the ground; the earth for forming it being obtained from a ditch in front. A *half-sunken* B. has the interior slope sunk a little below the surface. A *sunken* B. has the base from 24 to 42 inches below the level of the ground. The guns mounted on these three kinds of batteries partake in the varying elevations of the batteries themselves, and are adapted to different modes of firing on the enemy. A *siege*-B. consists of a range of heavy guns, for silencing the enemy's fire, ruining parapets and buildings, and making a breach through which infantry may enter. A *cavalier*-B. is especially elevated, to fire over a parapet without embrasures. In the *Moncrieff B.*, the gun is mounted so as to fire over a parapet 10 feet high, the recoil causing it to descend after the shot. *Enfilade, en revers, en écharpe, ricochet, cross, oblique*, &c. batteries differ chiefly in the direction in which they pour out their fire. The distinction between *gun*-batteries, *howitzer*-batteries, and *mortar*-batteries, depends on the kind of ordnance employed. A mortar-B. has a ditch of extra width, to afford spare earth for a platform of extra strength and solidity. A military engineer, in planning a B., makes his calculations in such form that the quantity of earth taken out at one spot may about equal that heaped up in another.

These batteries are all nearly alike in the general principle of their construction. They consist primarily of an *épaulement*, or built-up shelter, behind which the guns are placed; the platform

on which the guns actually rest may or may not be above the ordinary level of the ground, according to the nature of the battery. The épaulement or parapet is of immense thickness, to resist the action of the enemy's cannon-balls. The thickness at the top is seldom less than 12 feet, and may be as much as 20; for it is found that a 24-pounder ball will penetrate 18 feet of earth. The guns are placed about 20 feet apart, behind the parapet. Some batteries are straight, with all the guns parallel; while others may be portions of a triangle (*redan*) or of a polygon, and the earthwork has to be constructed accordingly. There is generally a ditch from 12 to 20 feet wide, outside the earthwork; and the depth from the crest of the parapet to the bottom of the ditch is 12 to 16 feet. For gun and howitzer batteries, there are embrasures through which the firing takes place; but mortar-batteries are without those openings.

Sometimes the épaulement is thrown up loosely, in haste; but for the better kinds of batteries, fascines, gabions, and sand-bags are largely employed. The main structure is lined with fascines 9 feet long, and the embrasures lined with other fascines 18 feet long—40 or 50 of the two kinds being required per gun. The fascines here spoken of are long bundles of brush-wood, weighing 30 to 200 lbs. each. Sometimes sand-bags are used instead of fascines, each containing about a bushel of sand or earth; and sometimes gabions, which are wicker cylinders filled with earth. A 6-gun sand-bag B., made wholly of these materials, requires nearly 8000 sand-bags.

The fate of a field-B. often decides a battle. At the battle of the Alma, when once the Guards and Highlanders had reached the Russian batteries on the hill, the day was won. At the battle of Inkermann, the issue depended mainly on the possession of a small 2-gun sand-bag B., which remained, after many vicissitudes, in the hands of the allies.

BA'TTERY, Floating. See Floating Battery.

BA'TTERY, Electric and Galvanic. See Electricity and Galvanism.

BATTHYA'NYI, one of the oldest, richest, and most celebrated families of the Hungarian magnates, which can trace its origin as far back as the invasion of Pannonia by the Magyars, in 884 A. D., and which has given to Hungary many warriors and statesmen. The surname is derived from lands obtained in the 14th c.—Balthasar von B., who was the head of the family in the latter half of the 16th c., fought with distinction in the Turkish wars, and constantly maintained at his own expense 1200 infantry and 500 cavalry.—Charles, Prince of B., a Lieutenant-field-marshal of the Empire, distinguished himself in the Bavarian War of Succession, and particularly by a victory over the French and Bavarians at Pfaffenhofen on 15th April 1745.—Count Casimir B., a member of the principal branch of the family, was born 4th June 1807. He was Minister of Foreign Affairs in Hungary during the insurrection in 1849, in which he also distinguished himself as a military governor. After the catastrophe of Vilagos, he fled, along with Kossuth, into the Turkish territory, where he remained till 1851. He then went to France, and died at Paris, 13th July 1854.—Count Louis B., belonging to another branch of the same family, and born at Presburg in 1809, having espoused the national cause, yet seeking to maintain the connection with Austria and his allegiance to the Austrian sovereign, was appointed President of the Ministry, when Hungary obtained a ministry of its own, in March 1848. His ability was not equal to the goodness of his intentions, and the circumstances in which he was called to act were very difficult and embarrassing. He did not hold the office long, and afterwards took part in public affairs, chiefly as a member of the diet, and with great moderation. Yet, after the Austrians entered Pesth, he was arrested in January 1849, and on 6th October was executed by sentence of martial law. His condemnation was unexpected, and awakened the more sympathy, because all men regarded it as unjust.—A Prince B. occupied recently a prominent position on the turf, winning the Derby of 1876.

BA'TTLE, a town in East Sussex, 8 miles northwest of Hastings, where the country rises in wooded swells, and it consists of one street, built along a valley extending from N.W. to S.E. Pop. (1871) 3495; (1881) 5388. Till of late, B. was noted for its manufacture of gunpowder, known as B. powder. It was anciently called Hetheland or Epiton, and derives its present name from the Battle of Hastings, fought on the heath between it and Hastings, on 14th October 1066, when the Normans, under William the Conqueror, finally overthrew the Saxon dynasty in England. William, to commemorate his victory, founded in 1067, on the spot where Harold's standard was taken, a splendid abbey, which was endowed with all the land within a league of it. The abbey had the privileges of a sanctuary, and the Conqueror's sword and a roll of his barons were deposited in it. The existing ruins, which belong to a building erected after the original abbey, occupy 3 sides of a quadrangle, and are a mile in circumference.

BA'TTLE, is a combat between large masses of troops, or whole armies. Every B. ought to have for its object the determination, if possible, of the whole contest, or at least the effecting of some important step to that end. It is therefore the aim of a general to bring about an engagement at the decisive point. This constitutes Strategy, while Tactic is concerned with the handling of the troops in the actual battle. Victory on the battle-field is not enough for a general; it is only by following up his victory to the annihilation, if possible, of the beaten army, that its fruits are secured. Order of B. is the particular way in which the several corps of different arms are disposed for entering into an engagement. It varies at different times, and is modified according to locality.

No general account of a B. can be given. Information on the various elements of which a B. consists will be found described under such heads as Attack, Artillery, Cavalry, Infantry, Charge, Fleet, Gunnery, Tactics, &c. The more important individual battles will be found described, in their causes and results, under the names of the places with which they are associated.

Considered in their political relations, the importance of battles is not always in proportion to their magnitude. 'There are some battles which claim our attention, independently of the moral worth of the combatants, on account of their enduring importance, and by reason of their practical influence on our own social and political condition, which we can trace up to the results of those engagements. They have for us an actual and abiding interest, both while we investigate the chain of causes and effects, by which they have helped to make us what we are; and also while we speculate on what we probably should have been, if any one of those battles had come to a different termination.'—Creasy's *Fifteen Decisive Battles of the World, from Marathon to Waterloo* (Since Waterloo, Königgrätz or Sadowa in 1866, and Sedan in 1870, have been the most decisive.) Creasy's list is as follows:

B.C.
490. Battle of Marathon.
413. Defeat of the Athenians at Syracuse.
331. Battle of Arbela.
207. " " the Metaurus.

A.D.
9. Defeat of the Romans under Varus.
451. Battle of Chalons.
732. " " Tours.
1066. " " Hastings.
1429. Joan of Arc's victory at Orleans.
1588. Defeat of the Spanish Armada.
1704. Battle of Blenheim.
1709. " " Pultowa.
1777. Defeat of Burgoyne at Saratoga.
1792. Battle of Valmy.
1815. " " Waterloo.

BA'TTLE, Wa'ger of. See Battel.

BA'TTLE-AXE was a weapon much used by the early northern nations, Celtic and Scandinavian, requiring great strength in its use. Some were held with one hand, some with two; the former kind could be wielded equally by horse and foot, but the latter was for foot-soldiers only. The B. had a longer handle, and a broader, stronger, and sharper blade than the common axe. During the middle ages, and somewhat earlier, it was much used in sorties, and to prevent the escalading of a besieged fortress. The *pole-axe* differed but little from the battle-axe. The *black bill* and *brown bill* were a sort of halbert, having the cutting part hooked like a woodman's bill, with a spike projecting from the back, and another from the head. The *glaive* was a kind of pole-axe or bill used by the Welsh.

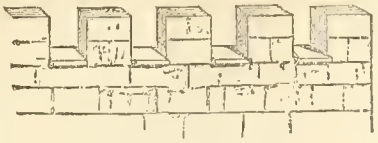
BATTLE CREEK, a city of Michigan, 121 miles west of Detroit. It manufactures flour and woollens. Pop. (1870) 5323; (1880) 7592.

BATTLEFORD, in Saskatchewan, North-west Territory of Canada, at the junction of the Battle River with the Saskatchewan, and a little to the north of the route of the Canadian Pacific Railway. The territory was organized as a part of the Dominion in 1875, and some government buildings have been erected at B. The country near is rolling prairie, thickly grassed, without tree or scrub.

BA'TTLEMENT, a notched or indented parapet used in fortifications. The rising parts are called cops or merlons; the spaces which they are separated, by *crenels*, embrasures, and sometimes loops. The object of the device is to enable the soldier to shelter himself behind the merlon, whilst he shoots through the embrasure. The bas-reliefs of Nineveh, and the Egyptian

Early English Traceried Battlement.

paintings, testify to its antiquity, and there is perhaps no nation by which it has not been adopted.



Simple form of Battlement.

BA'TTLE-PIECES are paintings representing battles. The modern mode of warfare is less favorable for this branch of art than the ancient, where personal valor had more room to display itself. Among the greatest paintings of this kind are, the battle of Constantine, sketched by Rafael, and executed by Giulio Romano; Lebrun's battles of Alexander; and the battle of the Amazons by Rubens. In smaller scenes, such as skirmishes and surprises, Antonio Tempesta, Hans Snellink, Pet. Snyders, Fulcone, Phil. Wouverman, &c., are distinguished. The most eminent of recent battle-painters is Horace Vernet.

BA'TTUE (from Fr. *battre*, to beat). The B. is a method of killing game on a great scale, by causing animals to be driven forward to a point where a number of shooters are waiting to shoot them. The driving is effected by beating the bushes; hence the term battue. This term, like the practice which it imports, is only of modern date; yet a plan of killing deer by driving them forward in herds in an ever-narrowing circle to a place where they are to be shot, is an old usage in the Highlands, where it is called the *tinchel*. The B. is at best a common-place and butcherly amusement, for it can scarcely be said to have the merit of being attended with even a reasonable degree of exercise and excitement. It is practised chiefly in extensive preserves of pheasants and hares during the autumn and winter months, when country gentlemen invite acquaintances to their mansions for the sake of field-sports. The B. takes place early in the day, and with good arrangements, it is attended with neither fatigue nor danger. The number of shooters is usually eight or ten, each provided with at least two guns, which are loaded by an assistant as quickly as they are discharged. When the shooters are stationed at safe distances from each other, and ready to commence work, the beaters begin theirs by driving the game before them. Sometimes, however, pheasants will run a long way before rising on wing, and to make them take to flight on approaching the guns, a low net is stretched across their path. It should be stated, however, that in the B., hares, rabbits, &c., are shot as readily as pheasants; and at length the ground is covered with slain, like a field of battle. By means of the B., large quantities of game are killed, and sent to market; the profits derived from this species of stock on some estates amounting to no inconsiderable sum annually. For an account of B.-shooting, we refer to *The Shot-gun and Sporting Rifle*, also *Stonehenge's British Rural Sports* (London, 1875).

BATU'M, or BATOU'M, formerly a Turkish fortified city, now a Russian free port on the eastern shores of the Black Sea. The Berlin Congress of 1878, in sanctioning the cession of B. to Russia, stipulated that it should not be made into a naval station, but should remain an essentially commercial port. The harbor is one of the best on the east coast of the Black Sea. A pretty extensive trade is carried on. Hides, wax, honey, and, above all, oak for ship-building, are the principal exports. B. has about 3000 inhabitants, mostly Turks and Lasians, or Laz. Great ruins of Greek churches and other buildings are found in the neighborhood. B. is now connected by railway with Poti and Tiflis; and since 1883, with Baku on the Caspian Sea.

BATURI'N, a town of Russia, 78 miles east of Tchernigov, and in that government. It was founded by Stephen Bathory, king of Poland, and was at one time the favorite residence of the Hetmans of the Cossacks. The palace of the Hetmans, with its once beautiful grounds, is now going rapidly to decay.

BAUD, a town of the dep. of Morbihan, France, situated on the Evel, 20 miles north-west from Vannes. Pop. (1876) 1496. B. has some trade in grain, cattle, hemp, butter, and honey. Near B. is a statue of granite, known as the *Venus of Quinipily*, worthless as a work of art, but remarkable on account of its history. Its origin is unknown, but it is supposed, from its Egyptian character, to be a Gallic Isis. Down to the 17th c., it was worshiped with foul rites, and even now is regarded with superstitious veneration by the peasantry. It appears to have been first called Venus in inscriptions on the pedestal set up in 1689.

BAU'DEKYN, a corruption of Bald'achin (q. v.).

BAUDELAIRE, PIERRE CHARLES, a poet belonging to the extreme left of the romantic school of which Gautier was the head, was born in Paris in 1821, and became known as a critic. *Les Fleurs du Mal*, a poem published in 1857, secured him a name, but brought on him a public prosecution; and parts of the work were condemned as morally unfit for publication. Both the subject and the manner of all his work displayed intense opposition to the rules of French classicism; but B. was distinguished from his fellow-romanticists by his delight in positively unpleasant subjects, and by the unnatural extravagance of his fancy. He wrote also *Gautier* (1859), *Les Paradis Artificials* (1860), *R. Wagner* (1861), and some volumes of admirable criticisms. His French rendering of the works of E. A. Poe is one of the most perfect of translations. B. died September 1867.

BAU'ER, BRUNO, a biblical critic and philosopher, belonging to the extreme school of German rationalism, was born at Eisenberg, in the duchy of Saxe-Altenburg, on the 6th September 1809. He studied at the university of Berlin, and early devoted himself to what is termed in Germany the scientific criticism of Scripture —that is to say, a criticism based on the conviction that the contents of the Bible have a natural, and not a supernatural origin. In 1839, B. became a *privat-docent* in the university of Bonn, but in 1842 was forbidden to deliver any more theological lectures. He then removed to Berlin. He passed through various stages of anti-supernaturalism. At first, he contented himself with believing that the substance of the Christian religion might be extricated from the entanglements of a confused and erroneous system of interpretation. Such is the idea that runs through his earliest works, his *Criticism of Strauss's Life of Jesus* (1836), his *Journal of Speculative Theology* (1836—1838), and his *Critical Exposition of the Religion of the Old Testament* (1838). To a more advanced stage belong his *Doctor Hengstenberg* (1839), and the *Evangelical Church of Prussia and Science* (1840). In the latter of these works, B. sought to prove that true philosophic union is the dissolution of the outward dogmatic church in the realm of the universal and free self-consciousness. In his *Critique of the Evangelical History of John* (Brem. 1840), and *Critique of the Evangelical Synopticists* (Leip. 1840), he attempted to show that the so-called facts of the gospel never really had a historical existence, and that those artistic compositions which we term the gospels, were simply the product of the human self-consciousness. B. considers Strauss a mere apologetical theologian, a comparatively orthodox writer! and regards his conclusions with the supercilious contempt of one who has reached a far higher elevation, while he conceives that his own special work in this world has been to strike off the last head of the Hydra of the Tradition-hypothesis. The persecutions to which he was now subjected brought about a complete rupture between him and the church; the consequence of which was a brochure entitled *The Question of Liberty, and my own Private Affairs* (Zurich, 1843). Then followed his *Christianity Unveiled* (Zurich, 1843), in which he expressed the same conviction that he had previously done in two ironical treatises—viz., that a dogmatic religion was opposed to our self-consciousness. About this time he broke with his old friends, the liberals, by writing a pamphlet against the emancipation of the Jews, *Die Judenfrage* (Brunswick, 1843). This tractate forms the transition point to the third period of B.'s intellectual activity, in which he seems to have abandoned theology altogether as something hopeless. He now occupied himself exclusively with literature and political philosophy. The number of his writings in this department is very great. The principal are, *History of the Politics, Civilization, and Enlightenment of the 18th Century* (Charlottenburg, 1843—1845); *History of Germany during the French Revolution and the Reign of Napoleon* (Charlottenburg, 1846); *History of the French Revolution until the Establishment of the Republic* (Leip. 1847); *Western Dictatorship; The Actual Position of Russia; Germany and Russia; Russia and England*. The prominent idea in the whole of his works belonging to this period is, that the failure of the popular and national struggles in the 19th c. results from the essential weakness of the 'enlightenment' of the 18th c. More lately B. has again returned to theology.

In 1850—1851, appeared his *Critique of the Gospels and the History of their Origin*, and his *Critique of the Epistles of St. Paul*, the latter of which the author considers wholly apocryphal, and written during the 2d c. Besides the works mentioned, B. has composed various other treatises on important points of history, theology, and politics. All B.'s writings exhibit great learning, industry, research and acumen; but are completely antagonistic to the received opinions in theology, or to any form of evangelical religion. He is generally admitted to be quicker in the discovery of error than of truth. His latest works are *Philo, Strauss, Renan und das Urchristenthum* (1874), and *Christus und die Cæsaren* (1877).

BAUGÉ, a town in the department of Maine-et-Loire, France, 23 miles east-north-east of Angers. The English, under the Duke of Clarence, were defeated here in 1421. Pop. (1876) 3318, who are engaged in the manufacture of linens and woollens.

BAUHI'NIA, a genus of plants of the natural order *Leguminosæ*, sub-order *Cæsalpineæ*. The upper petal is somewhat remote from the rest. The leaves are generally divided into two lobes. The species are natives of the warmer regions of both hemispheres, and some of them are remarkable for the size and beauty of their flowers. Most of them are twining plants, or *lianas*, stretching from tree to tree in the tropical forests; but some are small trees, as *B. porrecta*, the Mountain Ebony of Jamaica, so called from the color of its wood. The inner bark of *B. racemosa* (the Maloo

Climber), of *B. scandens*, and of *B. parviflora*, East Indian species, is employed for making ropes. *B. retusa* and *B. emarginata*, also East Indian, evude a brownish colored mild gum; whilst the astringent bark of *B. variegata* is used in Malabar for tanning and dyeing leather, and also in medicine. The leaves of various species are used in Brazil as demulcent medicines, having mucilaginous properties.—Livingstone mentions a species of B. in South Africa, called the Mopané Tree. It is remarkable for the little shade which its leaves afford. They fold together, and stand nearly erect during the heat of the day. On them the larvæ of a species of *Psylla* cause a saccharine secretion, in circular patches, beneath which the pupa of the insect is found. The natives scrape it off, and eat it as a dainty.

BAUMGA'RTEN, Alexander Gottlieb, a clear and acute thinker of the school of Wolf, was born at Berlin on the 17th of July 1714, studied at Halle, and in 1740 became Professor of Philosophy at Frankfort-on-the-Oder, where he died on the 26th of May 1762. He is the founder of Æsthetics (q. v.) as a systematic science of the beautiful, though his mode of treatment is objected to by the more transcendental Germans, as being purely psychological; that is to say, he makes æsthetics only a portion of the philosophy of the senses, and contrasts it with logic, which belongs to the sphere of the reason. The idea of a science of the beautiful first appears in his treatise *De Nonnullis ad Poema Pertinentibus*, published at Halle 1735. In 1750—1758, he issued two volumes of his *Æsthetica*, but his death hindered the completion of the work. His writings in other departments of philosophy are marked by clearness and precision; his *Metaphysica* (Halle, 1739; 7th edition, 1779) is still considered one of the most useful books for the study of the Wolfian philosophy.

BAUMGARTEN-CRUSIUS, Ludwig Friedrich Otto, a German theologian, born at Merseburg, 1788, and died at Jena, 31st May 1843. He studied theology at Leipsic, and in 1810 became university preacher. In 1817, he was appointed Professor of Theology at Jena, and always distinguished himself as a champion of religious liberty, on behalf of which he wrote various treatises. In 1820 appeared his *Introduction to the Study of Dogmatics* (Leip. 1820), a work of considerable originality and richness of thought. More complete exhibitions of his opinions are to be found in his *Manual of Christian Ethics* (Leip. 1827); *Outlines of Biblical Theology* (Jena, 1828); and *Outlines of Protestant Dogmatics* (Jena, 1830). In 1831—1832, he published a *Text-book of the History of Doctrines;* in 1834, a work on *Schleiermacher, his Method of Thought, and his Value;* and also *Considerations on certain Writings of Lamennais*. After his death, Kimmel published the whole of his exegetical prelections on the Gospels and Pauline Epistles.

B. was conspicuous for the breadth and solidity of his learning, the originality of his spirit, and the acuteness of his understanding, but was nevertheless deficient in clear and vivid expression. He attached himself to no school theological or philosophical. At an early period, he had been greatly influenced by the metaphysics of Schelling, from which, however, he ultimately emancipated himself. His thinking was, to a certain extent, rationalistic, but on the whole approached more closely to the direction of the spiritual Schleiermacher.

BAUMGARTNER, Andreas Ritter von, or Chevalier de, was born at Friedberg, in Bohemia, 23d November 1793, and studied at Vienna, where, in 1823, he became Professor of Natural Philosophy. Whilst filling this office, he gave popular lectures on Sundays upon mechanics, &c., for artisans and operatives, which met with much approbation. A result of these lectures was his *Mechanik in ihrer Anwendung auf Künste und Gewerbe* (2d ed. Vienna, 1823), and his *Naturlehre* (Vienna, 1833). An ailment of the throat induced him to resign his professorship, but he was appointed director of the imperial porcelain, mirror-glass, and smalt manufactories, and afterwards superintendent of tobacco manufactories. In the year 1846, the setting up of the electric telegraph was committed to him, and he was intrusted with the principal charge of the making of the Austrian railways. After the events of March 1848, he was Minister of Mines and of Public Buildings, and chief of one of the departments in the Ministry of Finance. In May 1851, he was appointed Minister of Commerce, Trade, and Public Buildings. At the same time he was appointed President of the Austrian Academy of Sciences, of which he had been vice-president for a number of years. He published in 1862, *Chemie und Geschichte der himmelskörper nach der Spectralanalyse;* in 1864, *Die mechan. Theorie der Wärme*. He died in 1865; and *Freiherr Von B., Eine Lebensskizze*, was published during the following year.

BAUPE'TTAH, a town of British India, in the presidency of Madras, 29 miles from Guntoor. Pop. supposed to be about 20,000.

BAUR, Ferdinand Christian, the founder of the 'New Tübingen School of Theology,' was born on the 21st of June, 1792. In 1817, he became professor in the seminary of Blaubeuren, where he gave the first indications of his remarkable abilities by the publication of his *Symbolism and Mythology, or the Nature-religion of the Ancients* (Stuttgart, 3 vols., 1824—1825), a work which indicates the influence of Schleiermacher over the author. In 1826, he was called to Tübingen, where he held the chair of Protestant theology. His whole life was consecrated to religious studies—the history of doctrines, the symbolism of the church, and biblical exegesis. On account of the universality of his culture, the wonderful activity and fertility of his mind, his rare combination of speculative thought with solid knowledge, and that faculty of historic divination or insight which enabled him to draw decisive results from separate, obscure, and neglected *data*—he has been regarded by many in Germany as the most massive theological intellect since Schleiermacher. Unlike Bruno Bauer, he made comparatively little use of the Hegelian philosophy in his writings; and when he did, it was professedly only that he might more clearly understand historical phenomena in their internal spiritual connection, and be enabled to represent the logical process of their development. His methods of investigating the progressive history of religious opinion, however, incurred the reproach of formalism from its adversaries, who said he applied it too rigorously, and made dogmas develop themselves with a kind of abstract inevitable regularity from previous historical conditions, without allowing for immediate and extraordinary providences. His most important works in the history of doctrine are—*Die christliche Gnosis oder die christliche Religionsphilosophie* (Tübingen, 1835), (The Christian Gnosis, or the Christian Philosophy of Religion); a work which makes the Christian Gnosis of the 2d and 3d centuries the starting-point of a long series of religio-philosophical productions traceable uninterruptedly down through middle-age mysticism and theosophy to Schelling, Hegel, and Schleiermacher; *Die christliche Lehre von der Versöhnung* (Tübingen, 1838), (The Christian Doctrine of the Atonement); and *Die christliche Lehre von der Dreieinigkeit und Menschwerdung Gottes* (Tübingen, 1841—1843), (The Christian Doctrine of the Trinity and the Incarnation). In reply to Möhler, the celebrated Roman Catholic theologian, who had attacked the Protestant Church, he wrote *Der Gegensatz des Catholicismus und Protestantismus* (Tübingen, 1836), (The Opposition between Catholicism and Protestantism).

Besides these works, based on a historical treatment of religion, to which class also belongs his *Lehrbuch der christlichen Dogmengeschichte* (Compendium of the History of Christian Dogmas), Stuttgart, 1847), he published various critical treatises on parts of the New Testament; such as, *Die Christuspartei in der Korinthischen Gemeinde; der Gegensatz des Paulinischen und Petrinischen Christenthums; der Apostel Petrus in Rom* (1831), (The Christ-party in the Corinthian Community; the Opposition of the Pauline and Petrine Christianity; the Apostle Peter in Rome), a work in which the author endeavors to demonstrate the existence of deep-rooted differences in that sphere of primitive Christianity, in which we are accustomed to see nothing but unity and harmony. His inquiries concerning the Gnosis led him to study minutely the pastoral epistles, the result of which study was *Die sogenannten Pastoralbriefe des Apostels Paulus* (Stuttgart, 1835), (The So-called Pastoral Epistles of the Apostle Paul), in which he combats the idea that St. Paul was their author, and refers them to the 2d c. Of a similar nature is his *Paulus, der Apostel Jesu Christi* (Stuttgart, 1845), (Paul the Apostle of Jesus Christ). His work on the Gospel of John produced a startling effect, as up to B.'s time that gospel had generally been held prior in date to the three synoptic gospels, whereas B, strove hard to show that it was of post-apostolic origin. In 1847, appeared his *Kritische Untersuchungen über die canonischen Evangelien, ihr Verhältniss zueinander, ihren Ursprung und Charakter* (Critical Inquiry Concerning the Canonical Gospels; their Relation to each other; their Origin and Character). In 1851, he published *Das Markus-evangelium nach seinem Ursprung und Charakter* (The Origin and Character of St. Mark's Gospel). B. died Dec. 1860. In these and other works of a similar nature, B. maintained that we must extend our notions of the time within which the canonical writings were composed to a period considerably post-apostolic, and which can only be determined approximately by a careful investigation of the motives which apparently actuated their authors. The chief characteristic, therefore, of the 'Tübingen School,' as exhibited in the works of its founder, is, the union of subjective criticism with a strong conviction of the historic reality of the New Testament writings. The most distinguished adherents of this new school of German theology are Zeller, Schwegler, Köstlin, and Hilgenfeld.

BAUTAIN, Louis-Eugene-Marie, a French philosopher and theologian, born at Paris, February 17, 1796. He studied under Cousin at the Normal School. In 1816, he was appointed professor of philosophy in the College of Strasbourg, and soon distinguished himself by the influence he exerted over the earnest youth of that city, who carried their admiration even to the length of imitating his walk and dress. The religious tendencies of his

character, however, not finding a satisfactory expression in philosophy, he threw himself into the arms of the church, and became a priest in 1828. After the events of 1830, he resigned his professorship, which until then he had retained; but his reputation for orthodoxy, never very strong, had been destroyed in the eyes of his bishop by his work *La Morale de l'Evangile comparée à la Morale des Philosophes*, published a few years before, and he was in consequence suspended from sacred offices for several years, but reinstated in 1841. In 1838, he was made dean of the Faculty of Letters at Strasbourg, and afterwards director of the College of Juilly. At a still later period, he was translated to Paris, and appointed vicar-general of the metropolitan diocese. In 1848, he attempted to give a religious direction to the revolution. He was selected as one of the professors of the Theological Faculty of Paris, and was an extremely popular preacher. His principal works are—*Philosophie-psychologie Expérimentale* (1839), *Philosophie Morale* (1842), *Philosophie du Christianisme* (1835), *La Religion et la Liberté considérées dans leurs Rapports* (1848), *La Morale de l'Evangile comparée aux divers Systèmes de Morale* (1855). He died in 1867.

BAU'TZEN, or, in official language, BU'DISSIN, capital of the circle of the same name, kingdom of Saxony. It has a population (1880) of 17,509, including many *Wends*, remnants of the old Vandals. It is situated on a rising ground overlooking the river Spree, and is the seat of the chief offices of justice in the circle, which has a population (1880) of 351,326, including 50,000 Wends. It has several churches, a royal palace—formerly the residence of the markgrafs of Meissen—numerous schools, and two public libraries and an hospital. The chief branches of industry are manufactures of woollens, fustian, linen, hosiery, leather, and gunpowder. B. is a place of considerable antiquity, and was known in the time of Henry I. (931), but was first made a town under Otho I. Its several privileges, and the reputation of certain holy relics preserved in St. Peter's Church, made the place important. It suffered greatly in the war with the Hussites, and still more during the Thirty Years' War. Meissner, the poet, who died in 1805, was born here. B., however, is chiefly celebrated as the place where Napoleon, with an army of 150,000 men, after an obstinate resistance, won a barren victory over 90,000 of the allied Russians and Prussians, May 20—21, 1813. The allies lost in the two days 15,000 in killed and wounded; in addition to 1500 prisoners, mostly wounded, which the French captured. The French left 5000 dead upon the field, and upwards of 20,000 were wounded. The result of the battle, and the splendid retreat of the allies, were most disheartening to the French army, and even to Napoleon himself.

BAVA'RIA (Ger. *Baiern*, and officially, *Bayern*), one of the states of the German empire; according to its size, the second in importance. B. is divided into two unequal parts, which are separated by the Baden and Hesse-Darmstadt dominions. The eastern portion, comprising fully eleven-twelfths of the whole, is situated between lat. 47° 20′, and 50° 41′ N., and long. 9° and 13° 48′ E. It is bounded N. by the Prussian province of Hesse-Nassau, the Thuringian principalities, and the kingdom of Saxony; E., by Bohemia and Austria; S., by the Tyrol; and W., by Würtemberg, Baden, and the Grand Duchy of Hesse. The western part, occupying the Rhine Palatinate, on the left bank of the Rhine, lies between lat. 48° 57′ and 49° 50′ N., and between 7° 5′ and 8° 27′ E. Rhenish Prussia, the Grand Duchy of Hesse, and Baden bound it on the W., N., and E., and France on the S.

B. is divided into eight circles, as follows:

Circles.	Area in sq. miles.	Pop. in 1875.
Upper Bavaria	6,535	891,404
Lower Bavaria	4,091	632,377
Palatinate	2,272	641,567
Upper Palatinate	3,679	503,422
Upper Franconia	2,632	555,043
Middle Franconia	2,914	607,085
Lower Franconia	3,409	597,056
Swabia and Neuburg	3,648	601,950
Total	29,180	5,022,904

At the census of 1880 the pop. was 5,284,778.

Surface, Hydrography, Railways, &c.—B. may be described as a mountainous country. It is walled in on the south-east, north-east, and north-west by mountains ranging from 3000 feet to close on 10,000 feet in height. The highest elevation is reached on the south, the Zugspitz of the Noric Alps being 9665 feet high. On the east, the highest points of the Böhmerwald, dividing B. from Bohemia, are the Arber and Rachelberg, which are respectively 4613 feet and 4800 feet high. On the north-east, the Schneeberg, in the Fichtelgebirge range, attains a height of 3481 feet. A branch of this chain, which is connected on the north-west with the Thuringerwald, extends south between the rivers Regnitz and Vils. The Rhöngebirge, the greatest height of which is 3000 feet, forms the northernmost chain of Bavaria. In the Rhine Palatinate, the principal mountain is the Hardt, whose culminating peak is about 2300 feet high. In the interior B. is intersected in several directions by various less elevated ranges, alternating with extensive plains and fertile valleys. B. is rich in wood, nearly one-third of its surface being covered with forests, mostly of pine and fir.

As to its *hydrography*, B. has the Rhine flowing along the whole eastern boundary of the circle of the Palatinate, which is also watered by the Speyer, the Lauter, and the Queich. The Danube enters B. Proper at Ulm, where it is joined by the Iller, and pursues its course in an east-north-east direction through the center of the country, until it passes out at Passau into the Austrian dominions. Including its windings, the length of the Danube in B. is about 270 miles, which can be navigated throughout. In its passage through B., it receives no fewer than 38 rivers, the chief of which, on the right bank, are, besides the Iller, already mentioned, the Lech, the Isar, and the Inn; and on the left, the Wörnitz, the Altmühl, the Kocher, the Naab, the Regen, and the Ilz. The north part of B. is in the basin of the Main, which, rising in the north, flows with many windings through the kingdom in a south-west direction to the Rhine, with which it unites at Mayence. Its most important tributaries are the Regnitz, the Rodach, the Tauber, and the Saale. B. has several lakes, the principal of which are the Chiem, which has a circumference of 35 miles; the Wurm, with a length of 14 miles, and a breadth of 4 miles; and the Ammer, with a circuit of 27 miles. These lakes are situated in the south, at the foot of the northern slope of the Noric Alps. A corner of Lake Constance also belongs to Bavaria. The lakes and rivers abound in fish. There are a few canals in the country, the most important of which is the *Ludwigs-Kanal*, which, taking advantage of the rivers Main, Regnitz, and Altmühl, unites the Rhine and Danube, and through them, the German Ocean with the Black Sea. This canal was executed by government at a cost of upwards of £800,000. B. has altogether about 1700 miles of railway in operation. One of the chief is that between Augsburg and Lindau on Lake Constance, a distance of 80 miles. These lines join Munich with Augsburg, Donauwörth, Nürnberg, Bamberg, Ulm, Kufstein, &c. B. has about 9000 miles of public roads, and over 1500 of telegraphs.

Climate, Soil, Products, &c.—The temperature of B. varies considerably, being cold and bleak in the mountainous regions, and very hot in summer in the plains and valleys. The climate may be described generally, however, as mild and salubrious. The soil, particularly in the valleys of the Upper and Lower Danube, is very fertile, second to none in Central Germany; but its capabilities as yet have not been fully developed, although even now the wealth of the country consists almost wholly of its agricultural produce. The plain south of Munich has been described as the granary of Germany, in consequence of its great productiveness, while the circles of Upper and Middle Franconia are styled the hop-garden of Bavaria. Wheat, rye, oats and barley are the chief articles of produce, but buckwheat, maize and rice are also grown to a small extent. The vine, as well as the hop plant, is cultivated extensively in Franconia, and the wine is held in great esteem. Rhenish B. also produces good wine. The quantity annually produced in B. is estimated at upwards of 16,000,000 gallons. Fruit, tobacco, flax, hemp, linseed, liquorice, and beet root are cultivated. Cattle-rearing forms the exclusive occupation of the inhabitants on the slopes and at the foot of the Alps, pasturage being found at an elevation of 8500 feet. Sheep, goats, and pigs are reared in Middle and Upper Franconia, and horses chiefly in Upper B. and Swabia, but the live-stock is far from being adequate to the extent and capacity of the country. The forests of B. annually furnish large quantities of timber. The soil is rich in mineral wealth, which as yet has not been drawn upon to anything like its full extent. The chief minerals are salt—which is a government monopoly, and obtained by evaporation principally from the rich mines in the south-east corner of the Alps—coal, and iron, which is worked almost everywhere throughout the territory. In Rhenish B., copper, manganese, mercury, and cobalt are found; quicksilver and black-lead are obtained in some places; marble in great variety is common, so also are gypsum, alabaster, and some of the finest porcelain clay in Europe.

Manufactures, &c.—The manufacturing industry of B., like its agriculture, is generally in an undeveloped state, and not centered in the hands of capitalists, who can largely take advantage of new inventions to prosecute it with energy and success, but distributed among numerous small manufacturers.

This is not the case with beer, the manufacture of which is carried to great perfection in B., and to an extent, if we take population into account, quite unparalleled in Europe. There are upwards of 5000 breweries in B., making about 110 million gallons of beer annually, which are mainly consumed in the country, the quantity of beer that a Bavarian can imbibe being quite marvelous. Nearly two-thirds of the revenue of the state are said to be derived from this source alone. Next to beer, coarse linen is the most important product of manufacturing industry, and of late years some considerable cotton-factories have been erected; but

the supply of cotton, woollen, and worsted goods is not equal to the home consumption. Leather is pretty extensively manufactured, so also are paper, articles of straw and wood, porcelain, glass, nails, needles, jewelry, beet-root, sugar, and tobacco. The mathematical and optical instruments of Munich are held in high repute. The exports consist of timber, grain, wine, cattle, wool, salt, hops, fruits, beer, leather, glass, jewelry, optical and mathematical instruments, butter, cheese, &c. The annual value of these is estimated at about £1,500,000. The principal imports are sugar, coffee, woollens, silks, stuffs, drugs, hemp, and flax. The position of B. gives it the transit trade between North Germany and Austria, Switzerland and Italy.

Population, Religion, Education.—The growth of the population of B. is much checked by the regulations which relate to marriages. No marriage can take place until the authorities who superintend the relief of the poor are fully satisfied that the persons wishing to marry have adequate means to support a wife and family; and certain military obligations have also to be fulfilled before a man can enter into wedlock. These restrictive laws have another consequence besides that of preventing a rapid increase of the population; they have tended to increase inordinately the number of illegitimate children. B. has a very bad pre-eminence in this respect on the continent. In the capital, the illegitimate births about equal the legitimate; and over the whole kingdom the proportion ranges from 1 in 4·5 to 1 in 5 of the total births, equal to a percentage of from 22¼ to 20 illegitimate births. In 1817, the population was 3,564,757; in 1833, 4,187,390; and in 1855, it had only increased to 4,541,556. During recent years, however, the increase has been more rapid, the population in 1864 amounting to 4,807,440; in 1871, to 4,863,450; and in 1880, to 5,284,778. The Bavarians, notwithstanding their beer-bibbing propensity, are essentially a sober and industrious people. Though all of German origin, they differ materially in character. The Franconians are intelligent, diligent, and steady; the Swabians, good-naturedly indolent; and the inhabitants of the Palatinate, lively and enterprising; while the Bavarians proper are dull and superstitious.

As to *religion*, in 1875, the Roman Catholics numbered 3,573,142; Protestants, 1,392,120; Jews, 51,335; and other minor sects, 5793. The state allows perfect toleration, guaranteeing the same civil rights to Catholic and Protestant alike. Individuals of every sect have the privilege of worshiping privately without fear of molestation; and on application to the king by a sufficient number of families, the right of public worship can be secured. A concordat with Rome divides the state into 2 archbishopries and 6 bishopries. The consistories of Anspach, Baireuth, and Speyer, under the superior consistory of Munich, govern the Lutheran Church, the Munich consistory being in some degree subject to a section in the home department, which manages the temporal concerns of all the churches. The president of the Munich consistory has a seat and vote in the council of the state. The revenues of the Church of Rome are derived from lands and endowments, the Protestant Church is supported by the state. Of late, the Bavarian government has become conspicuous by opposing the Ultramontanes, and encouraging the 'Old Catholics.'

B. has a good system of *education*, under the supreme direction of a minister of public instruction, to whom certain members of the provincial governments, specially instructed to watch the educational interests of the communities, are subordinate. They, again, have numerous inspectors under them, who make systematic reports. Nevertheless, in Upper and Lower B., about one-fifth of the children are yet without a school education. Besides elementary schools, there are about 30 *gymnasia*, and numerous Realschulen and technical schools of various kinds. The three Bavarian universities are at Munich, Würzburg, and Erlangen, the latter being Protestant. There are several extensive libraries in B., that of Munich being the largest in Germany. Art has been zealously cultivated in B., and since the days of King Louis I. has been peculiarly fostered by the state. There are numerous institutions for the furtherance of painting, sculpture, and music.

Government, Revenue, &c.—B. is a constitutional monarchy, the throne hereditary in the male line. Its constitution dates no further back than 1818, when it was declared a part of confederated Germany. The king is the executive. The legislature consists of a chamber of senators, and one of deputies. The senators are hereditary, the king, however, having the power, within certain limits, to nominate members for life. The Chamber of Deputies consists of five different classes—one-eighth of the whole members being chosen from landed proprietors, who exercise judicial powers in right of their property, and have no seat in the upper house; another eighth from ecclesiastics of the Protestant and Roman Catholic churches; a fourth from the inhabitants of cities and market towns; and a half from landed proprietors who neither possess judicial rights, nor a seat in the other chamber. There are, besides, three members from the universities—one from each. There is one member in the Chamber of Deputies for every 7000 families, or 35,000 inhabitants. In the event of there not being a dissolution, the chamber lasts for six years. The usual length of the annual session is two months. The chambers, in ordinary circumstances, meet once a year for the dispatch of business, and it is compulsory on the king to summon them once in three years. No deliberation can take place unless two-thirds of the deputies are present. All matters relating to public burdens, &c., come first under the consideration of the Chamber of Deputies; with reference to other questions, the king exercises his own discretion as to which chamber shall first discuss them. No alteration in taxation, and no new law, can be promulgated without the consent of the legislature; but the royal prerogative is loosely defined.

The cabinet consists of seven members, chiefs of the departments of foreign affairs justice, home affairs, public worship and instruction, finance, commerce, and public works and war. They are not necessarily members of the chambers, though they are privileged to be present at the deliberations. The privy council is composed of the king, certain royal princes, the ministers of state, and six councillors nominated by the king.

The *revenue* of B. for 1876—1877 amounted to 258,686,781 marks (£12,934,324), of which 20,296,453 marks were to be raised by direct taxation, 39,062,210 marks by indirect taxation, the rest chiefly from domains and state monopolies. The expenditure for the same year was estimated at the same figure. The interest on the national debt swallows up about 15 per cent. of the whole expenditure; the army, 18 per cent.; and worship and education about 11 per cent. By the budgets of 1880 and 1881, the receipts for each year are 221,741,445 marks (£11,087,072), and are just balanced by the expenditure. The public debt in 1879 was 1,259,646,194 marks (£62,982,309), about a third of it having been contracted for railways.

The raising of the *army* of B. was in 1871 adapted to the Prussian method of conscription. Every Bavarian is liable to service for seven years, and no substitution is allowed. The period of active service is four years, the remaining three being spent in the army of reserve; and the soldier, after quitting the reserve, is bound to serve other five years in the landwehr. When B., in November 1870, became one of the kingdoms of the German empire, her army, on the established conditions of its formation, was formed into two corps of the imperial army, each consisting of two divisions, under the command of the king of B. in times of peace, but controlled by the emperor of Germany in war. On the peace-footing, the infantry consists of 16 regiments, 48 battalions, 26,638 men in all; besides which there are 10 battalions of chasseurs, 5510 strong, and 32 battalions of landwehr. There are 10 regiments of cavalry, of 7192 men; 5544 artillery, 1214 engineers, and 1126 of the military train—in all, 47,224 men, without including the *landwehr*. In time of war the total force is 149,892, rather more than trebled.

History.—The Boii, a race of Celtic origin, were the first inhabitants of B. of whom tradition furnishes any account. From them, its German name, Baiern, as well as its old Latin name, Boiaria, is said to have been derived. They appear to have conquered the country about 600 B. C., and they retained it until shortly before the Christian era, when they were subjugated by the Romans; the country being made an integral part of the Roman empire, under the names of Vindelicia and Noricum. After the decay of the Roman power, the Ostrogoths and Franks successively held possession of it, until Charlemagne conquered it. After his death, it was governed by lieutenants of the Frank and German kings, until 1070, when it passed into possession of the Guelph family; and it was transferred by imperial grant, in 1180, to Otho, Count of Wittelsbach, whose descendant now occupies the throne. The Rhenish Palatinate was conferred on this family by the Emperor Frederick III. in 1216. Now followed quarrels between relatives, and divisions of territory, until the dukedom of B. was severed from the Rhenish and Upper Palatinates (see PALATINATE); of the latter, however, it repossessed itself in 1621—the peace of Westphalia, in 1648, confirming the title of its princes to that possession, as well as its right to the electoral dignity to which it had been raised in 1624. In the war of the Spanish Succession, B. supported France, and suffered considerably in consequence; but in 1777, on the extinction of the younger Wittelsbach line, it received the accession of the Rhine Palatinate. In 1805, B. was erected into a kingdom by Napoleon I. The king assisted Napoleon in his wars, and in consideration of his aid received large additions of territory. In 1813, however, the Bavarian king opportunely contrived to change sides, and thus managed to have confirmed to him, by the treaties of 1814—1815, an extent of territory nearly as valuable as the possessions which the treaties of Presburg and Vienna had given him, and which he had now to restore to Austria.

In 1818, as already intimated, the new constitution came into existence, but owing to various causes, it did not secure that measure of popular freedom and contentment that had been expected. In 1825, Louis I. ascended the throne. He was a well-meaning, liberal, and intellectual monarch, and was favorable to the liberty of the people and the press; but he lavished the wealth of the king-

dom to an extravagant degree on the embellishment of the capital, and on works of art, while he neglected to a considerable extent works of practical value, that would have tended to enrich the country, diminish the public burdens, and consequently increase the welfare of his people. In 1830, a wave from the French revolution swept over the country, disturbing its equanimity, but not to any serious extent. The Bavarian government, however, took alarm, and restricted the freedom of the press. These restrictions excited so much opposition, that they were soon after rescinded, but new dissatisfaction was created by the imposition of new taxes. The Jesuits now obtained an immense influence with the king, which they used to the detriment of popular rights. The wrath of the people was further aroused against their monarch by his connection with the notorious Lola Montez, who was looked upon as an agent of the Ultramontanists—an imputation which that lady, in her autobiography, published in 1858, indignantly repudiates, maintaining that she was the inveterate enemy of that party, and the true friend of the people. In March 1848, following the example set by the French revolutionists, the people of Munich seized the arsenal, and demanded reforms and the expulsion of Lola Montez. The king had to consent; but in the same month he abdicated his throne, in accordance, says Lola Montez, with a promise made by him to her. His son, Maximilian II., ascended the throne. He died in 1864; and Louis II., a distinguished patron of Wagner, the great musician, now reigns. See GERMANY.

BAVA'RIA, a colossal female statue at Munich, which bears the name of the country of which it is a personification, is said to be second in size only to the famous Colossus of Rhodes. It was erected by King Louis I., the model having been executed by Schwanthaler. Externally, the figure bears a German aspect. A long folding garment reaches from the middle to the naked foot; over the half-naked breast a skin is cast, and the hair falls freely over the back. The brow is adorned with sprigs of oak; in the left hand, which is raised, she holds a wreath of oak; and in the right, which is bent towards the breast, a sword; at her side reposes the Bavarian lion, the guardian of her kingdom, in a sitting attitude. The statue is 65 feet high, the pedestal being 30, so that the whole monument has a height of 95 feet. The statue was cast from the bronze of Turkish and Norwegian cannon. Internally, it is very remarkable. Through the back part of the pedestal, a door leads to a stone staircase, consisting of 60 steps. The figure itself is hollow, and resembles a mine, with side-passages which lead into the lion. A staircase of cast iron, of 58 steps, leads through the neck up into the head, where there are two sofas, and several openings for the enjoyment of the view. At the highest part of the head, there is the following inscription: 'This Colossal figure, erected by Louis I., King of Bavaria, was designed and modelled by L. von Schwanthaler, and cast in bronze, in the years 1844 to 1850, by Ferdinand Miller.' The head contains standing-room for thirty-one persons. The whole figure consists of seven pieces, and the lion, of five. The monument was formally uncovered, amidst great rejoicings, on the 7th August, 1850.

BA'VINS, in the pyrotechny of warfare, are small bundles of easily ignited brushwood, from two to three feet in length. They are made by arranging the bush-ends of the twigs all in one direction, tying the other ends with small cord, dipping the bush-ends in a kettle containing an inflammable composition, and drying them. They are employed among the combustible materials in fire-ships.

BAW'BEE', or BA'BEE', the popular designation of a half-penny in Scotland, now dropping out of use. The origin of the term is obscure; but it is most probably a corruption of *bas billon*, Fr., applicable to debased copper money. In the plural form, the word is often popularly used in Scotland to signify money generally. In Scottish song, B. is synonymous with a girl's fortune or marriage-portion—as, *Jenny's Bawbee*.

BA'XTER, RICHARD, one of the most eminent of the Nonconformist divines, was born, November 12, 1615, of poor but genteel parents, at Rowton, in Shropshire. His early education was somewhat neglected. Instead of attending, as he wished, one of the universities, he was obliged to content himself with a course of private study, in the midst of which he was induced, singularly enough, for he was habitually serious, to try his fortune at court. Hither he accordingly hied, fortified with an introduction to the Master of the Revels. A month sufficed to convince him that he was out of his element at Whitehall, and a protracted illness after his return helped to deepen the earnestness of his religious convictions. Soon after, at the age of 23, he was ordained, and entered on the Mastership of Dudley Grammar School, from which he removed to act as assistant to a clergyman at Bridgenorth, where he resided nearly two years. In 1640, he was invited to become parish clergyman of Kidderminster, an offer which he accepted; and within a comparatively brief period, not only did he establish his reputation as one of the most remarkable preachers of the time, but what was better, succeeded in effecting a wonderful improvement in the manners of the people. On the breaking out of the civil war, his position became somewhat peculiar. Sincerely attached to monarchy, his religious sympathies were almost wholly with the Puritans; and though a Presbyterian in principle, he was far from admitting the unlawfulness of episcopacy. These views, which, some time before the Restoration, became extremely popular, were now too catholic for the general taste, and the open respect shown by Baxter to some leading Puritans exposed him to some danger from the mob. He accordingly retired to Coventry, where he ministered for two years to the garrison and inhabitants. He afterwards accepted the office of chaplain to Colonel Whalley's regiment, and was even present at the sieges of Bridgewater, Exeter, Bristol, and Worcester. His influence was at all times exerted to modify the intolerance of partizanship, and to promote 'the spirit of love and of a sound mind.' On the urgent invitation of his parishioners, he returned to Kidderminster, when ill health forced him to leave the army, and continued to labor there for some time. During this period, he greatly extended his fame by the publication of his *Saints' Rest* and *Call to the Unconverted*. He never dissembled his sentiments with regard to the execution of the king and the usurpation of Cromwell, even in the presence of the Protector himself, who endeavored, without success, to enlarge his ideas on the subject of revolutions. On the return of Charles, B. was appointed one of his chaplains, and took a leading part in the conference held at the Savoy to attempt a reconciliation between the contending church factions, a project defeated by the bigoted obstinacy of the bishops.

B. was tempted with the offer of the see of Hereford, but declined the honor, praying instead to be permitted to return to his beloved flock at Kidderminster. He asked no salary, but his request was refused. The Act of Uniformity at length drove him out of the English Church, and in July 1663 he retired to Acton, in Middlesex, where he spent the greater part of nine years, chiefly occupied in the composition of some of the most important of his numerous works. These he produced with a rapidity unparalleled in modern generations, at least in this one respect, that the quality was not always in the inverse ratio of the quantity. The Act of Indulgence in 1672 permitted him to return to London, where he divided his time between preaching and writing. At length, in 1685, he fell into the brutal clutches of Judge Jeffreys, who condemned him, for alleged 'sedition' in his *Paraphrase of the New Testament*, to pay a fine of 500 marks, and in default, to lie in the King's Bench Prison till it was paid. The circumstances of the trial are graphically described by Macaulay in the second volume of his History. After a confinement of nearly eighteen months, B. was released and pardoned, on the mediation of Lord Powis. He lived after this to see better times, and died on the 8th December 1691, in the seventy-fifth year of his age.

B. is said to have preached more sermons, engaged in more controversies, and written more books than any other Nonconformist of his age; and Dr. Isaac Barrow has said of him, that 'his practical writings were never mended, and his controversial seldom confuted.' The total number of his publications exceeded 160. Of these, by far the most popular and celebrated are his *Saints' Rest*, *Dying Thoughts*, and *Call to the Unconverted*—20,000 copies of which last were sold in a twelvemonth, and it was translated into all European languages. More important, however, in a theological point of view, are his *Methodus Theologiæ* and *Catholic Theology*, in which his peculiar system—a compromise between Arminius and Calvin—is embodied. His autobiographical narrative is historically valuable; the review of his religious opinions is spoken of by Coleridge as one of the most remarkable pieces of writing in religious literature. A complete edition of his works, in 25 vols., with a life by Orme, was published in 1830. His Practical Works, in 4 vols., were published in 1847.

BAXTE'RIANS is the term that was formerly applied to those who adhered to Baxter's theological system, the peculiar doctrines of which were: 1st, That though Christ died in a special sense for the elect, yet he also died in a general sense for all; 2d, The rejection of the dogma of reprobation; 3d, That it is possible even for saints to fall away from saving grace. The tendencies of Baxter's views was towards a more liberal theology, but they are deficient in logical consistency. Nevertheless, they have been, and still are, embraced by many pious people—especially among the dissenters—who shrink from accepting what they consider the hard conclusions of Calvinism, or the latitudinarian views of Arminianism. The two most eminent B. are Dr. Isaac Watts and Dr. Philip Doddridge.

BAY (from a Saxon root, 'to bend') is properly applied to an indentation of the sea into the land, with an opening wider than the depth. A gulf is understood to be deeper than a bay, and has often a narrow opening. These terms are often loosely applied; Baffin's Bay, e. g., is really a gulf. When the body of water is large, and the entrance narrow, it becomes a shut sea, as the Baltic, the Red Sea, &c. Hudson's Bay, the Persian Gulf, and the Gulf of Mexico, might with propriety be termed seas.

BAY, a name given to a number of trees and shrubs more or less resembling the Laurel or Victor's Laurel (*Laurus nobilis*), which is also called SWEET BAY (see LAUREL); the name *Baye*, which was once exclusively applied to the fruit, having been extended to the whole plant. The Common Laurel or Cherry Laurel (*Prunus Laurocerasus*) is sometimes called BAY LAUREL. See LAUREL.—The RED BAY of the southern states of America is *Laurus Caroliniensis*. See LAUREL.—The WHITE BAY of Ameriea is *Magnolia glauca* (see MAGNOLIA), and the LOBLOLLY BAY of the same country is *Gordonia Lasianthus*. See GORDONIA.

From early times, bay-leaves have been associated with popular superstitions and usages. Along with other evergreens, they have adorned houses and churches at Christmas; and in token of rejoicing or of some meritorious deed, sprigs of bay, as well as of laurel, have been worn in the hat, or wreathed around the head. There appears to have been a notion that the B. was an antidote against the effects of thunder. In an old play, *The White Devil*, Cornelia says:

> 'Reach the bays:
> I'll tie a garland here about his head,
> 'Twill keep my boy from lightning.'

According to Shakspeare, the withering of bay-trees was reckoned an omen of death. Thus, *Richard II.*:

> 'Tis thought the king is dead; we will not stay.
> The bay-trees in our country all are wither'd.'

The following passage occurs in *Parkinson's Garden of Flowers*, 1629, p. 598: 'The bay-leaves are necessary both for evil uses and for physie, both for the sick and for the sound, both for the living and the dead. It serveth to adorn the house of God, as well as man; to crowne or enriche, as with a garland, the heads of the living; and to strike and decke forth the bodies of the dead; so that from the cradle to the grave, we have still use of it, we have still need of it.' For other notices of this kind respecting the B., we refer to *Brand's Popular Antiquities*, also to *Hone's Year Book*. Bay-leaves are sometimes used in cookery for the sake of flavoring.

BAYA'MO, or SAN SALVADOR, a town in the eastern part of the island of Cuba, 60 miles north-west from Santiago. It is situated in an unhealthy plain, near the left bank of the Canto, a small river which falls into an arm of the sea called the Canal of Bayamo. The town carries on a considerable trade. Pop. about 7500.

BAY CITY, in Michigan, U.S., stands near the mouth of the Saginaw River, and is an important port for the traffic of Lake Huron. It has many sawmills, salt wells, and factories, and exports large quantities of fish. Pop. (1871) 7064; (1881) 20,693.

BAY ISLANDS, a small group in the Bay of Honduras, 150 miles S.E. of Balize. The cluster was proclaimed a British colony in 1852. The chief island is Ruatan (q. v.); and the others of any consequence are Bonacca, Utila, Burburet, Helena, and Morat.

BAY OF ISLANDS, on the east coast of the northernmost portion of the North Island of New Zealand.

BA'YA (*Ploceus Philippinus*), a small East Indian bird, of the great family of the *Fringillidæ* (q. v.), and of a genus to some of which, from the remarkable manner of constructing their nests, the name Weaver Bird (q. v.) is often given. It is described by the older ornithologists under the name of the Philippine Grossbeak, or *Loxia Philippina*. It is yellow, spotted with brown, the throat black, the beak conical and large. Its nest is very curious. Suspended from a slender twig of a lofty branch, so that monkeys, squirrels, and serpents may not reach it, it is rendered still more secure by its form, which is very like that of a common Florence flask, the entrance however, being from beneath, and not from above, with lateral openings to separate chambers, in one of which the females sits upon the eggs, whilst another is occupied by the male, who there pours forth his song. It is composed of fine fibres of leaves and grass. The B. is very easily tamed, will perch on the hand, and can be trained to fetch and carry at command.

BAYADE'RES (from the Portuguese *bailadeira*, that is, dancing-girl) is the name given by Europeans to the dancing-girls and singers in India, who are divided into two great classes, each comprising many subdivisions. The first of these classes, who are called Devadasi—that is, slaves to the gods—are divided into two distinct grades, according to the rank of the families whence they have sprung, the dignity of the idol to which they are devoted, and the authority and riches of the temple to which they belong. Those of the first rank are chosen from the most influential families of the Vaisya caste, to which the rich landed proprietors and merchants belong. Those of the second class are chosen from the chief Sudra families, who correspond to our mechanics. No girls can be admitted among the Devadasis but such as are still in childhood, and free from any bodily defect. The parents of the girl must renounce by a solemn agreement all right to their child, who then receives the necessary instruction. The employment of the Devadasis is to sing the praises of their god at festivals and solemn processions, to celebrate his victories and great deeds, and to dance before him, to weave the wreaths with which the images are adorned, and in general to perform subordinate offices in the temple and for the priests. On the other hand, they are excluded from the celebration of such rites and ceremonies as are accounted peculiarly sacred, as, for example, at sacrifices for the dead, suttis, &c. The Devadasis of the first rank live within the enclosure of the temple, which they are not permitted to leave without the special permission of the high priest. They must remain unmarried for life, but are, notwithstanding, permitted to choose a lover, either in or out of the temple, provided he belongs to one of the high castes. A connection with a man of low rank would be punished with the utmost severity. If they have children, the girls are brought up to their mother's profession, and the boys are educated for musicians. The Devadasis of the second rank differ but little from those of the first, but they have more freedom, as they live without the temple. A certain number of them must attend daily at the temple service, but at public processions they are all obliged to appear. They not only dance and sing before the images—for which they receive a fixed allowance of rice-money—but when summoned by the nobles, they perform at marriages, banquets, &c.

All the Devadasis reverence, as their special patroness and protectress, the goddess Rambha, one of the most beautiful dancers in the paradise of Indra. They bring a yearly offering in spring to her and to the god of love. The singing-girls who travel about the country are of an essentially different class from the Devadasis. They perform only at private feasts, entertain strangers in the *tschultris*, or public inns, and get different names according to the special arts in which they excel. Some of them live independently in bands, consisting of from 10 to 12 persons. They travel about the country, and divide their gains with the musicians who accompany them. Others are under the authority of *dayas*, or old dancing women, who receive all the money they gain, and give the girls only enough for food and clothing. Some are really the slaves of such old women, who have procured them in their infancy either by purchase or by capture, and have instructed them in their art. To one of these classes belonged those B. who visited several of the European capitals in 1839. The costume of the B. is not without a certain alluring charm. Their dances do not resemble what we are accustomed to call dancing, but are rather a species of pantomime, which is explained by the songs recited by the accompanying musicians. The themes of these songs are usually either happy or despairing love, jealousy, &c. Europeans have spoken with much enthusiasm of the charms of these pantomimes; but to judge by the performances of the above-mentioned B. during their visit to Europe, these descriptions must be looked upon as very much exaggerated; for although these dancers possessed great physical agility, their movements were wanting in dignity and grace.

BAYARD, PIERRE DU TERRAIL, CHEVALIER, the knight *sans peur et sans reproche*, born 1476, at Castle Bayard, near Grenoble, was perhaps the only hero of the middle ages who deserved the unmingled praise and admiration bestowed upon him. Simple, modest, a sterling friend, and tender lover, pious, humane, and magnanimous, he held together in rare symmetrical union the whole circle of the virtues.

After acting as page to the Duke of Savoy, B. entered the service of Charles VIII., whom he accompanied to Italy, and gained renown in the battle of Verona, where he took a standard from the enemy. At the beginning of the reign of Louis XII., B. was engaged in a battle near Milan, where he followed the defeated and retreating forces with such impetuosity that he entered the city with them, and was made a prisoner, but the Duke Ludovico Sforza released him without ransom. At Barletta, in 1502, B., with ten other French cavaliers, fought a tournament with an equal number of Spaniards, in order to decide their respective claims to superiority; and although seven Frenchmen were overthrown in the first charge, the result, chiefly through B.'s bravery, after a six hours' combat was declared equal. Next, we find him fighting bravely in Spain, and against the Genoese and Venetians. When Pope Julius II. declared war against France, B. hastened to support the Duke of Ferrara; but failed in his scheme for making the pope a prisoner. Subsequently, he won fresh laurels in Spain. In the war with Henry VIII. of England—who had threatened Picardy, and besieged Terouane, in 1513—when the French, on one occasion, were about to lay down their arms, B. made a sudden attack on an English officer, and, pointing his sword at his breast, said: 'Surrender, or I take your life.' The Englishman gave his sword to B. who returned his own, saying: 'I am Bayard, your prisoner; and you are mine.' The emperor and the king of England exchanged their prisoners without any demand of ransom for Bayard. When Francis I. had ascended

the throne, B. was sent into Dauphiné to make a way for the army over the Alps and through Piedmont. In this expedition, he made Prosper Colonna a prisoner. Next, B. gained at Marignano, a victory for the king, who, in consequence, submitted to receive the honor of knighthood from Bayard. When Charles V. broke into Champagne, at the head of a large army, B. defended Mezieres against all assaults, and on his entry into Paris, he was hailed as the saviour of his country, was made knight of the order of St. Michael, and appointed over a company of 100 men, led in his own name, an honor which until then had been confined to princes of the blood-royal. He was slain by an arrow from an arquebuss, while crossing the Sesia, April 30, 1524. So highly was he esteemed for all noble qualities, that his death was lamented not only by the French king and nation, but also by his enemies His love of virtue, especially of that kingliest of virtues, *justice*, was so passionate, that he was wont to declare that all empires, kingdoms, and provinces where justice did not rule, were mere forests filled with brigands. His body was taken by the enemy, but was restored to France, and interred in the church of the Minorites' monastry, near Grenoble.

BAYAZI'D, or BAYEZEE'D, a town of Turkish Armenia, in the pashalic of Erzeroum, from which place it is distant east-south east about 150 miles. It is situated about 15 miles to the south-west of the foot of Mount Ararat; is fortified; and has a population of about 5,000, mostly Kurds. Prior to 1830, its population was estimated at upwards of 15,000, and it had a brisk trade; but since that time, on account of Russian interference, its commerce and inhabitants have gradually decreased. B. has repeatedly been the scene of conflict. The Berlin Congress of 1878 restored B. to Turkey, though it had been ceded to Russia by the preliminary treaty.

BAYAZI'D I. See BAJAZET.

BAY'BERRY. See CANDLEBERRY.

BA'YER, JOHANN, a German constructor of charts of the stars, was born, either at Augsburg or at Rhain, in Bavaria, in the latter part of the 16th c., and fulfilled the duties of a Protestant pastor in several places. His zeal for the Protestant Church was so conspicuous that he obtained the cognomen, *Os Protestantium* (the Mouth of Protestants); other accounts state that he was an advocate at Augsburg. It matters little which, as he is now remembered only on account of his *Uranometria* (1603, and 2d ed. 1639), in which he gave 51 maps of the heavens, constructed from the observations of his predecessors, and followed by explanations in his *Explicatio Caracterum Æneis Tabulis Insculptorum* (Stras. 1624). Although his maps are not remarkable for accuracy, even for his time, he has the merit of introducing the simple plan of distinguishing the stars of a constellation by means of letters. The largest star of the constellation he named by the first letter of the Greek alphabet (α), and the rest in order of their apparent brilliancy, by the following letters. This convenient plan is still followed.

BAYEUX, a city of Normandy, in France, dep. Calvados, situated on the Aure, not far from its mouth. Pop. (1876) 8315. B. is chiefly built of wood and plaster, is famous for its porcelain, and has also manufactories of lace, linen, calicoes, leather, and hats. It is a town of great antiquity—its cathedral being said to be the oldest in Normandy. In it was preserved for centuries the famous Bayeux Tapestry (q. v.), now in the public library of the place. B. is the seat of a bishop, and has a college.

BAYEU'X TA'PESTRY, a web of canvas or linen cloth, 214 feet long by 20 inches wide, preserved in the public library, Bayeux, upon which is embroidered, in woolen thread of various colors, a representation of the invasion and conquest of England by the Normans. Tradition asserts it to be the work of Matilda, wife of William the Conqueror, and it is believed that if she did not actually stitch the whole of it with her own hand, she at least took part in, and directed the execution of it by her maids; and afterwards presented it to the cathedral of Bayeux, as a token of her appreciation of the effective assistance which its bishop, Odo, rendered to her husband at the battle of Hastings. Some antiquaries contend that it was the work not of Queen Matilda (the wife of the Conqueror) who died in 1083, but of the Empress Matilda (the daughter of King Henry I.), who died in 1167. According to Mr. Bruce, the latest authority on the subject, the tapestry contains, besides the figures of 505 quadrupeds, birds, sphinxes, &c., 'the figures of 623 men, 202 horses, 55 dogs, 37 buildings, 41 ships and boats, and 49 trees—in all, 1512 figures.' The tapestry is divided into 72 distinct compartments, each representing one particular historical occurrence, and bearing an explanatory Latin inscription. A tree is usually chosen to divide the principle events from each other. This pictorial history—for so it may be called, and indeed, in several particulars, it is more minute than any written history we have—opens with Harold, prior to his depature for Normandy taking leave of Edward the Confessor. Harold is next observed, accompanied by his attendants, riding to Bosham with his hawk and hounds; and he is afterwards seen, succes-

Bayeux Tapestry.
Harold coming to anchor on the coast of Normandy.

sively, embarking from the Sussex coast; anchoring in France and being made prisoner by Guy, Earl of Ponthieu; redeemed by William, Duke of Normandy, and meeting with him at his court; assisting him against Conan, Earl of Bretagne; swearing on the sacred relics never to interfere with William's succession to the Saxon throne, &c.; and finally re-embarking for England.

The tapestry then represents Harold narrating the events of his journey to Edward the Confessor, whose death and funeral obsequies we next see. Harold then receives the crown from the Saxon people, and ascends the throne; and next we have the news brought to William, who takes counsel with his half-brother, Odo, Bishop of Bayeux, as to the invasion of England. Then follow

Bayeux Tapestry.
The crown offered to Harold by the people.

representations of the active war-preparations of the Normans; their embarkation; disembarkation; march to Hastings, and formation of a camp there; the battle, and death of Harold, with which the tapestry finishes.

The B. T. gives an exact and minute portraiture of the manners and customs of the times; and it has been remarked that the arms and habits of the Normans are identical with those of the Danes, as they appear in the miniature paintings of a manuscript of the time of King Cnut, preserved in the British Museum.

Mr. Lancelot appears to have been the first to direct attention to the existence of this curious monument, by a description of an illuminated drawing of a portion of it he had discovered, in a paper presented to the Academy of Inscriptions and Belles-Lettres, in 1724. This led to the discovery of the tapestry itself, in the Bayeux Cathedral, by Père Montfaucon, who published an engraving of it in 1730, with a commentary on the Latin inscriptions. In 1767, Dr. Ducarel gave an account of it in his *Anglo-Norman Antiquities*. From that time until 1803, when Napoleon had it conveyed to Paris, the B. T. excited little attention. Its exhibition, however, in the National Museum there awakened public curiosity concerning it, and gave rise to various speculations as to its age, intention, &c. The discussion satisfactorily established it to be what tradition asserted it—a contemporary pictorial record of the events of the Norman Conquest. The Society of Antiquaries (London) published an engraving of the whole in the sixth volume of the *Vetusta Monumenta*. The B. T.

would have been destroyed at the Revolution, had not a priest fortunately succeeded in concealing it from the mob, who demanded it to cover the guns. It was formerly preserved in the

Bayeux Tapestry,—Battle of Hastings.

cathedral of Bayeux, where it was wont to be exhibited, on certain days every year, in the nave of the church, round which it exactly went. Bruce's *Bayeux Tapestry Elucidated* (London, 1855); *Archæologia*, vols. xvii., xviii., xix.; *Vetusta Monumenta*, vol. vi.; *Pictorial History of England*.

BAYLE, Pierre, one of the most independent thinkers in the 17th c., was born in 1647 at Carlat, in the old county of Foix, France, and studied philosophy under the Jesuits at Toulouse. The arguments of his tutors, but especially his friendly intercourse and quiet disputation with a Catholic clergyman, who lived in his neighborhood, led him to doubt the orthodoxy, of Protestantism, and shortly prevailed so far that he openly renounced his father's creed, and adopted the Catholic one. In the course of about 17 months, however, the conversation of his relatives brought him back to the Protestant profession. To escape ecclesiastical censure, he now went to Geneva, and thence to Coppet, where he studied the philosophy of Descartes. After a few years he returned to France, and in 1675 was elected to fill the chair of philosophy in the university of Sedan. In this office he remained until 1681, when the university was disfranchised. His next appointment was that of professor of philosophy at Rotterdam. The appearance of a comet in 1680 having given occasion to a widely spread alarm, B., in 1682, published his *Pensées Diverses sur la Comète*, a work full of learning, and treating, in discursive style, many topics of methaphysics, ethics, theology, history, and politics. This was followed by his *Critique Générale de 'l'Histoire du Calvinisme de Maimbourg.'* In 1684, he commenced a periodical, *Nouvelles de la République des Lettres*. The religious persecutions in France gave B. occasion to write his *Commentaire Philosophique sur ces Paroles de l'Evangile; 'Contrains les d'entrer,'* which professed itself to be a translation from the English, and contained a strong defence of the principle of toleration. In consequence of the accusations brought forward by the theologian, Jurieu, who regarded B. as an agent of France, and the enemy of Protestants, B., though he skilfully defended himself, was deprived of his license to teach (in 1693). He now assiduously devoted his leisure to the *Dictionnaire Historique et Critique* (1st edition, 2 vols. Rotterd., 1696—last edition, 16 vols., Paris, 1820). This was the first work published under his own name. Again Jurieu came forward as B.'s adversary, and induced the consistory of Rotterdam to censure the Dictionary, chiefly on account of the supposed irreligious tendency of the article on 'David,' and the commendation bestowed on the moral character of certain atheists. B. promised to expunge all the objectionable matter; but afterwards, when he found that the public entertained a different and more favorable opinion of the peculiar passages than the Rotterdam Consistory, he judged it best to allow them to remain as they were, or made only slight alterations. New opponents were called into the arena by his *Réponse aux Questions d'un Provincial* and the continuation of his *Pensées sur la Comète*. Jacquelot and Leclerc now attacked his religious opinions, while others persecuted him as the enemy of Protestantism and of his adopted country, Holland. These literary and theological controversies had a bad effect on his failing health, and a disease, for which he refused to employ medical aid, proved fatal. He died, December 28, 1706.

B. stands at the head of modern sceptics and logicians. Accustomed to view every question scrupulously on all sides, he was apparently led to doubt on religious matters generally; at least, it is not to be denied that his scepticism carried him the length of doubting the worth or the wisdom of the religious dogmatism that ruled both Catholics and Protestants in his day. B. was thus the antithesis of a bigot, but his hostility to bigotry rather originated in his indifference to the doctrines about which theologians quarrelled, than in any clear or high perception of the iniquity of religious persecution. With great eloquence and persistency, he vindicated the doctrine that moral characteristics and convictions may exist and flourish independently of particular religious opinions; and considering the barbarous manner in which the rival churches in B.'s time sought to enforce conformity of sentiment, and crush the liberty of private judgment, it is not to be wondered at that this doctrine, however objectionable abstractly, should have found a wide acceptance in Europe. Voltaire calls him 'a more admirable logician than a profound philosopher;' and adds that 'he knew almost nothing of physics.' This probably means no more than that he was ignorant of the then recent discoveries of Newton; for the scientific articles in the Dictionary presuppose a knowledge of the theories of Descartes (q. v.), with which he was conversant enough. The style of B. is clear and natural, but diffuse, and often impure. The articles in the Dictionary seem to have been chosen merely as vehicles to introduce numerous digressions in notes, many of which are prolix and uninteresting; but the greater number of the articles are characterized by good sense, logic, critical acumen, and great learning. Though it is impossible to detect the presence of a religious or a philosophical system in the work, it everywhere gives indications of the high intelligence, honest principle, and universal knowledge of the author. It was prescribed both in France and Holland, and was consequently very widely diffused in both countries, and has exercised an immense influence over the literature and philosophy of the continent. It was the dawn of scepticism in the 18th c., and may be historically regarded as the protest of the enlightened human intellect against the irrational dogmatism of the churches. In his personal character, B. was amiable, obliging, disinterested, and modest, but at the same time morally courageous and independent. His *Œuvres Diverses* were published in four volumes at the Hague, 1725—1731. See life of B. by Des Maizeaux (Amsterdam, 1712), and by Feuerbach (1838).

BAYLE'N, a town in the province of Jaen (Andalusia), Spain, situated 22 miles N.N.E. of Jaen. It has manufactures of linen, glass, bricks, tiles, soap, &c. Pop. 10,000. B. is celebrated as the place where the Spaniards won their first and only victory over the French in July 1808, and that more by accident, and the errors of the French commander, Dupont, than by good generalship on their part. About 18,000 French soldiers laid down their arms at B., the only condition being, that they should be sent to France; and other detachments of French troops afterwards offered their submission. The Spaniards, however, basely broke faith with them, and sent them to the hulks at Cadiz. The capitulation had the worst effect on the French arms. Joseph Bonaparte at once fled from Madrid, and Napoleon could find no words strong enough to express his indignation at the folly and pusillanimity of the surrender.

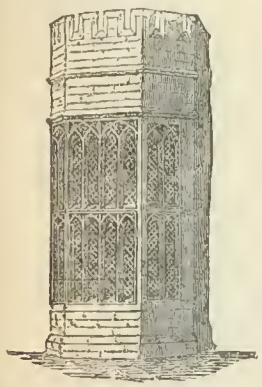
BA'YONET, supposed to be named from Bayonne, as the place of its invention, is a dagger or small spear fixed at the end of a musket or similar weapon. The first bayonets, used in France in 1671, called *bayonets-à-manche*, had handles which fitted into the muzzle of the guns; but at a later date were introduced the *bayonets-à-douille*, or socket-bayonets, having a socket which enabled the B. so to be used as not to interrupt the firing. The use of pikes went out when that of bayonets came in. It seems very probable that the first B. was a dagger, which the musketeer stuck by means of its handle into the muzzle of his weapon, to shield him from a cavalry charge; and that the usefulness of the contrivance suggested a permanent arrangement. Bayonets are now made with great rapidity at the government rifle factory at Enfield. Two pieces of metal are at first selected—viz., a piece of the very best cast steel, 7 inches long by ⅝ inch square; and a piece of the best wrought-iron rod, 4 inches long by about 1 inch in thickness. The steel is to form the blade, and the iron, the socket-handle. The steel being properly shaped at one end, is joined to the iron by welding. A forging machine is next employed to give a rough outline of the required shape. Then comes the action of a swaging-machine, with dies which come down upon the metal in great force, and counter-dies beneath the metal. The metal is then annealed; turned in a cutting-machine to remove a wire-edge thrown up in the act of stamping; cut to a proper length, and the socket-end made square; drilled and bored, to make the socket hollow; shaped and furrowed along the blade; bent at the neck; hardened and tempered; and finished by a numerous train of minor operations. The B.-charge is now one of the most terrible manœuvres of trained infantry, in which each nation fancies itself to excel all others.

BAYONNE, one of the most strongly fortified towns of France, in the department of the Basses-Pyrénées, situated at the confluence of the Adour and Nive, about three miles from the mouth of their united waters in the Bay of Biscay. These rivers divide the town into three parts—Great and Little B., and the suburb of St. Esprit. Population in 1876, 22,307. B. is beautifully situated at the foot of the Pyrenees, and is itself a handsome place. It has extensive ship-yards, rope-walks, glass-manufactories, sugar-refineries, and distilleries, and a brisk export trade in hams, for which it is famous, chocolate, liqueurs, timber, tar, and cork. Its chief imports are wool, olive-oil, and licorice. It is the see of a bishop, has a cathedral, a mint, and schools of commerce and

navigation. B. is also historically interesting. It is said that here Catharine de'Medici and the Duke of Alba planned the massacre of the Huguenots, which took place on St. Bartholomew's Day, 1572. Here the great Napoleon cozened Charles IV. out of the crown of Spain, after he had ineffectually endeavored to get Ferdinand VII., to whom Charles had previously resigned it, to give it up. The forcing of the passage of the Nive, immediately in this vicinity, by the British, in December 1813, occasioned some of the most bloody conflicts of the Peninsular campaign. The place was invested by the British early in the following year, and a sally from it by the French, on April 14, was only repulsed after great loss on the side of the British. B. is also famous as the place where the bayonet was invented about the year 1670.

BAY'-SALT is a name applied to common salt which is obtained from sea-water by solar evaporation. It is extensively obtained from *salt-marshes* which exist along the coasts of France and on the shores of the Mediterranean. See SALT.

BAY-WI'NDOW, or (corruptly) BOW-WI'NDOW, a window peculiar to Gothic architecture, so called because it forms a *bay* or projecting space outwards from a room. The external walls of bay-windows are, for the most part, either rectangular or polygonal, the semicircular form from which the term *bow* was probably derived having been unknown previously to the introduction of the debased Gothic. Though mentioned by Chaucer, bay-windows are not found in any of the styles before the perpendicular, during the prevalence of which they were frequently introduced, particularly in halls. Bay-windows generally reach to the floor, and are frequently supplied with a seat, which is called the *bay-stall*. There are many very beautiful examples of bay-windows in the colleges and halls of Oxford and Cambridge. When used in upper stories, such windows are supported on corbels, or large projecting mouldings. See ORIEL.



Bay-Window, at Compton, Wingate, Warwickshire.

BA'ZA (the *Basti* of the Romans), a town of Spain, in the province of Granada, and about 50 miles east-north-east of the city of that name. It lies in a rich plain, is generally ill built and irregular, with no feature of architectural interest. Population about 12,000, who are chiefly engaged in agricultural pursuits.

BAZAINE, FRANÇOIS ACHILLE, a marshal of France, born 13th Feb. 1811. Entering the army in 1831, he served with distinction in Algeria, in Spain, in the Crimea, and in the Italian campaign of 1859. He took part in the French expedition to Mexico in 1862, and from 1863 till the end of the war held supreme command of the French forces. When in Africa in 1836 he had gained the cross of the Legion of Honor; in 1856 he had been promoted to be Commander of the Legion; in 1863 he received the Grand Cross; and in 1869 he was made commander-in-chief of the Imperial Guard. At the outbreak of the great war with Germany, B. was at the head of the 3d army corps near Metz. After the battles of Wörth and Forbach he took command of the main French armies, and on Aug. 14, 1870, began a retreat from Metz. Defeated at Mars-la-Tour and Gravelotte, he retired within the fortifications of Metz, which was immediately invested by Prince Frederick Charles. Attempts to escape failing, B. capitulated Oct. 27; when 3 marshals, over 6000 officers, and 173,000 men laid down their arms and became prisoners of war. In 1873 B. was tried by a court-martial, and sentenced to degradation and death for having failed to do his duty. The sentence was commuted to 20 years' imprisonment. But in 1874 B. contrived to escape from the fortress on the Isle Ste Marguerite, on the S. coast, where he was then confined, and ultimately made his way to Madrid.

BAZA'R, or BAZAA'R, an oriental market-place, either open or covered, where various articles, including slaves, are exposed for sale, and where eastern merchants meet for transaction of business, as on 'Change or at the Bourse in England and France. In European cities, handsome establishments, especially for the sale of fancy goods, are now often styled bazars.

BAZARD, AMAND, a French socialist was born at Paris 19th September 1791. After the Restoration he helped to found the revolutionary society of the 'Friends of Virtue;' and in 1820, an association of French Carbonari (q. v.), which soon had 200,000 members. He was the leading conspirator in the 'plot of Belfort.' After some time, B., impressed with the necessity of a total reconstruction of society, attached himself to the school of St. Simon. In 1825 he became one of the editors of a St. Simonian journal, termed *Le Producteur*. In 1828, he delivered at Paris a series of prelections on his politico-religious creed, which met with extraordinary success. His socialistic views were afterwards published in the *chef d'œuvre* of the sect, *Exposition of the Doctrine of St. Simon* (1828—1830), of which only the first part was by B., the second, containing the principles of the new social religion, being the composition of Enfantin. After the July revolution, a larger scope was afforded to the St. Simonians. The masses were attracted by the flattering doctrine, that 'all social institutions ought to have for their end the moral, intellectual, and physical amelioration of the poor.' In a short time, B. and his coadjutors had 'created a new society, living in the midst of the old,' with peculiar laws, manners and doctrines. But B.'s connection with it was of short duration. He differed from Enfantin on the doctrine of a 'community of wives,' and in November 1831 seceded in disgust. His efforts to found a school of his own proved unsuccessful, and during a heated discussion with his former friend Enfantin, he was struck with apoplexy, from the effects of which he never recovered. He died at Courtry, near Montfermeil, on the 29th July 1832.

BAZOCHE, or BASOCHE, a kind of burlesque translation into French of the Latin word *basilica*, i. e., royal palace. When the French parliament ceased to be the grand council of the king, and confined itself exclusively to administering justice, a distinction of name necessarily sprang up between those noblemen who formed the royal train and the *habitués*, of the court of justice. The former were called *courtiers;* the latter, *basochians*, or parliamentary clerks. But inasmuch as the word *basilica* necessarily presupposed a king, the *basochians*, to keep up their dignity, gathered round a mock one of their own making, who resided at the Château des Tournelles or the Hôtel St. Pol, just as the courtiers did round the reality at the Louvre. Such was the origin of the Basochian king and kingdom. Their historical existence can be traced to the beginning of the 14th c., when Philip the Fair conferred on the brotherhood certain privileges. The principal authorities in this harmless monarchy, after the sovereign himself, were, the chancellor, the masters of requests, the referendary, and the attorney-general. Henry III., suppressed the title of king, and conferred all the privileges and rights attached to that office on the chancellor.

Still the B. continued to exist as a kingdom, minus its head, and affected on all occasions the language of royalty. Its jurisdiction included the consideration and decision of all processes and debates that arose among the clerks. It administered justice twice a week, and also caused a species of coin to be struck which had currency among its members; but if we are to judge from the proverb about *la monnaie de basoche*, it did not enjoy an immense credit in the outer world of hard cash. The mock-monarch also possessed the extensive privilege of selecting at his pleasure, yearly, from the French royal forests, a tall tree, which his subjects, the clerks, were in the habit of planting, on the 1st of May, before the grand court of the palace, to the sound of tambourines and trumpets. But this was not all. In the public sports, this fantastical little kingdom was worthily honored; its chancellor had rooms at the Hôtel de Bourgogne; at the carnival, the *basochians* joined themselves to the corps of the Prince of Fools, and to the performers of low farces and 'mysteries.' They acted in their turn a species of satirical 'morality' (q. v.), in which they made extensive use of the liberty granted to them, in ridiculing vices and the favorites of fortune. Of course, they could not fail to provoke enmity and occasion serious scandal. Louis XII. patronized these amusements. In 1500, he gave the brotherhood of the B. permission to perform plays in the grand saloon of the royal palace. Francis I. witnessed them in 1538; but in 1540, they were interdicted as incorrigible. This interdict only applied to those of Paris, for several years after, we read of the Basochian farces of Bordeaux. In their later development, they seem to have resembled the *Fastnachtspiele* (Shrove-Tuesday Plays), so popular in Germany both before and after the Reformation. They were the beginning of French comedy.

BDE'LLIUM, a gum-resin, resembling myrrh (q. v.) in appearance and qualities, but weaker, and at the same time more acrid. High medicinal virtues were ascribed to it by the ancients, but it is now little used. It is supposed to be the produce of *Balsamodendron Roxburghii* in India, and of *B. Africanum* (also called *Hendelotia Africana*) in Senegal—trees or shrubs belonging to the natural order *Amyridaceæ* (q. v.), so remarkable for the number of similar substances which it produces.—EGYPTIAN B., however, is obtained from the Doom (q. v.) palm, *Hyphæne Thebaica*. A similar substance is yielded also by *Ceradia furcata*, a half-succulent plant of the natural order *Compositæ*, inhabiting the most sterile regions of the south-west of Africa; whilst the SICILIAN B., formerly used in medicine, is produced by *Daucus gummifer*, a species of the same genus to which the carrot belongs, growing on the coasts of the Mediterranean.—The B. mentioned in Gen. ii, 12 is probably not a gum-resin at all; but what it is, is uncertain.

BEA'CHES, Raised. Modern geology teaches that the frame of the land is liable to risings and depressions, even in the present age. Several districts in different parts of the world have been raised, in consequence of earthquakes, within the remembrance of the present generation. There is good proof that certain parts of Eastern Sweden, bordering on the Gulf of Bothnia, have been elevated about three feet within the last hundred years. These facts prepare us to learn that, around the British Islands, and in other parts of the earth, there are tracts of ground at various elevations above the present sea-level, which have evidently been sea-B. at a former time. The evidences consist of, first, the levelness of the ground in the general direction of the present shores over considerable spaces; second, the alternating beds of sand and gravel, such as we see composing the present B.; and, third, the presence of marine shells, which, in our country, are generally of species now living in the boreal seas. There are also what may be called terraces of erosion—indentations made in a rocky coast by the lip of the sea in ancient times—usually consisting of a flat platform presenting patches of gravel, and of a backing wall or sea-cliff, the latter sometimes penetrated with deep caves, In Scotland, there is a very decided terrace of erosion all round the bold coasts of the West Highlands and Western Islands, at an elevation of about 25 feet above the level of the similar, but scarcely so well-marked indentation which the sea is now making. In Lapland, there is a similar terrace, but stooping from 220 to 85 feet in the course of thirty miles. There is also a clear and well-marked terrace of the same kind, at about 520 feet above the present sea-level, behind Trondhjem in Norway. The whole subject is treated elaborately in *Ancient Sea margins*, by R. Chambers, 1848, where a series of gravelly terraces are described as existing in Scotland at various heights above the sea, telling of an uprise of the frame of the land in stages, and indicating by their uniformity of level that this movement was equable.

BEACHY HEAD, the loftiest headland on the south coast of England, projecting into the English Channel, 2¼ miles south-south-west of Eastbourne, Sussex. It consists of perpendicular chalk-cliffs, 564 feet high, forming the east end of the South Downs. Several caverns have been cut out in the rock, for shipwrecked seamen to take refuge in; but shipwrecks have been far fewer since 1828, when the Bell Tont Light-house was built here. This light-house is 285 feet above the sea, in lat. 50° 44′ 24″ N., long 0° 12′ 42″ E., and is seen above 20 miles off. The view from B. H., in clear weather, extends to Hastings, the Isle of Wight, and France. The cliffs are the resort of myriads of sea-fowl. Off this point, the French fleet beat the combined English and Dutch fleets in 1690.

BEA'CON (allied to *beck* or *beckon*, to give a signal) denotes any signal set upon a height, but especially the alarm-fires at one time used to spread the intelligence of foreign invasion or other great event. These fire-signals were in use in the earliest times, and notices of them are found in the literary remains of ancient Persia, Palestine, and Greece. They were made by kindling a pile or bale of wood on the tops of lofty mountains, and keeping the flame bright by night, or having the fire so covered as to emit a dense smoke by day. There were various preconcerted modes of exhibiting the light or smoke, so as to indicate the nature of the intelligence. Thus, an act of the parliament of Scotland, in 1455, directs that one bale on fire shall be warning of the approach of the English in any manner; two bales blazing beside each other, that they are *coming indeed;* and four bales, that they are coming in great force.

An early instance of B.-signals is found in the book of the prophet Jeremiah, in his call, in chap. vi. 1, to the people of Benjamin to kindle a fire-signal on one of their mountains: 'Set up a sign of fire in Beth-haccerem; for evil appeareth out of the north, and great destruction.' An instance of the use of a line of beacons in very ancient times is given in a passage of the tragedy of *Agamemnon*, by the Greek poet Æschylus. The commander-in-chief of the Greek army at the siege of Troy is represented as communicating the intelligence of the fall of the city to his queen, Clytemnestra, at Mycenæ, in the Peloponnesus. The line consists of eight mountains, and the news is supposed to be conveyed in one night from Troy.

In England, the beacons were kept up by a rate levied on the counties, and had watches regularly stationed at them, and horsemen to spread the intelligence during the day, when the beacons could not be seen. They were carefully organized while the Spanish Armada was expected. In the beginning of 1856, an old B.-work on Malvern Hill, in Worcestershire, which had done its part in former days in spreading the intelligence of the appearance of the Armada, of the approach of the Young Chevalier, and of that of the Dutch fleet afterwards, dealt with by Admiral Blake, was lighted up in anticipation of the close of the Crimean war, and afforded an interesting amusement to scientific persons in estimating the distance at which the blaze could be seen from distant mountains.

BEA'CON, in maritime affairs, is a signal for warning against dangers, or for indicating the proper entrance into a channel, harbor, or river. Generally speaking, a B. is fixed; whereas a *buoy* floats. The power of constructing these beacons rested at one time in the sovereign; but in 1565 an act of parliament empowered the Trinity House corporation to erect them on such parts of the sea-coast and forelands as appeared to be most in want of those safeguards; and tolls were levied on the maritime counties for their maintenance. In recent times, the construction of *floating* beacons has occupied a good deal of attention, as it is conceived that they might in many cases supply the place of much more costly light-houses. Messrs. Brown and Lenox have constructed for the Trinity Board a B. for the Goodwin Sands—comprising a hollow wrought-iron floating vessel, with six water-tight compartments; a tower 28 feet high, tapering in diameter from 7 to 3½ feet; and a ball at the top of 3½ feet diameter. This B. was visible from a considerable distance; but some leakage frustrated its continued use. Mr. Herbert, in 1854, introduced a new B., intended to float upright in all states of the winds, tides, and currents; and others of similar character have since been invented. Many beacons are now made in which a bell is sounded instead of a light shown, as a warning. One by Messrs. Brown and Lenox is so constructed as to yield a continuous bell-ringing, so long as tide or current is flowing. There is a keel at the bottom, to make the B. turn with the tide. There are channels below the line of floatation, through which the tide-water or current flows; the water causes two undershot wheels to revolve; and this revolution, by means of axes, cranks, rods, guides, and levers, is made to bring the force of a hammer to bear on a bell. Some beacons on this principle have a bell of 2 cwt. Nearly allied with beacons, although not strictly such, are *gong*-beacons, which have in many cases been supplied to light-vessels. Fog sirens, fog whistles, and fog horns are similarly employed; but these audible signals are connected with light-houses or light-ships, and are only beacons in an indirect sense. See Buoy and Light-house.

BEACONSFIELD, Earl of. See Disraeli, Benjamin.

BEAD, BEADE, or BEDE (allied to 'bid'), in Anglo-Saxon and Old English, signified 'a prayer,' and hence came to mean the small perforated balls of gold, silver, glass, ivory, hard wood, &c., used for keeping account of the number of prayers repeated. A certain number strung on a thread makes a rosary (q. v.). A *bedesman* or *bedeswoman* is one who prays for another. Persons of station and wealth in old times 'had regularly appointed bedesmen, who were paid to weary Heaven with their supplications.' Bedesmen appointed to pray for the king and state, sometimes lived together, and hence *bedehouse* is synonymous with an almshouse. A common form of signature at one time was: 'Your bounden bedesman,' or 'Your humble bedeswoman,' instead of the modern, 'Your obedient servant.'

BEAD, in Architecture, a small round moulding, sometimes called an astragal. It is of frequent occurrence in architecture, particularly in the classical styles, and is used in picture-frames, and other objects carved in wood.

BEA'DLE is an inferior parish officer chosen and appointed by the vestry. His business is to attend to the vestry, to give notice of its meetings to the parishioners, to execute his orders, to assist the parish constable, and generally to do and execute all the orders and business of the vestry and of the parish, as their messenger or servant, Shaw's *Parish Law*, c. 19. See Parish; Vestry. The B. holds his office during 'pleasure, and he may therefore be dismissed at any time for misconduct by the parishioners assembled in vestry.'

BEADS, a variety of personal ornament, made of various materials, as glass, pottery, metal, bone, ivory, wood, jet, amber, coral, &c., and perforated so that they can be strung on threads, and made into necklaces, bracelets, rosaries, &c., or worked on cloth as a kind of embroidery. Their use is of great antiquity, for they are found in the most ancient of the Egyptian tombs as decorations of the dead, and beads supposed to have been used as barter by the Phœnicians in trading with various nations in Africa are still found in considerable numbers, and are highly valued by the natives under the name of 'Aggry' beads. Ever since the 14th century, the manufacture of glass beads has been chiefly engrossed by the Venetians, and the glass manufacturers of Murano, still produce fully nine-tenths of all the beads made; the imports to this country alone in 1872 were 2,093,503 lbs., of the value of £105,488. The manufacture is curious; the melted glass, colored or uncolored, is taken from the pot by two workmen, who slightly expand the gathering by blowing down their blow-pipes; they then open up the expanded glass, and join the two together whilst still very soft. This done, they walk rapidly away from each other in opposite directions, in a long shed like a small rope-walk, and draw the glass, which retains its tubular character, given by the blowing, &c., into rods of great length, and often extremely small diameter. On cooling, which takes place very quickly, these long

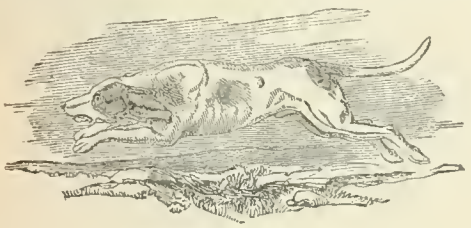
rods are broken up into short lengths of about a foot, and a small number of these shorter rods are placed on a sharp cutting edge, after being annealed, and are chopped into lengths. The roughly cut beads are next mixed very thoroughly with fine sand and ashes, then put into a metal cylinder over a brisk fire, and turned round rapidly as they begin to soften with the heat. They are then agitated in water, which cleans away the sand and ashes and leaves the holes free, after which they are strung.

BEADS, St. Cuthbert's, a title popularly given to the single joints of the articulated stems of Encrinites (q. v.). The central perforation permitted them to be strung as beads; and from the fancied resemblance, in some species, of this perforation to a cross, they were formerly used as rosaries, and associated with the name of St. Cuthbert:

On a rock by Lindisfarn
St. Cuthbert sits, and toils to frame
The sea-born beads that bear his name.

They are known as Entrochites, or wheel-stones.

BEA'GLE, a small variety of hound, formerly much used in England for hare-hunting. It has now been almost wholly superseded by the Harrier (q. v.), to which its name is also sometimes given. The true B. is smaller than the harrier, not above ten or eleven inches in height at the shoulder, sometimes considerably smaller, stout and compact in make, with long pendulous ears, smooth-haired, sometimes dark-brown, with a streak or spot of white about the neck, sometimes white with black or reddish



Beagle.

spots. There appears to have been also a rough-haired variety. The B. is remarkable for its exquisite scent and perservance; and although much distanced by the hare at first, is almost sure to kill it. It was customary in England, in former times, when beagles were used, to follow the chase on foot, a hunting-pole being employed to assist in leaping. During the chase, the B. gives utterance to a cry which has been regarded as particularly musical; and Queen Elizabeth had little 'singing-beagles,' one of which could be placed in a man's glove. The smaller breeds were preferred, perhaps, at first, for the prolongation of the chase; and the diminutive size of a pack or 'cry' of beagles became a boast. The smallest are sometimes called *lap-dog beagles*. The origin of the name B. is uncertain.

BEAK. See Bill.

BEA'KED, BECQUÉ. When the beak of a fowl is of a different tincture from the body, it is then said, in heraldry, to be beaked of such a tincture. If its legs are of the same tincture, it is then beaked, and membered so and so. In place of B., Guillim commonly says 'armed.'

BEA'KER, a term formerly in use, signifying a kind of drinking-bowl or cup, derived from the same root as the German *becher*, the Italian *bicchiere*, or the barbarous Latin *baccarium*. The Scotch call a hooped wooden dish a 'bicker.'

BEAM (Ger. *baum*, Dut. *boom*, Ang.-Sax. *beam*, signify 'a tree'), any piece of wood, long like a tree. In the arts, the word has many special technical applications. It is the name, for instance, for three parts of a weaving-loom (q. v.), for a part of the balance (q. v.), and for a part of the steam-engine (q. v.). In ship-building (q. v.), it is applied to any of the transverse pieces of framing extending across the hull. In ship measurement, it means breadth at the wales. See Tonnage. B., in engineering, is a strong stay of wood or of iron, for supporting lateral pressure. See Strength of Materials.

BEAM, of a ship, is one of the main timbers which aid in supporting the decks. Beams stretch across from side to side, aiding to strengthen and uphold the sides of the hull as well as the decks; and they are themselves supported at the ends by massive pieces, called knees, standards, and clamps. Each is made of one fine piece of timber, if possible; but if the length be too great for this, two or more timbers are scarfed together. Wherever it is practicable, the beams are upheld at or near the middle by pillars. In the *Great Eastern* steam-ship, the beams are of iron, and, like most other parts of the vessel, are cellular in construction. In the old timber-built sailing ships-of-war, now rapidly becoming obsolete, the *beak-head* B. was the broadest in the ship; the *midship* was the longest; the *orlop* was that which supported the orlop deck, and strengthened the hold. The old 74-gun ships had each 24 beams under the lower deck. Many of these characteristics still prevail; but others have given way to change, owing to the increased length of war-steamers, and to the necessity of making room for the machinery. The beams of all ships are generally made deeper in the middle than at the ends, in order that the decks supported by them may have a slight convexity on the upper surface, to carry off the rain-water readily, and to lessen the recoil of the guns.

The position of the beams, stretching across a ship at right angles to the direction of the keel, has given origin to many technical phrases used on shipboard. 'On the starboard B.' is applied to any distant point out at sea, at right angles to the keel, and on the starboard or right hand—as viewed from the stern—side of the ship. 'On the port B.' similarly applies to the left hand. 'On the weather B.' is that side of the ship which receives or is towards the wind. 'Before the B.' is the bearing of any object when seen more in advance than *on* the beam. 'Abaft the B.' is the reverse of the expression just noted. 'On her B.-ends' is applied to the position of a ship when so much inclined to one side that the beams become nearly vertical.

BEA'MING is a handicraft process in the cloth-manufacture preliminary to weaving, and was formerly done by the weaver himself; but it has long since become a special employment, followed by workmen trained to the business as beamers, and, like, hand-weaving, is tending to extinction by machinery—warping and beaming, in weaving by power, being conjoined into one operation. See Weaving. B. is simply the art of winding the web on the weaver's beam in a manner suitable for weaving—the two essential requirements being firmness in the winding on of the web sufficient to withstand the reaction of weaving, and evenness in the spreading of the yarn at the required width. This is effected by what is called a beaming machine, which is simply a kind of roller-mill, extending from end to end of the beamer's shop. The weaver's beam, on which the web is to be wound, is set horizontally on two upright standards at the one end of the shop, and at the other end there is a friction-roller, set likewise level in a heavy frame, fixed to the floor, on which the web is wound like a rope, with the thrum-end out.

The number of pins or strands in the web being known, the beamer has merely to take a ravel (a comb-like utensil) with the corresponding number of the teeth in the breadth required for the web, and filling each tooth successively with its respective pin, the spreading is completed; and the web being attached to the beam, the winding on of the web is a common crane operation, in which the tension on the yarn is regulated by the friction on the friction-roller. The beamer may thus beam for 400 weavers. The price of beaming a web varies from 3*d*., to perhaps 8*d*. or 10*d*.

BEAM-TREE, White (*Pyrus Aria*, see Pyrus), a tree of 20—40 feet in height, a native of almost all parts of Europe and of corresponding climates in Asia, not uncommon in the mountainous districts of Britain, and frequently planted. It has been variously referred by botanists to several allied genera, *Sorbus*, *Cratægus*, and *Mespilus*. It has a straight erect trunk, and a round or oval head; the leaves are ovate, cut and serrated (in some varieties, deeply loped), white and downy beneath; the flowers in large terminal corymbs; the fruit scarlet, of the size of small peas. The fruit is acid and astringent, but becomes agreeable by incipient decay; it is sometimes called Sorb or Service-berry, and resembles the true Service (q. v.) in quality, although much smaller. Beer is made of it by fermentation. The wood is very hard and fine-grained; it is used for cogs for the wheels of machinery. The whiteness of the foliage makes the tree—sparingly introduced—ornamental in plantations.

BEAN, in Agriculture. The B. was cultivated to a small extent at least in ancient times, both in Palestine and Egypt. The Roman family of the Fabii are said to have derived their name from this plant. It requires a rich or alluvial land to grow the bean in perfection, and hence it is only found entering into a regular rotation of cropping upon soils of the best class. Since the introduction of maize into the south of Europe, the land under this plant has been considerably restricted. The maize thrives better, and is far more productive than the B., in warm climates. In the north of Europe, too, the potato, flax, beet, and other fallow crops are more productive and certain. Indeed, the high summer temperature of the continents of Europe and America is by no means favorable to the growth of the bean. In the west of England, the summers are rather too moist for its yielding its seeds in abundance. The straw and haulm are apt to be developed too much, and the blossoms do not set well. Beans are largely cultivated on all the better descriptions of clay soils in the eastern counties, such as Kent and Suffolk. The variety most generally grown there is the *Common Tick or Field B.*, having much resemblance to the *Scotch or Horse Bean*.

The modes of cultivation are very various, and a large breadth is still sown broad-cast. The great objection to this mode is the

liability of weeds to spring up and check the growth of the crop. Beans are considered one of the fallow crops; but the soil, after it has borne a crop of beans, is little fitted for a cereal crop, unless it has been hoed and kept clean in summer. To effect this end, beans are usually sown in rows, and hoed during the early growth by the hand or horse hoe. In preparing the land for a bean crop in England, the stubble, after being liberally dressed with farm-yard manure in autumn, receives a deep furrow, so as to expose the soil to the winter frosts. The surface is then scarified, and after being harrowed, the beans are sown in drills of 18 inches in width, at the rate of 3 to 3½ bushels per acre. The sowing begins as soon after the month of January as the soil admits of the necessary operations, and may be practised up to the middle of March. The earlier the crop is put in, the better in general is the chance of its being productive. The greater liability of the eastern counties to drought, renders the crop more subject to the attacks of insects, such as the 'black dolphin,' or *B. Aphis*, which usually makes its appearance as soon as the plant suffers from the want of moisture. For this reason, the B. crop is rather an uncertain one in the climate of the eastern counties, and other crops are gradually encroaching on the breadth which it used to occupy. The Russian or winter beans are sown in these counties to some extent in autumn, and from ripening earlier, often escape the attacks of vermin, and suffer less from the drought.

Perhaps East Lothian is as favorable, in respect both of soil and climate to the cultivation of the field bean, as any part of Europe. The summers are comparatively cool, and the rains generally moderate, and pretty well diffused over the growing season. The crops are less liable to depredations of the 'black dolphin.' and the long period over which the growth of the plant is extended, is favorable to large crops. Sometimes the crop is sown broad-cast, when the land is clean and well manured; and it is said that as large crops have been raised in this way as by sowing in rows. The produce of this mode of cultivation, however, is much more irregular, and the land is often left in a foul condition. Drilling is therefore the general practice in cultivating this crop in the Lothians. The stubble is usually manured and ploughed in autumn, and when the weather admits, in spring it is ploughed again, and the beans are sown by a small machine in every third furrow; or the land is merely ploughed in autumn, and formed into drills or ridges by the double mould-board plough in spring. Into these the farm-yard manure is put and spread, and the beans are sown above it either broad-cast or by a three-barrelled machine.

The seed is then covered by the double-moulded plough, as in the planting of potatoes. By this mode, the plants receive a plentiful supply of nutriment in their early stages of growth. When land is out of condition, or when the crop is sown upon lighter and inferior descriptions of soil, this is perhaps the most advisable method to follow. Mr. Hope, during his tenancy of Fentonbarns, introduced the English method of cultivation into East Lothian. The stubble is dunged and ploughed in autumn, and as soon as the land is dry in spring, about 3 bushels of beans are drilled, 18 inches apart, by means of Garrett's machine. As soon as the crop appears above ground, Garrett's lever horse-hoe is put over the ground, to stir the surface, and keep it free from weeds. During the spring and early summer, the horse and hand hoeing are repeated as often as it is deemed advisable, until the crop covers in the land by its abundant foliage, and keeps down all weeds. Mr. Hope's experiments indicated that the yield of grain is greater by the narrow than by the wide drilling.

In England, the crops of beans vary from 20 to 40 bushels per acre; but in dry and warm seasons, the produce often falls below the first-named quantity. The weight per bushel is from 60 to 64 lbs. On some of the best soil in Fife, and in the Lothians, as many as 60 bushels per acre are obtained in favorable seasons, and the weight of the bushel is sometimes as much as 66 lbs. In Scotland, the straw is more abundant than in England. It forms good fodder both for cattle and horses, as well as supplying material for the dung-heap. Beans are usually cut by the sickle, allowed to lie a few days unbound to winnow, and when bound, put up into *stooks*. In late seasons, when there has been a considerable growth of leaves, they are often long before they are ready for carrying to the stack. Notwithstanding the relatively high price of beans, the breadth under this crop has been diminishing also in Scotland. It is said, that the draining of the soil has not been so beneficial to the B. as to other crops. The greater returns which the land gives under potatoes in the B. soils of Fife and the Lothians since the opening of the railways, has encroached upon the extent formerly assigned to it in the six-course rotation. In the Carse of Stirling and Falkirk, it retains its hold much better, and forms the chief preparation for the wheat-crop. The field B. is now little used as an article of human food. It is considered to be specially adapted for the feeding of horses which are subjected to hard work. For this purpose, it is usually roughly ground, and mixed with a little bran. In the winter season, a portion is often boiled, and given to them at night. When the price is moderate, a mixture of ground beans and oilcake, or linseed, is much esteemed for milch cows, as well as for fattening cattle and sheep. Special or light manures are less applied to the B. crop than to any other. In many instances, nitrate of soda and sulphate of lime have been used with advantage, but farm-yard manure is almost essential to its free growth.

BEAN (*Faba*), a genus of plants of the natural order Leguminosæ, sub-order, *Papilionaceæ*, included by Linnæus and many other botanists in the genus *Vicia* (see VETCH), from which it is distinguished chiefly by the leathery tumid pods, spongy within, and by the large scar on the end of the seed.—The COMMON B. (*F. vulgaris*, *Vicia Faba* of Linnæus) is somewhat doubtfully supposed to be a native of the borders of the Caspian Sea; it has been in cultivation from remote antiquity in Europe as well as in Asia. It is an annual plant, generally from two to four feet high, with thick angular stem, leaves with 2—5 oval leaflets, and destitute of tendrils. The pods are thick, long, and woolly within; the seeds more or less ovate and flattened. The flowers, which are almost without stalks, are ordinarily white, with a black spot in the middle of the wing: but there is a variety with flowers entirely white, and another in which they are scarlet. The flowers are deliciously fragrant. Burns alludes to this in the lines—

Bean leaves and flower.

> The zephyr wantoned round the bean,
> And bore its fragrant sweets alang.

A field of beans perfumes the summer air for a considerable distance. The varieties and sub-varieties in cultivation are very numerous, differing in the size and form of the seed, the color of the flower, the period which they require for growth, the height, the stem in some unbranched, in others divided at the base into a number of stalks—the pods in some mostly solitary, in others, clustered, &c. The B. is cultivated both in fields and gardens, and the seeds (beans) are used for feeding cattle, also for making a sort of meal for human food, and in a green state are put into broths or boiled for the table. They are very nutritious, containing when ripe about 36 per cent. of starch, and 23 per cent. of legumine, a nitrogenous substance analogous to the caseine of milk. Whether for man or for cattle, however, they particularly require to be mixed with other food. The straw is used for fodder, and is very nutritious when cut before it is fully ripe. The B. succeeds best on a dry and moderately rich soil. A well-drained clay is very suitable for it. Its tapering and deeply penetrating root unfits it for shallow soils. The varities of B. preferred for the garden are generally much larger, both plant and seed, than those cultivated in the field. The Windsor B. has seeds of a flattened, almost circular shape, fully an inch in diameter; whilst those of the Horse B. or Tick B., cultivated as a field crop, are often not more than half an inch in length, and not quite three-eighths of an inch in breadth. Garden-beans in Britain, are usually sown in spring, in rows two feet or more apart; and sowings are made at different dates, that there may be a succession of unripe beans for culinary use. The Windsor, Long Pod, and Early Mazagan, are among the most approved garden varieties.

The roots of the B. are diuretic, and a decoction of them has been used with advantage in cases of dropsy.

B. crops are very liable to be injured by a species of Aphis (q.v.), *A. Fabæ*, sometimes called from its color the Collier Aphis, and sometimes the Black Dolphin Fly, which destroys the leaves, and so renders the plants incapable of bringing the ordinary amount of seeds to perfection. The most effectual remedy known is to cut off the tops of the plants, which are always first attacked, as soon as the Aphis appears, and so to prevent its multiplication. The *topping* of beans is regarded by many gardeners as a good practice, even when they are quite free of the Aphis.

The Kidney B. (q. v.), or Haricot (*Phaseolus vulgaris*), is an entirely different plant from the Common Bean.

BEAN-CAPER. See ZYGOPHYLLACEÆ.

BEAN GOOSE. See GOOSE.

BEAN-KING'S FESTIVAL, a social rite principally observed in France, from which country it would seem to have been transplanted to Germany. On the evening of Twelfth Day (q. v.), or, as the Germans call it (in allusion to the legend, that the wise men of the East who came to worship Christ were three kings), Three Kings' Day (*Dreikönigstag*), companies assemble to spend a few

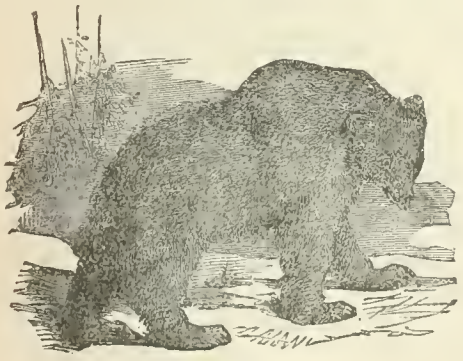
hours in mirthful relaxation A large cake is baked, with a bean hidden somewhere in it. The cake is then divided into pieces, each person present receiving one, and whoever obtains the piece with the bean is king for the year. In this capacity, he holds a mock-court, and receives the homage of the company, who also amuse themselves with other diversions. The Bean King, however, is compelled to pay for his dignity, for he has to give an entertainment on the next Twelfth Night, that an opportunity may be afforded to choose another king. In France, this custom was at an earlier period so common, that even the court indulged in it, although the church, in the 17th c., exerted itself zealously for its suppression. The opinion that the B. K. F. owes its origin to the Roman saturnalia, when even the children, partaking in the universal glee, were wont to elect a king, is not destitute of probability.

BEAN, St. Ignatius's. See Strychnos.

BEAR (*Ursus*), a genus of quadrupeds, the type of a family called *Ursidæ*, belonging to the order *Feræ*, sub-order *Carnivora*, and tribe *Plantigrada*. In the Ursidæ or B. family, are included not only the true bears, but also badgers, glnttons and wolverines, racoons, coatimondis, binturongs, the kinkajou, the panda, &c. (See these articles.) Walking on the whole sole of the foot (plantigrade), the animals of this family are not, in general, capable of running very swiftly; and the nearly equal length of their fore and hind legs unfits them for leaping; most of them are also heavy both in form and gait. But whilst thus deficient in the powers which other carnivorous animals possess for obtaining prey, they really exhibit the same beautiful mutual adaptation of endowments and wants; they are, in fact, by no means strictly carnivorous; no animals are more thoroughly omnivorous than some of them; whilst others, even of the true bears, always give a decided preference to vegetable food when it can be obtained, and their teeth and digestive organs are in exact accordance with such tastes. Their jaws are much more elongated than those of feline animals, and their bite proportionally less powerful, although some of the bears are still very formidable from their great general strength and the size of their canine teeth. Their claws are not retractile, and are adapted for digging in the earth, or for climbing trees, rather than for seizing prey. All animals of the family have five toes to each both of the fore and hind feet.

Bears have six cutting teeth above, and six below, one canine tooth on each side in each jaw, with four false molars and two molars (or grinders) on each side above, and four false molars and three molars below. The false molars are, in general, soon lost by the more carnivorous species. The true molars are very large and tuberculous, the false molars comparatively small. The tuberculous crowns of the molars exhibit the adaptation to vegetable food.—The tail in all species of B. is very short, so that some of them appear almost tailless. Most of them may be described as nocturnal in their habits.

Bears are found in Europe, Asia, and North and South America, and both in warm and cold climates, the species belonging to cold climates being in general the most fierce and carnivorous.

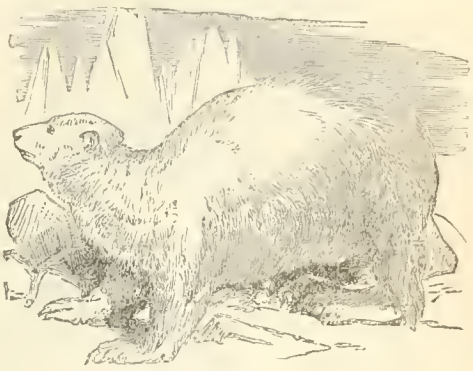


Brown Bear.

The ancients mention them as occurring in Africa; it must, therefore, be regarded as a curious circumstance that no recent accounts make certain the existence of any species in that continent. Nor is any known to belong to Australia.

The common B. of Europe, or Brown B. (*Ursus Arctos*), was at one time a native of the British islands. Bears were carried from Britain to Rome, for the cruel sports in which the Romans delighted, and they certainly were not exterminated in Scotland before the latter part of the 11th c. The Brown B. is usually about four feet long, and two and a half feet high. Its claws are about two inches long, and much curved. It has a convex forehead, and generally a brown fur, which is somewhat woolly in the younger animals, but becomes smoother with age. It produces from one to three young ones at a birth, which remain blind for about four weeks. It is generally believed to be the only European species, although different varieties occur; and one, the Black B., has been regarded by some naturalists as specifically distinct. The common B. is very widely distributed over the whole of Europe and of the north of Asia, Japan, and North America. In America, it is known as the Barren Ground Bear. It is a solitary animal, and generally inhabits mountainous regions or thick forests. It sometimes preys on lambs, kids, &c., is fond of fish, which in some countries, as in Kamtchatka, constitutes a great part of its food; climbs trees in quest of honey, eats also fruits and vegetables, and in confinement, exhibits a strong appetite for bread.

It usually prefers vegetables to animal food. The skin is valued for making fur-cloaks, &c.; the flesh is used as food, often in the



Polar Bear.

shape of hams, as is that of the American Black B.; the paws are esteemed a delicacy. The fat (bear's grease) is in great request as an unguent for the hair. The intestines are used in Kamtchatka, instead of glass, for windows. To the people of Kamtchatka, indeed, bears, which are there very abundant, afford many of the necessaries and comforts of life.—The common B., like others of the genus, in cold climates, usually spends the winter in a torpid state. It selects a cavern or the hollow of a tree for its hybernation, or makes a hole for itself by digging; it is also said, but this needs confirmation, sometimes to construct a sort of hut with branches of trees, lined with moss. The winter being spent without food, it is said to be very lean on the return of spring. This and other species of B. are very often killed in their winter dens.

The American Black B. (*Ursus Americanus*) is found in all parts of North America. Its total length seldom exceeds 5 feet. The fur is soft and smooth, and generally of a glossy black; but there are varieties of other colors, as the Cinnamon B., the Yellow B., &c. The American Black B. usually exhibits a timid disposition; seldom attacks man; feeds chiefly on berries, when they can be obtained; occasionally visits gardens for the sake of cabbages and other vegetables; and strongly prefers vegetable to animal food, but has recourse to the latter when pressed by hunger, and in such circumstances occasionally approaches human habitations and captures pigs, which it endeavors to carry off. In such cases the B. walks on its hind-legs, the pig being firmly squeezed between its fore-paws and breast, making a noise which frequently leads to a rescue. This and other species of B., when assailed, not unfrequently hug their adversaries in the manner here described, when their strength renders them very dangerous. The skin of the American Black B. is used for caps, rugs, &c., and great numbers are annually killed upon this account, chiefly by the Indians in the employment of the Hudson's Bay Company. Almost 10,000 skins are annually imported into Britain, of which, however, the greater part are again exported. In the beginning of the 19th c., the number imported was more than twice as great as now; the skins were also of much higher price. A B.'s skin is still worth from £1 to £3.

The Grisly B. (*U. ferox*) of North America, found chiefly on the Rocky Mountains and the plains to the eastward of them, from Mexico to lat. 61° N., is much larger than either of the species already noticed, and much more fierce and carnivorous. It sometimes measures more than 9 feet from nose to tail, and the claws of the fore-feet more than 6 inches in length. It has a lengthened and narrowed muzzle, a very short tail, and long grisled hair. No animal of the New World is more formidable than the Grisly B. It is capable of overpowering the bison, and dragging away the huge carcass. It feeds, however, also on fruits and roots.—The Arctic B., or Polar B., also called the White B. (*U. maritimus*), resembles this species in size and fierceness, but is very distinctly characterized by its flat head and comparatively long neck. It has a smooth white fur. It is the only known species of B. which is strictly marine in its habits, never being found far from the sea. It inhabits the most northerly shores of Asia and America, Spitz-

bergen, &c., where it pursues seals, both in the water and upon the ice, and preys upon fishes, birds, &c. Amongst the articles of its food are eggs and berries in their season, and in confinement it will subsist long on bread and other vegetable food. Like other species of the genus, it displays great affection for its young, and will brave all dangers in their defence.—Of other species of B., the Syrian B. (*U. Syriacus*) may be mentioned, as perhaps the species particularly intended by the name B. in the Old Testament. It is generally of a dingy-white or brown color, and has a stiff mane of erect hairs between the shoulders. Flocks are not safe from it, yet it more frequently commits ravages on crops of pulse.

Syrian Bear.

In its habits generally, it much resembles the common B.; as do also the Tibet B. (*U. Tibetanus*), and the Spectacled B. (*U. ornatus*), so called from semicircular yellow marks above its eyes, a native of the Andes of Chili.—The Long-lipped B., or Sloth B. (*U. labiatus*), of the East Indies, is the kind commonly led about by Indian jugglers.

Its long hair, short limbs, high back, peculiarly uncouth appearance, and gentleness of disposition, recommend it for this purpose. In a wild state, it is said to feed chiefly on fruits, honey, and ants. It possesses in a remarkable degree the power, common in some measure to all the bears, of protruding the lips in order to lay hold of food.—Some other East Indian species, which feed chiefly on fruits and honey, are known as Sun-bears, as the Malayan B. (*U. Malayanus*) and the Bornean B. (*U. Eurysplilus*). They are characterized by an extremely long extensile tongue. They are of gentle disposition, and become very affectionate when tamed. Sir Stamford Raffles had a Malayan B., which was very playful and quite harmless, although a powerful animal, and which showed refinement of taste in refusing to eat any fruit but the mangosteen, or to drink any wine but champagne. This species in a wild state does much damage to cocoa-nut plantations, by climbing the trees, and eating off the terminal bud, when it is said also, to drink the sap (toddy) which flows out in abundance.

Remains of several extinct species of B. have been discovered in caves in Germany, England, and other countries, some of which appear to have been larger than the present bears of Europe, and of more decided carnivorous propensities. Of these, the *U. spelæus*, or Great Cavern B., has the skull of considerable vertical elevation from the upper end of the muzzle, and larger than that of the biggest Brown B. The *U. Arctoideus* has a skull nearly of the configuration of that of the *U. Americanus*, and of the size of that of *U. spelæus*. The *U. priscus*, or Ancient B., has the skull of a smaller size, and differing less from that of living bears.

Ant B. is a name of the Great Ant-eater (q. v.).

BEAR, BERE, or BEER, See Barley.

BEAR, Great and Little. See Ursa Major and Minor.

BEAR-BAITING. In different countries, bears were formerly made objects of cruel sport, by being baited with dogs. In England, B. was one of the established amusements, not only among the common people, but among nobles, and even royalty itself; it is related that Queen Elizabeth did not consider it unbefitting her sex or rank to attend these rude entertainments. Pennant, in his *Zoology*, quoting from *The Household Book of the Earls of Northumberland*, says: 'Our nobility also kept their bearward; twenty shillings was the annual reward of that officer from his lord, the fifth Earl of Northumberland (who died 1527), "when he comyth to my lorde in Christmas, with his lordshippe's beests for making his lordschip pastyme the said twelve days."' The places where bears were kept and publicly baited were called bear-gardens. There is a spot in the neighborhood of the court at Westminster, which, until lately, was known as the Bear-garden. B., like bull and badger baiting, has long been unknown in England.

BEA'RBERRY. See Arbutus.

BEAR LAKE, Great, in British America, in N. lat. 65°—67°, and W. long. 117°—123°. It is the most northerly of that chain of fresh-water seas—Huron, Superior, Winnipeg, Athabasca, Great Slave, Great Bear—which mark a continuous hollow in the middle of the continent. Great Bear Lake is irregular in shape, with a surface estimated at 14,000 square miles, equal to about half the area of Scotland. It sends forth a river of its own name to the Mackenzie. Its height above the ocean is computed at 230 feet. The climate is, of course, severe. The rigor of the winter may be inferred from the fact, that boats are sometimes blocked up by solid ice, after the crews have begun to suffer from the heat and the mosquitoes.

BEAR-LEADER. In former times, bears were led about with a chain, muzzled, and made to dance or stand on their hind-legs for popular entertainment; small dancing dogs being usually added, for the sake of attractiveness. As a measure of police, these somewhat dangerous and painful exhibitions are now stopped. From this old practice has been taken the phrase, B., now used jocularly to signify a discreet person who takes charge of a youth of rank on his travels to see the world.

BEAR-PIT, a pit prepared for the keeping of bears, usually seen in zoological gardens. A pit of this kind is circular, measuring about 25 feet in diameter, and 20 feet deep. The sides are built with brick; the bottom is level, and paved with stone; and around are vaults with doors for the residence of the bears. From the center of the pit rises a stout and tall pole, on which are cross-spars at proper distances, to enable the bears to climb to the top. As is well known, the animals are fond of climbing up these poles, and catching morsels of bun from the visitors. The poles are sufficiently distant from the sides to prevent the bears from leaping out. The vaulted receptacles require to be cool and dry.

BEAR'S GREASE. Under this name there are sold by perfumers and others, large quantities of pomades, tastefully done up for the toilet, and which are represented to be of great efficacy in nourishing and promoting the growth of hair. These so-called preparations of B. G. are for the most part composed of purified beef-marrow, hog's-lard, or fat of veal, and spermaceti, along with almond oil, and some scenting ingredients. The genuine bear's fat or B. G. would appear to possess the virtue of encouraging the growth of, and strengthening the hair, in an eminent degree; but the scarcity of the commodity is such that substitute fats are employed to supply the demand. See Hair.

BEARD, the hair which grows on the upper lip, and on the chin and cheeks of the male sex. It is usually, though not always, of the same color as the hair of the head, but somewhat shorter, stronger, and more wiry; it is invariably the color of the hair on the eyebrows. The B. is the distinctive sign of manhood. In women, an incipient B. sometimes appears in the later years of life. Instances also occur of women with a B. almost equal to that of the male sex, but these are recorded as prodigies. The B. is generally luxuriant in persons of the Slavic and Celtic races. The aborigines of America, who are naturally almost beardless, make themselves entirely so by plucking out the hairs of the beard. In early times, the B. was considered by almost all nations a sign of strength and an ornament of manhood, was carefully cherished, and even regarded as sacred. Among the Turks, Arabs, Persians, and many other nations, the removal of the B. was, and is yet to a very great extent, regarded as a severe punishment and an extreme degradation. The case of David's ambassadors, recorded in 2 Samuel, chap. x., illustrates the same feeling as prevalent among the ancient Jews. The Moslems carry combs constantly about with them for the purpose of dressing the beard. It is common to do so immediately after prayers, the devotee remaining on his knees during the operation. The hairs that fall out are then carefully picked up and preserved for entombment with their owner when he dies; frequently he himself deposits them beforehand in his destined tomb. The ancient Jews did not dye their beards, and the Turks rarely, but the practice was common among the Arabs and Persians. The Arabs dyed the B. red, not only because dye of that color (being merely a paste of *henna* leaves) was easily obtainable, but because it was an approximation to golden yellow, the color recommended by their prophet Mohammed, who hated black, the color the Persians preferred. The Persian kings are said to have interwoven their beards with gold thread. It is customary among the Turks to anoint the B. with perfume, and to smoke it with incense. The Jews also anointed their beards. The Moslems commonly clipped their whiskers, the Jews did not. The Egyptians shaved their beards except in time of mourning, when they let them grow. From some of the ancient Egyptian statues, however,

Egyptian Beard-case,
From the Memnon's head in the British Museum.

it would appear that beard-cases were worn, which would seem to indicate that the practice of shaving was not universal. The fashions of beards have been very different at different times and in different countries.

A neglected B. was a sign of mourning among the Jews. According to Levi's *Succinct Account of the Rites and Ceremonies of the Jews at this present Time*, they are forbidden to shave or cut their nails, or bathe for thirty days after the death of a father, mother, brother, sister, son, daughter, wife, or husband. In Greece, the B. was universally worn till the time of Alexander the Great, who ordered shaving, that the beards of his soldiers might not be laid hold of by their enemies in battle. Shaving was introduced among the Romans about 300 B.C. Pliny says Scipio Africanus was the first Roman who shaved every day. Subsequently, the first day of shaving was regarded by the Romans as the entrance upon manhood, and celebrated with great festivities. Under Hadrian, the B. was allowed to grow again; and this fashion prevailed till the time of Constantine the Great, when it was discontinued. Peter the Great compelled shaving in Russia by imposing a heavy tax upon the B., and further, by having the beards of all whom he found wearing them plucked out by the roots, or shaved with a blunt razor. The B. was commonly worn in France till the time of Louis XIII., when, because the monarch was young and beardless, the fashion changed at the court and throughout the kingdom. A similar change took place in Spain on the accession of Philip V. With regard to our own country, the Anglo-Saxons wore beards for a considerable time after their invasion of Britain; and the B. appears to have been general among the people at the time of the Norman Conquest. But the Normans not only shaved themselves, but compelled the conquered to do so likewise; and many of the English preferred to leave the country rather than submit to have their whiskers shaved. It would appear, however, from the sculptured representations on the tombs of kings and nobles, that not very long after the Conquest some of the Normans adopted the custom they had prohibited among the vanquished. Edward III. is represented on his tomb in Westminster Abbey with a very long beard. In the time of Elizabeth, beards were of the most varied and fantastic cut. Taylor, the 'Water-poet,' thus satirizes the extravagance of beards prevailing in that and the succeeding reign :

> Some seem as they were starched stiff and fine,
> Like to the bristles of some angry swine;
> Some cut and pruned like to a quick-set hedge,
> Some like a spade, some like a fork, some square,
> Some round, some mowed like stubble, some stark bare;
> Some sharp stiletto-fashion, dagger-like,
> That may with whispering, a man's eyes out-pike,
> Some with the hammer-cut, or Roman T,
> * * * * * *
> That heights, depths, breadths, triform, square, oval, round.
> And rules geometrical in beards are found.

The B. gradually declined under Charles I.; in the reign of Charles II., whiskers and moustaches only were worn; and the practice of shaving the whole face soon became general all over Europe; and it is only within the last 70 years that the B. has been in some measure restored, the soldiers of Bonaparte setting the example. But until within the last 30 years, it was regarded by some of the continental governments as a badge significant of democratic sentiments, and as such was interfered with by police regulations. Physicians recommend that the B. should be allowed to grow on the chin and throat in cases of liability to inflammation of the larynx or of the bronchiæ; and moustaches and whiskers are reckoned useful for prevention of toothaches and nervous diseases of the face. The British soldiers in the Crimea were allowed to wear their beards; and with some limitations, the British army generally are now permitted to do so. The wearing of the B. has, in short, been a matter of fashion in all ages and countries—an extreme in one way usually leading to an extreme in the other. At present, the tendency in England and elsewhere is to let the B. grow, though in a way suggested by the taste of the individual. The B. is itself liable to the same diseases with the hair of the head, and to a peculiar disease (*mentagra*) occasioned or kept up by shaving, consisting in a bark-like exudation from the inflamed sebaceous glands of the hair. For detailed information see Kitto's *Pictorial Bible*; Bulwer's *Artificial Changeling* (Lond. 1653); Hotoman's *Pogónias* (Leyden, 1586), reprinted in the *Lexicon* of Pitiscus; Taylor's *Whip of Satire*; &c.

BEARD MOSS. See USNEA.

BEARDIE. By this name is the little fish called the loach known in Scotland. See LOACH.

BEARING, of a ship at sea, is the direction in which she sails, in reference to the points of the compass. Or, in a more comprehensive sense, it is the direction in which each of two objects are situated in reference to the other. When the latitudes and longitudes of two places are known, their respective bearings from each other can be calculated by trigonometry. On shipboard, seamen often conveniently refer the B. of another ship, or of an object on shore, not to the points of the compass, but relatively to the line followed at the moment by the ship's keel. Thus, the B. of the distant object may be *ahead*, *astern*, on the *starboard bow*, on the *larboard quarter*, &c.; the bow being between the head and the midship, and the quarter between the midship and the stern.

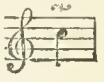
Bearing, or rather the verb *to bear*, is much used as a technical direction on shipboard. Thus, to 'bear in with the land,' to 'bear off from the land,' to 'bear up,' to 'bear away,' &c., are nearly equivalent to sailing, or steaming, or steering, in such and such direction.

BEARING THE BELL, a phrase which signifies to take the lead or first place in anything, or to carry away the prize. This old colloquial phrase is said to have originated in a practice, at the early part of the seventeenth c., of giving a small golden or silver bell as a prize to the winner at horse-races. See BELL. In Dudley Lord North's *Forest of Varieties*, p. 175, we read :

> Jockey and his horse were by their masters sent
> To put in for the bell—
> Thus right, and each to other fitted well,
> They are to run, and cannot misse the bell.

BEARN, formerly one of the thirty-two provinces into which France was divided, and now forming the greatest portion of the Basses-Pyrénées. B. was a portion of Aquitania under the Romans, and after the downfall of that empire, under its ruling dukes, it was a country of considerable importance. From the intermarriage of the ruling family, the Counts of Foix, with that of Navarre, sprang the French monarch Henry IV., who, because he was born and brought up in B., was derisively called the Bearnois. When he ascended the throne of France, it of course, virtually became a part of that country; but was only formerly incorporated with it in 1620 by Louis XIII. In 1813, after the British had crossed the Nive, and established themselves in Urogne, St. Jean de Luz, &c., the rich fields of B. furnished them ample supplies, the peasants taking their produce, for which they were well paid, as regularly to the British stations as to market.

BE'AS, anciently *Hyphasis*, one of the five rivers which give name to the *Punjab*, or land of five waters—Jelum, Chenab, Ravee, Beas, and Sutlej. It rises on the verge of the Ritanka Pass of the Himalaya, in lat. 32° 34′ N., and long. 77° 12′ E., its source being 13,200 feet above the sea-level. After a course of about 220 miles, it joins the Sutlej, 35 miles to the south-south-east of Amritsir. It is subject to periodical rises and falls, being in the dry season generally fordable; but after the rainy months, it is sometimes nearly half a mile in breadth about 20 miles above the point of confluence.

BEAT, in Music, a species of embellishment, written thus: , and played as follows: . Beat also means a signal given by the hand or foot in music to insure simultaneous performance—the hand or foot being raised on the unaccented, and lowered on the accented part of the bar.

BEAT OF DRUM, in military matters, is a signal or instruction conveyed by a particular mode of drum beating. It is an audible semaphore, a telegraph that speaks to the ear instead of the eye. There are many varieties, known by the names of the general, the reveillé, the assembly, the foot-march, the grenadiers' march, the retreat, the taptoo or tattoo, the call to arms, the call to church, the pioneers' call, the sergeants' call, the drummers' call, the chamade, the rogue's march, the long roll, &c. Some of the same instructions or commands are also given by the bugle, and some by the trumpet.

BEATIFICA'TION is a solemn act in the Catholic Church, by which the pope, after scrutinizing the life and services of a deceased person, pronounces him blessed. After this he may be worshiped in a specified portion of the church, and the act holds out the prospect of future canonization, which entitles him to general worship in the church universal. B. was introduced in the 12th c. It may be regarded as an inferior degree of canonization (q. v.).

BEATING AND WOUNDING, or simply *wounding*, is the name sometimes found in law-books for the offence of inflicting on another some dangerous hurt or wound; and it has been otherwise described as an aggravated species of Battery (q. v.). A still more aggravated and atrocious offence of this kind used to appear in the list of offences against the criminal law of England under the term MAYHEM, which was a violently depriving another of the use of a member proper for his defence, such as an arm, a leg, a finger, an eye, a foretooth, and some others; but it was laid down quaintly enough, that the loss of one of the jaw-teeth, the ear, or the nose was no mayhem in common law, because these members can be of no use in fighting.

The offences to which we have referred—viz., *battery*, *beating and wounding*, and *mayhem*—can, however, be best considered under

the important and well-known term ASSAULT, which is indeed often used to express the above injuries, and which is implied in them all. The above offences, it will have been observed, all involve an actual attack on and injury to the person of the party assaulted. But there may be an assault without such actual hurt. This is a *common assault*, and hence, in criminal law, assaults are distinguished by their being *common* or *aggravated*. A common assault has been defined as an attempt or offer to do a corporal hurt to another, as by striking at another with a stick or weapon, or without a weapon, though the party striking misses his aim.

The principle is, that it is sufficient, in order to constitute such an offence, that there has been such an exhibition of a violent and offensive *animus* as to show at once the intention, and the power, to commit it. So, drawing a sword or bayonet, or even holding up a fist in a menacing manner, throwing a bottle or glass with intent to wound or strike, presenting a gun at a person who is within the distance to which the gun will carry, pointing, a pitchfork at a person who is within reach, or any similar act, accompanied with such circumstances as denote at the time an intention, coupled with a present ability, of using actual violence against the person of another, will amount to an assault.—Russell on *Crimes and Misdemeanors*, vol. i. p. 750. It has even been laid down, that to present a pistol, purporting to be loaded, so near as to produce danger to life if the pistol had gone off, is an assault in point of law, although, in fact, the pistol was not loaded.

But no *words*, however provoking or irritating, can amount to an assault. On the other hand, the injury need not be effected directly with the hand of the person making the assault. Thus, there may be an assault by encouraging a dog to bite, by riding over a person with a horse, or by wilfully and violently driving a cart, &c., against the carriage of another person. Nor is it necessary that the assault should be immediate, as where a defendant threw a lighted squib into a market-place, which, being tossed from hand to hand by different persons, at last hit the plaintiff in the face, and put out his eye, it was adjudged that this was actionable. And the same has been held where a person wantonly pushed a drunken man against another, and thereby hurt him. A defendant put some cantharides into coffee, in order that a female might take it; and she did take it, and was made ill by it, and this was held to be an assault. It is also an assault, wilfully and of malice, to expose another to the inclemency of the weather; so is the taking indecent liberties with females without their consent, although they did not actually resist; and to such indecent liberties a very wide application has been given, even to the extent of holding a medical practitioner guilty of assault, who stripped a young girl of her clothes, on the pretence that he could not otherwise judge of her illness. Philanthropists and benevolent people will likewise be glad to be told, that not only does the striking that takes place at a *prize-fight* constitute an assault as between the combatants themselves, but all persons present in concert and co-operation may be punished as aiders and abettors. Again, an assault may be committed by unlawfully imprisoning or detaining the person of another; and by such detention is meant every confinement of the person, whether it be in a common prison or in a private house, or by a forcible detaining in the public streets. Numerous other cases could be stated, showing how nicely and protectively the law on this subject has been elucidated; but the explanation we have given is sufficient for its popular illustration.

Generally, it may be laid down, that the essential thing is the *intention* with which the alleged act is done, so that no matter how violent or menacing the conduct of the accused may have appeared to be, nor even how serious the injury, if it can be shown that the whole was unintentional or accidental and undesigned, there is no assault. It remains to be added on the subject of common assaults, that the party injured may proceed against the defendant summarily or by action or indictment for the same assault; but the court in which the action is brought will not compel him to make his election to pursue either the one or the other. Yet if the party has obtained a conviction before justices of the peace, this will be a bar to any other remedy, civil or criminal; and if the justices grant a certificate that it was not proved, or was trifling, this also, as must be quite apparent, will be a bar.

With respect to *aggravated* assaults, their special character arises from the great criminality of the object intended to be effected. Thus, attempts to murder, or to do great bodily harm, to ravish, and to obstruct officers of the law in the execution of legal process, are all of the nature of aggravated assaults; as are also attempts to commit robbery, or any other felony. The remedy for an aggravated assault is usually by indictment, but justices of the peace may also, at least in the first instance, decide some cases. In certain cases, the punishment is regulated by recent statutes: thus, by the 24 and 25 Vict. cc. 96, 100, it is enacted that persons unlawfully and maliciously starving an apprentice or servant, whereby the life of such person shall be endangered, or the health injured, shall be guilty of a misdemeanor, and on conviction may be imprisoned, with or without hard labor, for any term not exceeding two years; and where the offence shall be against a young person under the age of 16 years, and shall amount in point of law to a felony, or to an attempt to commit a felony, or to an assault with intent to commit a felony the guardians of the union or parish, or, where there are no guardians, the overseers of the parish, are authorized and required to prosecute, the costs of the prosecution being paid out of the common fund of such union or parish. Again, by an act of 24 and 25 Vict. c. 100, it is declared expedient to make further provisions for the punishment of aggravated assaults, and it is therefore enacted, that if any person shall unlawfully and maliciously inflict upon any other person, either with or without any weapon or instrument, any grevious bodily harm, or unlawfully and maliciously cut, stab, or wound any other person, every such offender shall be guilty of a misdemeanor, and being convicted thereof shall be liable to three years' penal servitude, or to be imprisoned, with or without hard labor, for a term of two years: provided, however, that nothing contained in the act shall be deemed or taken to repeal other enactments of the act, by which it is provided, that if any person shall unlawfully and maliciously, by any means, wound any person, so as thereby to endanger the life of such person, or so as thereby to inflict upon such person any grevious bodily harm, every such offender, being convicted thereof, shall be liable to be sentenced to penal servitude for life, or for the term of three years, or to be imprisoned, with or without hard labor, in the common jail or house of correction, for any term not exceeding two years; and, if a male, to be once, twice, or thrice publicly or privately whipped, in addition to such imprisonment, if the court shall think fit.

The only other enactment that it may be necessary to notice is one in the same statute of 24 and 25 Vict. c. 96, which provides that any person convicted of any indecent assault, or of any assault occasioning actual bodily harm, shall be liable to be imprisoned for any term now warranted by law, with hard labor during the whole or part of such imprisonment.

In Scotland, the principle of the law of assault, and of its aggravations, is very much the same as that above stated. In the Scotch system, it is laid down that it is of the utmost importance in all cases of actual assault to ascertain who struck the first blow, and the party who receives it will be excused for retaliating, if he do not exceed the just and fair measure of resentment. There, too, the highest of all aggravations is the assault with intent to murder. It is also an aggravation that the assault has been committed in pursuance of an old grudge, and on a principle of revenge; where, also the offence has been accompanied with an intent to compel a rise of wages, or to deter from working at a certain rate, or in pursuance of a combination entered into for these illegal purposes. Another aggravation of the offence in Scotland is its being committed by a child on its parent, by a husband on his wife, or by any person upon another within his own house, although the latter crime falls more strictly under the antiquated term of *Hamesucken* (q. v.). The remedy in Scotland is, as in England, by civil action of damages, and by a criminal prosecution, both being maintainable, and the latter usually at the suit of the Lord Advocate, as public prosecutor; but the private injured party may prosecute criminally should the Lord Advocate decline to do so. See, on the subject of this article generally, Russell *On Crimes and Misdemeanors*, in England, and Alison's *Principles of the Scotch Criminal Law*.

BEATING JUDGES, in the Scotch law, is the strange title of a strange offence, according to the enlightenment of the present age—namely, that of committing a personal assault on a judge. By the provisions of an old statute now in desuetude, an assault on a judge sitting in court is a capital offence.

BEATING THE BOUNDS is the popular expression in England for those periodical surveys or perambulations by which the ancient boundaries of parishes are preserved. The procedure, according to common custom, is in this wise. On Holy Thursday or Ascension Day, the clergyman of the parish, with the parochial officers and other parishioners, followed by the boys of the parish school, headed by their master, go in procession to the different parish boundaries, which boundaries the boys strike with peeled willow-wands that they bear in their hands, and hence the expression beating the bounds. The correct legal term is *Perambulation* (q. v.). See Brand's *Popular Antiquities*, vol. i. pp. 174, 175; Lyson's *Environs of London*, vol. ii. p. 146; Hone's *Every-day Book*, vol. i. p. 651; Steer's *Parish Law*, by Hodgson; and Toulmin Smith's *Parish Law*.

According to these and other old authorities, the beating was not confined to the above performance of the boys with their willow-wands; but where it was desired to preserve evidence of particular boundaries, the singular expedient was used of whipping the boys themselves on the spot, or one of them, who received a stated fee for the permitted castigation out of the parish funds—it being thought that the impression made on the memory of the whipped boy was calculated to have a beneficial effect on the preservation of his evidence. A similar ceremony appears anciently to have

prevailed in Scotland, and for the same purpose. See Lord Stair's *Institutes of the Scotch Law*, book iv., title 43, s. 7, where it is stated that the boys were 'sharply whipped.'

BEA'TON, or BE'THUNE, DAVID, Cardinal and Primate of Scotland, a zealous opponent of the Reformation in that country, descended from a celebrated French family, was a younger son of John Beaton of Balfour, Fifeshire. Born in 1494, he became, in October 1511, a student at the university of St. Andrews, and afterwards studied theology and the canon and civil laws at Paris. Early entering the church, he was preferred by his uncle, James Beaton, Archbishop of Glasgow, to the rectory of Campsie Stirlingshire. His tact and general abilities recommended him to the Duke of Albany, regent during the minority of James V., who, in 1519, appointed him resident for Scotland at the French court. In 1525, he took his seat in the Scots parliament as Abbot of Arbroath; his uncle, on being translated two years before to the archbishopric of St. Andrews, having resigned to him that abbey, with the half of the rents. In 1528, B. was appointed Lord Privy Seal, and is said to have been the adviser of James V. in instituting the College of Justice or Court of Sessions in Scotland, the idea of which was suggested by the constitution of the parliament of Paris. B. subsequently became Prothonotary Public, and was twice sent ambassador to France, to negotiate James's two marriages—first, with the French king's daughter, Princess Magdalene, who died six months after her nuptials; and secondly, with Mary, Duchess of Longueville, daughter of the Duke of Guise. The king's union with the latter he solemnized, in 1537 in the cathedral church of St. Andrews.

During his residence at the French court, he was admitted to all the privileges of a French citizen, and appointed by Francis I. Bishop of Mirepoix in Languedoc. After his return, he became coadjutor to his uncle in the see of St. Andrews, and on the 28th December 1538, on the recommendation of the king of France, was, by Pope Paul III., elevated to the dignity of a cardinal. On his uncle's death, in 1539, he succeeded him as Archbishop of St. Andrews and Primate of Scotland, and soon commenced a furious persecution of the Reformers, already numerous and increasing. That he might be invested with supreme authority in all matters ecclesiastical, he obtained from the pope the appointment of *legatus a latere* in Scotland, and induced the king to institute a Court of Inquisition, to inquire after heretics in all parts of the kingdom. To maintain the French influence, and prevent all danger to the Roman Catholic Church in Scotland by a friendly connection with England, he contrived to frustrate a proposed meeting of King James with his uncle, Henry VIII., and even prevailed on the former to declare war against his royal relative. On the death of James, after the disastrous overthrow of the Scots at Solway Moss, December 14, 1542, B. produced a forged will of the late king, appointing himself, with three others, regents of the kingdom during the minority of the infant Queen Mary. The nobility, however, rejected the fictitious document, and elected the Earl of Arran regent, who then professed the reformed faith. The following month, B. was arrested and imprisoned, accused, among other charges, of a design to introduce French troops into Scotland, in order to stop the negotiations then in progress with Henry of England for a marriage between the young Prince of Wales, afterwards Edward VI., and the infant Queen of Scots. He was soon after liberated, and reconciled to the regent, whom he induced to abandon the English interest, and publicly to abjure the reformed religion. On the young queen's coronation in 1543, B. was again admitted of the council, and appointed Chancellor. He now renewed his persecution of the Reformers; and, in January 1546, accompanied by the regent, he made a diocesan visitation of the counties under his jurisdiction, and punished with the utmost severity all the Protestants he could find. At Perth, a number of persons, accused of heresy, were banished the city, others were imprisoned; three men were cruelly hanged, and one woman drowned, by his directions. During a Provincial Council of the clergy held at Edinburgh, at which he presided, he caused the celebrated evangelical preacher George Wishart, to be apprehended, and conveyed to the castle of St. Andrews, where he was burnt at the stake, B. and other prelates witnessing his sufferings from a window. A conspiracy having been formed against him, at the head of which were Norman Leslie and his brother, B. was assassinated in his own castle of St. Andrews, 29th May 1546. Though endowed with great talents, B. possessed little learning. He is said, however, to have written *Memoirs of his Own Embassies;* a treatise on *St. Peter's Supremacy*; and *Letters to Several Persons*, of which Dempster observes there are several copies extant in the Imperial Library at Paris. Haughty, cruel, and intolerant, he was also licentious in the extreme. He had six natural children, three sons and three daughters—the latter married into families of distinction. One of his sons became a Protestant. His death was scarcely lamented by any party in the state.

BEA'TTIE, JAMES, poet and moral philosopher, was born, 25th October 1735, at Laurencekirk, Kincardineshire, Scotland. He studied at Marischal College, Aberdeen, where he acquired a high reputation as a classical scholar. In 1758, he was appointed one of the masters of the grammar-school in that city, and in 1760, Professor of Moral Philosophy in Marischal College. Ten years afterwards appeared B.'s famous *Essay on Truth*, which met with most extravagant success. It was intended as an antidote to Hume, whose penetrating scepticism had found its way into all the enlightened circles of Scotland, and alarmed the friends of revealed religion. Drs. Reid and Campbell had previously attempted to refute the scepticism of the great historian, but, in the opinion of many, too deferentially. B., whose nature was poetically vehement, and whose zeal was consequently very ardent, assaulted Hume more violently, if not more powerfully, than his predecessors. The author himself naturally shared the popularity of his essay. He was introduced to George III., and solicited by dignitaries of the English Church to take orders; high preferments were also promised, which, however, he magnanimously refused, shrinking with delicacy from doing anything which might give his adversaries a chance of saying that he had written on behalf of religion for hire. It was thought for a time that B. had demonstrated 'the immutability of Truth,' and exposed the 'sophistry of scepticism;' but if we may judge from the neglect which has overtaken his treatise during the last fifty years, his achievements had been overestimated. B. was deficient in logical acumen and in extent of philosophic erudition, but his poetical fancy, pure enthusiasm, and pious intentions, recommended the essay to multitudes. In 1771, appeared the first part of *The Minstrel*, and in 1774, the second part. It is a delightful poem. Time has dealt gently with it, for it still retains the freshness of its youth. It overflows with a sweet poetic emotion, and is rich in picturesque descriptions, while the versification has a quiet fulness of melody. The author's gentle yet fervent spirit beats in every line. The poem describes 'the progress of a poetical genius born in a rude age, from the first dawning of fancy and reason, till that period at which he may be supposed capable of appearing in the world as a minstrel.' B. intended to have added a third part, but circumstances hindered him. In 1776, he published a series of essays on *Poetry, Music*, &c.; in 1783, *Dissertations Moral and Critical;* in 1786, *The Evidences of the Christian Religion briefly and plainly stated;* and in 1790—1793, *The Elements of Moral Science;* all of which works are written in a clear and elegant style, and with a high appreciation of whatever is beautiful and good. He died August 18, 1803. His life has been written by his friend, Sir William Forbes.

BEAUCAIRE, a well-built commercial town of France, situated on the right bank of the Rhone, in the department of Gard, opposite Tarascon, with which it is connected by a magnificent suspension bridge. Population (1876) 7956. The harbor is commodious for vessels, which enter it by a canal communicating with the Mediterranean, and avoiding the sand-banks at the mouths of the Rhone. The main feature of B. is its great fair, established, it is said, as early as the 12 c. It is held annually, beginning 22d July, and lasting six days. In former times, when this fair was free from duties, it was attended by merchants and manufacturers from almost all parts of Europe, from the Levant, and even from Persia and Armenia; and as the small town could not contain the vast concourse of traders, thousands of wooden huts and of tents were erected in the neighboring valley. But the numerous imposts demanded since 1632, foreign wars, and the competition of Marseille, Lyon, and other large places, reduced the traffic of B., which sank still lower in the days of the Revolution. The fair, however, is still held in much repute, the number attending it being estimated at 50,000, and the amount of property changing hands at £1,200,000. The chief articles of commerce are silks, wines, oil, almonds, and other fruits, spices, drugs, leather, wool, and cotton. B. appears to have been known in ancient times as Ugernum, which, in the 7th c., was a place of importance in a military point of view.

BEAUCHAMP, ALPHONSE DE, a French historian and publicist, born at Monaco, 1767; died in Paris, June 4, 1832. He received his education in Paris, and entered the Sardinian military service. At the outbreak of the war with France, he refused to bear arms against his country, and obtained his discharge; but being suspected of treasonable designs, he was imprisoned for some months. After his liberation, he returned to Paris, where he took part against Robespierre; and on the establishment of the Directory, obtained a situation in the office of the minister of police, and had the surveillance of the press. Here he commenced his *Histoire de la Vendée et des Chouans* (3 vols., Par. 1806; 4th ed., 1820), for which Fouché supplied the materials. As this work displeased the Emperor, B. was banished to Rheims but was recalled in 1811, and again received a subordinate appointment (on condition that he should publish nothing concerning his political contemporaries), which he lost in 1814. Under the Restoration; he received a pension (1820), and wrote for the *Moniteur*, the *Gazette de France*, and the *Biographie des Hommes Vivants*, edited by Michaud. The numerous historical writings of B. are interesting, but bear the impress of party-spirit; but in his *Histoire du Brésil*

(Par. 1815), and *Histoire de la Conquête du Pérou* (Par. 1807), he found no opportunity of expressing his political partialities. Among his other works may be mentioned the *Histoire de la Campagne de* 1814—1815 (2 vols., Par. 1818), the *Histoire de la Révolution du Piemont*, directed against De la Rosa (Par. 1823), and *Vie de Louis XVIII.* (Par. 1825). After the July revolution, he was employed on several legitimist journals; and the supposititious *Mémoires* of Fouché (4 vols., Par. 1828—1829) have, with good reason, been ascribed to Beauchamp.

BEAUFORT, a village of Maine-et-Loire, France, which, with its castle, came into the possession of the English House of Lancaster in the 13th c., and gave origin to the English title of Duke of B. The Dukes of B. are descended from John of Gaunt.

BEAU'FORT, a town of Cape Colony, 338 miles N.W. of Cape Town, with which it is connected by rail. Pop. in 1880, 1600. B. is the capital of an electoral division, with an area of 8536 sq. miles.

BEAU'FORT, Cardinal, and Bishop of Winchester (born about 1370), was a natural son of John of Gaunt, Duke of Lancaster, and was half-brother to King Henry IV. He was educated in England and Germany, and in 1404 became Bishop of Winchester. He repeatedly filled the office of Lord Chancellor, and was involved in all the most important political movements of his times. He was present at the Council of Constance, and voted for the election of Pope Martin V., by whom he was subsequently made a cardinal. When the cardinal's nephew, Henry V. of England, proposed to levy a new impost on the clergy, in order to raise money for carrying on the war against France, B. was the chief opponent of the measure; but nevertheless he lent the monarch, out of his own private purse, £28,000—an almost incredibly large sum in those days, and one which justifies the belief that he was the wealthiest subject of his time in all England. His service in this affair was soon recognized by the pope, who sent him as legate into Germany, there to organize a crusade against the followers of John Huss. This undertaking failed; and the cardinal, having expended, in levying an English army against France, the moneys granted from Rome for other purposes, now fell under papal displeasure. In 1431, B. conducted the young king, Henry VI., to France, to be crowned in Paris as king of France and England. Here he also endeavored, but vainly, to reconcile the Duke of Bedford, Regent of France, with the offended Duke of Burgundy. Cardinal B. died at Winchester in 1447. His memory is stained by his suspected participation in the murder of his great political rival, the Duke of Gloucester, who headed the lay opposition to the despotism of ecclesiastical statesmen; and by the fact, that he presided over the tribunal which sentenced the Maid of Orleans to perish at the stake.

BEAUGENCY, an ancient town of France, in the department Loiret, and situated on the right bank of the Loire, 15 miles south-west of Orleans. B. was at one time surrounded by walls, flanked with towers and bastions, and defended by a strong castle, now ruined. In the history of the wars of France, B. occupies a conspicuous place. It was successively in the hands of the Huns, Saxons, Normans, and English, but it sustained most damage during the religious wars of the 16th c. B. manufactures woollens, leather, &c., and has a trade in wine, wool, and corn. Pop. (1876) 3901.

BEAUHARNAIS, Alexandre Vicomte de, born 1760, in the island of Martinique, served, under Marshal Rochambeau, in the American War of Independence. Afterwards, he went to France, but though well received by the French court, he embraced the popular cause. Elected deputy to the States-general by the nobility and the justiciary authorities of Blois, he was among the first of his order to fraternize with the *Tiers Etat*, or democratic party. On the night of August 4, 1789, he voted for the abolition of all privileges, and the political equality of all citizens. As a reward for his constancy to the cause of liberty, he was named Secretary of the National Assembly, and subsequently member of the military committee, but lost his popularity considerably by venturing to praise and defend the conduct of General Bouillé in the sanguinary suppression of the insurrection at Nancy. The manner in which he received the news of the flight of Louis XVI. exhibits a curious mixture of contempt and dignity. 'Gentlemen,' said he to the Assembly over which he presided. 'the king has just gone off; let us pass to the order of the day.' In 1793, he declined the office of Minister at War, and tendered his resignation as general of the Army of the Rhine, because it had been determined to exclude the nobility from the service. During the Reign of Terror, his enemies revived the report that he had participated in the surrender of Mentz, because he had remained idle with his troops for 15 days. In consequence of this accusation, he was called from his country residence at Ferté-Imbault to Paris, where he was tried and sentenced to death by the revolutionary tribunal. He submitted to his fate with firmness, and died on the scaffold, July 23, 1794, aged 34 years. His widow, Josephine, married Napoleon Bonaparte, who adopted Eugène and Hortensia, son and daughter of Beauharnais. Hortensia was married to Louis Bonaparte, king of Holland, and became the mother of the late Emperor of the French.

BEAUHARNAIS, Eugene de, Viceroy of Italy during the reign of Napoleon I., and afterwards Duke of Leuchtenberg, and Prince of Eichstadt, was born September 3, 1781, and was the son of the Viscount Beauharnais. After his mother's marriage with Bonaparte, he accompanied him in his campaigns in Italy, and in the expedition to Egypt. He rapidly rose to the highest military rank; and in 1805, after the erection of the imperial throne, he was made a Prince of France and Viceroy of Italy. In 1806, he married the Princess Amalie Augusta of Bavaria, and not long afterwards was created Prince of Venice, and declared by Napoleon his adoptive son, and heir of the kingdom of Italy. Although his political power was much limited, he conducted himself in Italy with much prudence, energy, and moderation, and in all the various scenes of his life maintained an honorable and virtuous character. It is to be regretted, however, that he considered himself so entirely a vassal of Napoleon, and bound to carry out the often harsh decrees of the latter in regard to Italy. His military talents were great, and were displayed particularly in the Italian campaigns, in the wars against Austria, and in the retreat from Moscow, in which the preservation of the French army from total destruction was very much to be ascribed to the skill and resolution of the viceroy and of Ney. The victory of Lützen was decided by his conduct in that battle. Napoleon sent him from Dresden to Italy, which he ably defended, even after Austria had joined the coalition, and Murat had deserted the cause of the French Empire. After the fall of Napoleon, he entered into a convention with Count Bellegarde. In the affairs of the Hundred Days, he took no part; and in the treaty of Fontainebleau and Congress of Vienna, he was allowed to retain his possessions in the March of Ancona; and large sums were granted to him in compensation for his other Italian possessions, with which he purchased from his father-in-law the landgraviate of Leuchteuberg and principality of Eichstadt, and took his place as Duke of Leuchtenberg among the nobles of Bavaria. He died at Munich on the 21st February 1824. —His eldest son, Charles Augustus Napoleon, Duke of Leuchtenberg, married the Queen Donna Maria of Portugal on the 25th January 1835, but died on the 25th of March in the same year.—Another son, Max Eugène Joseph Napoleon, who succeeded his brother as Duke of Leuchtenberg, married the Grand Duchess Maria Nikolajewna, a daughter of the Emperor Nicholas of Russia; and his children bear the name of Romanowski, and are ranked among the members of the Russian imperial family. He died 1st November 1852, of disease of the lungs, consequent upon a scientific tour in the Ural. He was a zealous mineralogist, and left large collections, which are preserved at St. Petersburg.

BEAUMARCHAIS, Pierre Augustin Caron de, a French poet, born in Paris, January 24, 1732; died May 17, 1799, was the son of a watchmaker, and was brought up to his father's trade. He soon displayed a remarkable taste for music, attained proficiency as a player on the harp and the guitar, and was appointed music-master to the daughters of Louis XV. This was the beginning of his course of good-fortune. He acquired considerable property by marriage, and to dignify the somewhat ambiguous position in which his calling placed him, he devoted his talents to literature. His first play, *Eugenie* (1767), was successful, and was followed by *Les Deux Amis* (1770). Having become involved in lawsuits with Lablache and Götzman, he revenged himself on the latter—who was a member of the so-called *Parliament Maupeou*—by publishing his famous *Mémoires* (Paris, 1774), which united the bitterest satire with the sharpest logic, and gained for him a reputation that made even Voltaire uneasy, who could not bear a rival in his own department. Despite his wit, however, he lost his suit. His fame now rests on his two comedies, *Le Barbier de Seville* (1775), and *Le Mariage de Figaro*. Of his later works, we may mention *Mes Six Epoques*, in which he describes the perils through which he had passed in the first period of the Revolution. During the American War of Independence, he entered into a speculation for supplying arms, &c., by which he realized a considerable profit, but was a great loser by his expensive edition of Voltaire's works, and other speculations. The desire of gain and love of distinction were the leading motives which actuated Beaumarchais. His literary merits have been differently estimated. The most judicious critic of his writings and character is M. de Loménie, whose *B. and his Times* is full of interesting literary anecdote. An edition of B. was published at Paris in 1809.

BEAUMA'RIS, a seaport and chief town of Anglesea, North Wales, is situated on the west side of the picturesque Bay of B., near the north entrance to the Menai Strait, 3 miles north of Bangor, and 239 miles north-west of London. B. has the ivy-covered remains of a castle, erected by Edward I., and a free grammar-school, and is a favorite sea-bathing resort. The bay is a safe anchorage in stormy weather. B. unites with Amlwch,

Holyhead, and Llangefin in sending one member to parliament. It exports copper and other ores, slates, marble, &c. Pop. (1871) 2291; (1881) 2241. The vessels which entered this port in 1880 numbered 4611, of tonnage 1,108,136; which cleared it, 4550, of 1,105,103 tons.

BEAU'MONT, Francis, poet and dramatist; FLE'TCHER, John, poet and dramatist. These writers were so closely associated in their lives and labors, that their names have become indissolubly united.—Francis Beaumont, the third son of Sir Francis Beaumont, one of the justices of the Common Pleas, was born at Gracedieu, in Leicestershire, in 1586, ten years after Fletcher; and died in 1615, ten years before him. When ten years of age, he became a gentleman-commoner of Broadgate Hill (now Pembroke Hall), and in 1600 was admitted a member of the Inner Temple. Two years thereafter, he published certain translations from Ovid. When about nineteen years of age, he became the friend of Ben Jonson, and wrote commendatory verses to some of his dramas. At the theater, which attracted to its service most of the intellect and wit of the time, he became acquainted with Fletcher, and drawn together, they lived in the same house till B.'s marriage in 1613. He married Ursula, daughter and coheir of Henry Isley of Sundridge, in Kent, by whom he had two daughters. He died at the early age of thirty, and was interred in Westminster Abbey. Poetry seems to have run in the blood of the Beaumonts. Several members of B.'s immediate family wrote verses, and the elder brother of the dramatist, Sir John Beaumont, is said by the critics to have much improved our rhyme couplet.

John Fletcher was born in 1576. His father was a clergyman, and appears to have inherited many of the honors of the church. He was for some time the incumbent of Rye, in Sussex; thereafter, he was appointed Dean of Peterborough, and is said to have attended Queen Mary on the scaffold, and to have embittered her last hours with irrelevant exhortation. On his elevation to the see of London, he married a second time, and thereby procured the disfavor of the Virgin Queen. He died shortly after—of a queen's frown, as some maintain; others say, of the immoderate use of tobacco. John F. entered Bennet College, Cambridge, on the 15th October 1591, where he acquired some reputation for classical erudition. It is uncertain how long he remained at the university, or whether he took a degree. The *Woman-hater*, produced in 1606—1607, is the earliest play of his which is known to exist. It is not known precisely in what circumstances F. passed his life. He asserts his independence in some verses introductory to *The Faithful Shepherdess*, published about 1610, yet he wrote more rapidly than most men then writing for bread. The last four years of his life produced eleven new plays—a swiftness surpassing that of Shakspeare himself. Tarrying in London, it is said, for a suit of new clothes, he caught the plague, and died. His death occurred in 1625, and he was buried in the church of St. Saviour's. F. also could boast of poetic descent and connection. Dr. Giles Fletcher, the bishop's younger brother, has been called 'an excellent poet;' and two sons of his, Giles and Phineas, distinguished themselves by their verses. The one wrote *Christ's Victory and Triumph*; the other, *The Purple Island*.

The works of B. and F. comprise in all fifty-two plays, a masque, and several minor poems; but it is difficult to allocate, in any satisfactory manner, the authorship of these. F., being the longer lived and more prolific writer, of course contributed the largest share. Rowley assisted F. in *The Maid of the Mill*. Some critics think that the hand of Shakspeare may be detected in *The Two Noble Kinsmen*, and not without some show of reason. There is a tone of music and a step of thunder in some of the passages to which no parallel could be found in any of the companion-dramas. Two plays left unfinished at F.'s death were completed by Shirley. Out of the fifty-two plays, B. is supposed to have a share in the composition of seventeen, and only three out of that small number were, during F.'s lifetime, published as joint productions. Two of these—*Philaster*, and *The Maid's Tragedy*—are, with the exception of the great passages in *The Two Noble Kinsmen*, the glory of the collection. The question has been often discussed, why these plays are called by the name of B. and F., thus giving precedence to the younger and less voluminous writer. Mr. Dyce thinks, that of the three plays published as joint productions during F.'s life, B. had either the greater share, or that, through feelings of natural courtesy, F. placed the name of his deceased associate before his own, and that future editors naturally followed the arrangement which they found to their hand. Mr. Darling is inclined to give no reason at all, and ascribes the whole thing to accident. From all that can be gathered, it would appear, that B. possessed the deeper and more thoughtful genius; F., the gayer and more idyllic. There is a strength as of granite rock in *The Maid's Tragedy;* there is a glad, exhuberant music, and a May-morning light and freshness, in *The Faithful Shepherdess*, which Milton did not disdain to accept as a model in the lyrical portions of *Comus*, and of which the *Endymion* of Keats is but an echo. In these plays, B. and F. are the cleverest, gayest gentlemen. They never sound the deep sea of passion; they disport themselves, dolphin-like, on its surface. They have no power of serious characterization, and their numerous creations are seldom consistent; but they say the most clever, pleasant, and glancing things. Morally, little can be said in their praise. No audience of the present day could sit out the representation of their purest plays. Some of the impurest are almost beyond conception, yet there is always an air of good-breeding about them, and the filth is handled in the most gentlemanly manner. It was a great intellectual period in which B. and F. lived; but Shakspeare stands above them and the rest of that dramatic brotherhood like Mont Blanc above the summits of the Lower Alps—conspicuous not only from his altitude, but from his purity.

BEAUMONT, Gustave de, a distinguished French publicist, born February 6, 1802, at Beaumont-la-Chartre, in the department of Sarthe. He studied law, and was made procurator-substitute in the superior tribunal of the Seine, but lost this office after the July Revolution. In 1831, B. and Tocqueville were commissioned by the French government to study the prison-discipline of America. When B. returned to Paris, he received a place under government, but was soon deposed, as he refused to conduct the prosecution in the scandalous process against the Baroness de Feuchères. In 1840, he was elected deputy for the department Sarthe, and distinguished himself, as a member of the Opposition, by his information and readiness on all political questions. After the February Revolution, 1848, he was returned as member of the Legislative Assembly, and here maintained the character of a sincere but moderate republican. After the 2d December 1851, he was arrested and imprisoned for some time in the fortress of Mount Valérien. After regaining his liberty he lived in retirement, until his death in 1866. B. was the grandson of Lafayette, and in 1836 married his cousin, the daughter of Georges Lafayette. The writings on which B.'s reputation is founded are—*Note sur le Système Pénitentiare* (1831); *Du Système Pénitentiare aux Etats-Unis, et de son Application en France* (2 vols. 1832; partly by Tocqueville); *Marie ou l'Esclavage aux Etats Unis* (1835); and *L'Irlande, Sociale, Politique, et Religieuse* (1839).

BEAUMONT (Elie de), Jean Baptiste, Professor of Geology in the *Collége de France*, was born at Canon in 1798. He was distinguished not merely as a practical geological investigator, but also as a clear and acute speculator. The prevailing theory regarding the elevation of mountain systems was elaborated chiefly by him. He was occupied for 23 years, in conjunction with Dufrénoy, in the preparation of a geological map of France, and its accompanying text. Among his writings are: *Coup d'Œil sur les Mines*, 1824; *Les Vosges*, 1829; *Voyage Métallurgique en Angleterre* (2d ed., 1837—1839); *Notice sur les Systèmes des Montagnes* (1852). He died in 1874.

BEAUMONTAGUE is a composition of iron borings, brimstone, pitch, sal-ammoniac, rosin, and bees-wax, which is used to fill up cracks and flaws in an iron casting, and so to give falsely an appearance of solidity. The ingredients are melted in a vessel over an open fire, and when cooled, are rolled into small balls. When used, these are broken up, and a bit is inserted into the flaw. A red-hot iron passed over it forces the B. into the crevices of the faulty article, which, when finished, bears no trace whatever of having been dealt with in this way.

BEAUNE, capital of an arrondissement in the French department Côte d'Or, formerly included in the Duchy of Burgundy, is situated in a pleasant district on the river Bouzeoise, about 23 miles south-south-west of Dijon. The town is well built; has a fine parish church, Notre Dame, founded in 976 by Duke Henri of Burgundy; and a splendid hospital, founded in 1443 by Nicholas Rollin, Chancellor of Philip, Duke of Burgundy. There are manufactories of serges, woollen cloth, and cutlery. A considerable trade is carried on in Burgundy and Champagne wines. B. gives its name to one of the best of the Burgundy wines. Pop. (1876) 10,696.

BEAUNE, Florimond, a distinguished mathematician, and friend of Descartes, was born in 1601, at Blois, in France, where he died in 1652. His labors and discoveries contributed greatly to the improvement of the modern analytical geometry first introduced by Descartes. Algebra was also enriched by B.'s showing that, in equations to the fourth degree, the limits of positive roots might be found from the coefficients. B. may be regarded as the proper founder of the Integral Calculus, as he first endeavored to deduce the nature of curved lines from the properties of their tangents. The so-called 'B.'s Problem' (which has been completely solved only by Jean Bernouilli), still given in the Integral Calculus, was for his time new and remarkable, it turns also on the determination of the nature of a curved line from a property of its tangent. The only work of his we possess is *De Æquationum Limitibus Opuscula duo, et Notæ Breves*.

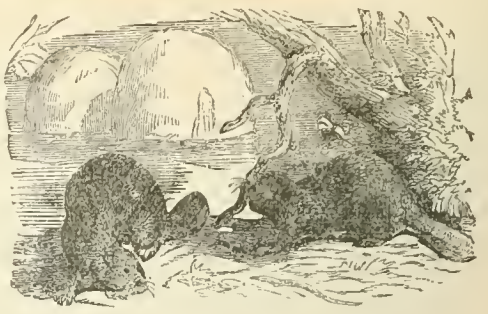
BEAUREGARD, Peter Gustave Toussaint, a general of the army of the Confederate States of America during the War of Secession, was born of a family of Canadian French descent, on his father's plantation, near New Orleans, Louisiana, about 1817. He graduated at the military college of West Point in 1838; was appointed to the artillery, and transferred to the engineers; won his brevet of captain at the battles of Contreras and Churubusco, in Mexico, and of major at Chepultapec, where he was twice wounded. After the Mexican war, he was engaged upon the fortifications on the coast of the Gulf of Mexico, and was, for a few days in February 1861, superintendent of the military academy at West Point. At the secession of Louisiana, he resigned, February 20, 1861, and was appointed by the Confederate government to the command at Charleston, South Carolina, where, April 11, he commenced the war by the bombardment of Fort Sumter (q. v.). July 21, he won the battle of Bull Run. March 5, 1862, he took command of the Army of the Mississippi, under General A. S. Johnston, and on April 6, fought the battle of Shiloh—on the first day a victory, and on the second, when the Federals had been reinforced, a partial defeat to the Confederates, with the loss of General Johnston. After holding General Halleck in check for two months, he was obliged, by his failing health, to retire for a time from active service; but in 1863 defended Charleston; and in 1864 commanding at Petersburg, aided General Lee in the long and gallant defence of Richmond, the capture of which closed the war. He has since been President of the New Orleans and Mississippi Railway; and in 1866, in the interests of the Company, he visited New York, London, and Paris, being everywhere received with the highest distinction. He has also been in the service of the Khedive of Egypt.

BEAU'TY. See Æsthetics, Art.

BEAUVAIS, an important manufacturing French town, capital of the department Oise. It is situated in the valley of the Thérain (a tributary to the Oise), about 41 miles north-north-west of Paris, and surrounded by rising woodlands. Formerly, B. was included in the old province, Ile de France. It is now the seat of government for the department, and the residence of a bishop, and contains a literary and economical society, a public library, a museum, &c. Among its several fine buildings, the most noteworthy is its uncompleted cathedral, the choir of which is the loftiest as well as one of the finest specimens of Gothic in France. The manufactures of B. include woollen cloths, shawls, carpets, Gobelin tapestry, &c. Pop. (1876) 16,591. B. is an ancient town. It was included in the country of the powerful *Bellovaci*, in *Gallia Belgica*, and was known by the Romans as *Cæsaromagus*, afterwards as *Bellovacum*. In the middle ages, it was styled *Belvacum*. In 850, and at other times, B. was desolated by the Normans. The *Jacquerie*, or Peasants' War, broke out in the neighborhood of B., March 21, 1358. In 1443, B. was besieged by the English, who were repulsed by the heroic self-sacrifice of Jean Lignière. Again, in 1472, it was besieged by Charles the Bold of Burgundy, with an army of 80,000 men, when the women of B., under the leadership of the heroine Jeanne Lainé, surnamed La Hachette for her daring, displayed remarkable valor. The standard which the Burgundians had planted on the wall was torn down by Jeanne Lainé, and borne off by her in triumph. The banner is preserved in the town hall, and a procession, in which it is carried by young girls, annually commemorates the heroic deed. B. is the birthplace of the learned Dominican Vincent de Beauvais (Vincentius Bellovacensis).

BEA'VER (*Castor Fiber*), a quadruped of the order *Glires*, or *Rodentia* (q. v.), valued for its fur, and for the peculiar substance called *Castoreum* (q. v.), which it yields, and also much noted for its instincts. Some naturalists regard the American B. as distinct from that of Europe and Asia; but the differences observable either in external or anatomical characters are very inconsiderable; and the opinion that a great difference exists in instincts and habits, appears to have been too hastily adopted. If there is only one species of B., it is very widely distributed in the northern regions of the world, reaching in America almost as far south as the Gulf of Mexico. It once existed in the British islands, where, however, it has long been extinct; and it has become rare in Europe, in many parts of which it was once common. It has become rare also in the United States, disappearing before man; but is nowhere so abundant as in that wide region of lakes and rivers which lie to the north and west of the settled parts of North America. Considerable numbers of beavers are found on the banks of the Obi and other rivers of Siberia, and in Kamtchatka.

The incisors or cutting teeth of the B. are remarkably strong, and exhibit in the highest degree the distinctive character of the order to which it belongs—the front of hard enamel, which in the B. is of a bright orange color; the back of the tooth formed of a softer substance, more easily worn down, so that a sharp, chisel-like edge is always preserved; the bulbs being also persistent, so that the teeth are continually growing, as by their employment in gnawing wood, they are continually being worn away. There are four flat molar teeth (or grinders) on each side in each jaw. Each foot has five toes: those of the fore-feet are short, and not connected by a web; those of the hind-feet are long, spreading out like the toes of a goose, and webbed to the nails. In accordance



Beaver.

with this remarkable peculiarity, the B., in swimming, makes use of the hind-feet alone, the fore-feet remaining motionless and close to the body. Another character, to which nothing similar appears in any other rodent, is the large, horizontally flattened tail, which, except at the root, is not covered with hair, like the rest of the body, but with scales. The caudal vertebræ, however, do not exhibit a flattened form.

The B. is usually at least two feet in length, from the nose to the root of the tail; the tail is of an oval form, about ten inches in length, fully three inches in greatest breadth, and scarcely an inch in thickness. These dimensions are sometimes exceeded. The general form of the animal is thick and clumsy, thickest at the hips, and then narrowing abruptly, so that it seems to taper into the tail. The head is thick and broad, the nose obtuse, the eyes small, the ears short and rounded. The fur consists of two kinds of hair; the longer hair comparatively coarse, smooth, and glossy; the under coat dense, soft, and silky. The color is generally chestnut, rarely black, spotted, or nearly white.

The B. is very aquatic in its mode of life, and it seldom wanders far from some lake or river. In consequence of its habits, it is also limited to wooded districts, and the northern range of the species is everywhere terminated by the limits of the wood upon the river-banks.

The food of the B. consists of the bark of trees and shrubs (birch, poplar, willow, &c.), and of the roots of water-lilies (*Nuphar luteum*) and other aquatic plants. In summer, it eats also berries, leaves, and various kinds of herbage. There is reason to think that it never, as has been supposed, kills or eats fish. Like some other rodents, it lays up stores of provisions for winter; but these, in the case of the B., consists chiefly of bark, or of branches, and even trunks of trees. Its extraordinary powers of gnawing are exerted to cut down trees of several inches in diameter, both for food, and for the construction of those houses and dams which have rendered it so much an object of admiration to mankind. A tree of 18 inches in diameter has been found thus cut down by beavers, although smaller ones are usually preferred; and when a tree of this size is cut, the branches only, and not the trunk, are employed in the architectural operations of the animals. These operations are very wonderful, although the statement, at one time commonly made, that beavers drive stakes into the ground, has no foundation in fact; and some of the other particulars which passed current along with it, were equally fabulous. The houses or lodges of beavers are grouped together near the edge of the water, the mud being scraped away from the front, so that there may be a sufficient depth of water there to allow free egress, even during the most severe frost. The winter stores of the animals, consisting of piles or heaps of wood, are also always under water, at such a depth that they cannot be locked up in ice. When the depth of water is not sufficient, the beavers construct a dam across the stream, by the side of which the lodge is placed; the dam is sometimes as much as 300 yards in length, convex towards the current, and most convex in the strongest currents, sometimes extending on both sides beyond the natural channel of the stream. The materials of which it is composed are sticks, roots, and branches, with stones, moss, grasses, and mud, strangely commingled, but in such a manner that the structure becomes absolutely water-tight. Branches of which the bark has been used for food, or taken off for winter provender, are very generally employed for building purposes. In their building, beavers interlace small branches with each other and with the larger; and a B. kept in confinement has been known to manifest this instinct, by interlacing branches with the bars of its cage, whilst it also filled the interstices with carrots, and other vegetables, given it for food, nicely bitten to the proper size, and packed in snow, to protect itself from the cold. B. dams are built with the sides inclining tow-

ards one another, so that although ten or twelve feet wide at bottom, they have a narrow top.

The dams and houses are annually repaired, before winter comes on, the work being performed by night. 'In places,' says Hearne, 'which have been long frequented by beavers undisturbed, their dams, by frequent repairing, become a solid bank, capable of resisting a great force, both of water and ice; and as the willow, poplar, and birch generally take root and shoot up, they by degrees form a kind of regular planted hedge, which I have seen in some places so tall that birds have built their nests among the branches.' A broad ditch is often dug all around the lodge, so deep that it cannot freeze to the bottom, and into it the beavers make the holes by which they go out and bring their food. The larger lodges are in the interior, about seven feet in diameter, and between two and three feet high. The top is formed of branches of trees, matted with mud, grass, moss, &c. The walls are very thick, and the whole structure not only secures much warmth, but is a sufficient protection from wolves, wolverines, and other beasts of prey. Different apartments have often one common roof, but they have usually no internal communication. The sleeping-places of the animals are around the wall of their lodge, the center being left free; they are formed merely of a little grass or tender bark of trees. A single house seldom contains more than ten or twelve beavers, but many such families are often congregated in one place. Beavers, both in a wild state and in confinement, are scrupulously cleanly in their habits.

Beavers often sit on the hind-feet and tail, and eat in this posture, holding up their food in their fore-paws. They also walk on the hind-feet, with support of the tail, when they carry materials to their buildings, except branches, which are dragged. They have considerable power in the tail, and not unfrequently flap it, which has given rise to an opinion, perhaps not altogether erroneous, that they use their tails for plastering their buildings, or beating and adjusting the mud which is employed in them.

Beavers do not usually eat in their lodges, but in holes or burrows in the bank of the river, the entrance to which is from beneath the water, and which thence proceed obliquely upwards, often to a distance of many feet. To these holes the beavers also flee when their lodge is broken up; and it is therefore a common practice of the B. hunters to break up the B. lodges, that they may take the animals in their holes or vaults. Beavers are also taken by nets and traps.

It is chiefly in winter that beavers congregate together. During summer, they wander about a little. The young are generally produced in April or May, from two to seven at a birth. Their eyes are open when they are born.

Single beavers are frequently met with, which live apart from all others of their species. All of these are males, which, it is supposed, have been conquered and driven away by others of their sex.

In the parts of North America where beavers have now become rare, they live mostly in burrows in the river-banks, like those which are still found in Europe. Circumstances prevent them from following out their gregarious tendencies. That the beavers of Europe and Asia construct lodges and dams, when they have opportunity of congregating in sufficient numbers, appears to be no less certain than that those of America do so.

Large glandular pouches, two in number, closely connected with the organs of reproduction, contain the substance called *Castoreum* (q. v.). Its uses in the animal economy are by no means well known; they are probably analogous to those of musk, civet, &c.; but its peculiar pungent odor is so attractive to beavers, that use is made of it as a bait for B. traps.

The B. is very easily tamed; but no wooden cage will keep one confined. Except in the extraordinary building instincts already noticed, the animal exhibits no remarkable sagacity.—The use of the B.'s fur for making hats is well known. See HAT. An act of the English parliament, in 1638, prohibiting the use of any other material for hat-making, contributed to the rapid diminution of the number of beavers in the parts of North America from which their skins were then obtained. During great part of the 18th, and the earlier part of the 19th c., the number of B. skins annually exported from America appears to have been not less than 200,000. It is now greatly diminished, but is still large. The flesh of the B. is much esteemed as an article of food by trappers and others who frequent the fur-countries, but it is very oily.

Fossil remains of beavers, apparently of the same species with that now existing, are found in the deposits referred by geologists to the pliocene and pleistocene periods. Other remains are also found of a much larger animal of the B. kind, which must have existed in Europe and Asia along with the present species, but which seems to have become extinct before the historic period. They were different, however, not merely in size, but in other particulars so important, that Owen has constituted for the 'great B.' a distinct genus, *Trogontherium* (Gr., a chewing or gnawing beast).

Of existing animals, the most closely allied to the B. is the *Coypu* (q. v.), sometimes called the Chilian B. (*Myopotamus Coypus*), which yields the fur called *Racoonda* (q. v.).

BEA'VER. See HELMET.

BEA'VER WOOD. See MAGNOLIA.

BEBEE'RINE is one of the alkaloids, and is obtained from the greenheart bark or *bebeeru* of Demerara. It is used in medicine in place of quinine, which it resembles in properties, though it is not so powerful in its action as a tonic and febrifuge. The condition in which it is generally sent into market is as the sulphate of B., occurring in shining scales of a pretty brown color, and soluble in water.

BEBEE'RU, BEEBEE'RU, or BIBI'RI. See GREENHEART.

BECCAFI'CO (*Sylvia hortensis*, or *Curruca hortensis*), a little bird of the family of the *Sylviadæ*, or Warblers (q. v.), sometimes called the Pettychaps, and sometimes the Garden Warbler, rather rare in Britain, but abundant in some of the more southern parts of Europe, and in great demand for the table in Italy, its flesh being regarded as of peculiar delicacy. It is a mere summer bird of passage, however, not only in Britain, but even in the south of Europe. The upper parts are mostly of a brown color, the lower parts whitish. It is a bird of very pleasing song. B. is an Italian name, and is sometimes extended to other birds of the same family used for the table.

BECCAMOSCHI'NO (*Sylvia cisti'cola*), a little bird of the family of the Warblers, found in Italy, and remarkable for its nest, which resembles that of the tailor-birds, being usually placed in a bush of lengthened herbage, the leaves and stalks drawn together over it, and a flooring formed for it by leaves curved across below, and sewed together generally with some kind of vegetable fibres.

BECCARI'A, CESARE BONESANA, a political and philanthrophic writer, was born at Milan 1735 or 1738. The opinions of the French encyclopædists, especially those of Montesquieu, had the greatest influence in the formation of his principles and sentiments. The work which most favorably exhibits the character and genius of B. is his *Trattato dei Delitti e delle Pene* (Treatise on Crimes and Punishments), first published in 1764, in which he argues against the severities and abuses of criminal law, especially capital punishment and torture. The work was extremely popular, and was translated into several European languages. It is marked by eloquence, sensibility, and lively power of imagination. Kant unfairly accuses the author of an affected humanity, though it must be admitted that the German philosopher has exposed the invalidity of some of the arguments brought forward. On the whole, however, the work of B. is acknowledged to have done great good, and the subsequent reforms in the penal code of European nations have generally taken the direction he has pointed out. He was among the first to advocate the beneficial influence of education in lessening crime. This naturally brought upon him the hatred of the priesthood, who, according to their usual formula of persecution, accused him of impiety; but their malice was frustrated by the efforts of Count Firmian, the Austrian governor of Lombardy, a man of liberal and enlightened sentiments. In 1768, B. was appointed Professor of Political Philosophy at Milan, and achieved great success as a lecturer. He died of apoplexy in November 1793. In the course of his life he published several works.

BEC-FIN, the common French name for different species of birds of the family of *Sylviadæ*, or Warblers (q. v.). It is sometimes to be met with in English books.

BECHE-DE-MER, or TREPANG, an article of luxury among the Chinese, consisting of the dried bodies of several species of *Holothuria* (q. v.), or Sea-cucumber, which are found in great abundance in the shallow waters of lagoons, and on reefs, from the south-eastern coasts of Asia to New Holland. The traffic in B. is very extensive, and the Malays catch the animals, and prepare them in large quantities for the Chinese market. They are usually about 8 or 9 inches long, but some are 2 feet in length, and 7 or 8 inches in girth. They are often found nearly buried in the coral sand, their feathered tentacula alone floating above it. The larger ones are sometimes speared in shallow water; but most of them are taken by divers in depths of from 3 to 5 fathoms. An expert diver will bring up eight or ten at a time. They are split down one side, boiled, pressed flat with stones, dried in the sun, and afterwards in smoke, and packed in bags, in which state they are bought by the Chinese, and conveyed in junks to China. Fleets of Malay proas are employed in the search for this curious production of the sea. Macassar is the great staple-place of the trade, and from it above 8000 cwt. of B. are annually sent to China, the price varying according to the kind and quality, from thirty shillings to ten pounds per cwt. There is also a considerable export of B. from Manilla. B. is extremely gelatinous, and is very much used by the Chinese as an ingredient in rich soups.

BECHER, Johann Joachim, author of the first theory of chemistry, was born at Speier in 1625. In his youth, he had many difficulties to contend with, but his zeal and perseverance overcame them all. He acquired an extensive knowledge of medicine, physics, chemistry, and even politics, and in 1660, was made a member of the Imperial Council at Vienna. While residing in this city, he assisted in establishing several manufactures, and drew up the plan of an East Indian commercial society, but unfortunately he fell into disgrace, and had to leave the city. He next went to Mainz, and subsequently lived in Munich, Würzburg, Haarlem, and finally London, where he died in 1682. He had many enemies, and was accused—not altogether unjustly—of charlatanry. Nevertheless, he rendered important services to chemistry. His *Physica Subterranea* was the first attempt made to bring physics and chemistry into close relation; in these two he sought the causes of all the inorganic phenomena in the world. He at the same time began to construct a theory of chemistry, and also investigated the process of combustion. B. taught that every metal was composed of an earthy substance common to all metals; of a combustible principle also identical in all; and was differentiated from other metals only by the possession of a peculiar mercurial element; when a metal was heated, until it had changed its form, the mercurial substance was discharged, and nothing remained except metallic calx. Herein lies the first germ of Stahl's phlogistic theory, which obtained universal currency until the time of Lavoisier.

BECHUANS. See Betjuans.

BECKER, Gottfried Wilhelm, a German author, born at Leipsic in 1778, entered the university of that city with the view of studying medicine, and having taken his doctor's degree in 1801, settled there as a practising physician and a writer of medical works, several of which reached many editions. The wars of the period led him, however, to turn his attention to history and modern languages, and he became well known by his contributions to periodicals, his series of popular histories, and his translations from the English, French, and Italian. In 1833, B. entirely relinquished practising medicine, and devoting himself to literature, became a fertile and admired contributor to many of its more popular branches. He died at Leipsic, 17th January 1854. He published several attractive volumes of travels in his own country, peculiarly adapted to the young, among which we may instance his *Tour to the Harz, Sketches of Southern Germany*, &c. His historical writings, which are not less numerous, chiefly narrate the events of his own time. Amongst them we may particularize *Andreas Hofer, Egypt as it Now is, The Fate of Spain in Modern Times*, &c. In light literature, also, he was very successful as a translator. All his works have been published at Leipsic.

BECKER, John Philip, one of the most active Radical politicians of late years, was born, March 1809, at Frankenthal, in the Palatinate on the Rhine, and brought up as a brushmaker. The French revolution of July 1830 gave a political bias to his tendencies, and he took part in the political agitations of the day, in consequence of which he was imprisoned; but in 1833 he was released, and exerted himself warmly on behalf of his brothers in opinion. In 1837, he settled in Switzerland, taking a part in several Radical publications, and organizing, in 1838 and 1845, volunteer corps. In the autumn of 1847, he was summoned to the military bureau at Berne, and being chosen adjutant of Ochsenbein's division, fought against the Sonderbund with acknowledged bravery. Upon the failure of Hecker's attempt to revolutionize Baden in 1848, B., who had organized troops for his support, returned to Switzerland, to plan an expedition of German and Swiss auxiliaries, to support the cause of freedom in Rome and Sicily. Their movements being frustrated, he led his troops in the summer of 1849 into the Palatinate and the Duchy of Baden, where a rising had taken place, and acted a prominent part in many engagements. Subsequently, he settled in Geneva, and engaged successfully in commerce. A history of the revolution of 1849, in Southern Germany, has been published by him and Esselen. B. has lately been known as a leader of the Socialist party, and is an active agitator on behalf of the association known as the 'International.'

BECKER, Karl Ferdinand, born at Leipsic in 1804, may be named with Kiesewetter and Winterfeld as one of the best German writers on the history of music, and also as an excellent composer for the organ, as is proved by his trios and other compositions well adapted to the genius of the instrument. Among his works may be mentioned: a *Choral-book*, or collection of psalm and hymn tunes (Leipsic, 1844); *Choral Melodies* for Spitta's Psalter and Harp, 1841; a *Catalogue* of his musical library, one of the most extensive in Germany; *On the Choral Collections of Various Christian Churches*, 1841; *The Choral Compositions of the 16th and 17th Centuries*, 1847; and *The Composers of the 19th Century*, 1849. He died Oct. 1877.

BECKER, Karl Ferdinand, one of the most distinguished German philologists, was born at Liser, in the old electorate of Treves, in 1775. At first a teacher, he afterwards studied medicine, and ultimately settled as a practitioner at Offenbach. Here he educated his own children with such success that several families induced him to take charge of theirs, and thus his house was converted into an academy (1823), which he conducted till his death in 1849. This gave scope to his early predilection for linguistic studies, to which his scientific training led him to give a quite new direction. B. contemplates language as an *organism*, pervaded by strict logical laws. From this point of view, he wrote his *Deutsche Grammatik* (2d ed. 1870). He neglects too much the historical development of language, and thus, as might be expected, comes at times into conflict with the results of comparative philology; yet his work is valuable for its logical consequence, and for its leading idea of organism in language. Besides a *Schulgrammatik* (10th ed. 1872), which is an outline of his larger work, he published several other treatises on the German language.

BECKER, Wilhelm Adolf, a distinguished German author, was born at Dresden in 1796. Originally intended for commercial life, he soon abandoned a pursuit which he found uncongenial to his taste, and devoted his time to the acquisition of learning. In 1816, he came to Leipsic, where he studied theology, and more particularly philology. In 1840, he traveled through Italy; and in 1842, was appointed Professor of Archæology at the university of Leipsic, where his prelections on the Latin authors were numerously attended. He died at Meissen, 30th September 1846. His lively fancy, aided by a thorough knowledge of the classic languages, enabled him to make quite a novel use of antiquity. In his *Charicles* (Leip. 1840), he ventured to reproduce the social life of old Greece, and in his *Gallus* (Leip. 1838), to give sketches of the Augustan age at Rome.

The learning which he has contrived to stuff into his picturesque sentences is marvellous, not to speak of the quantity buried in his *excursus*, or disquisitions, which, in the English translation of the works by Metcalfe, are transferred from the text to the end of the volumes. Lockhart's *Valerius* is the only thing in English literature which corresponds to these compositions of the German author. B.'s treatise *De Comicis Romanorum Fabulis* (Leip. 1837), is a valuable contribution to the history of Roman dramatic poetry. His most important work, in a scholastic point of view, is his *Handbook of Roman Antiquities* (1843—1846), which, after his death, was continued by Marquardt.

BECKERATH, Hermann von, one of the most remarkable public characters of Germany, was born at Krefeld (in Prussia), December 1801. He sprang from a commercial family, and made a considerable fortune as a banker. But he gave himself also to pursuits of a more intellectual character, and especially to the studies of jurisprudence and politics. The accession of Frederick-William IV. to the throne roused B. to a sense of the political condition of his country, and he devoted himself to work out its constitutional freedom. In 1843, he was elected representative of his native town in the provincial diet, and continued for several years to take a prominent part in Prussian politics. He was a deputy in the National Assembly which sprang up in the eventful year 1848, and held its sittings at Frankfort. His eloquence exercised considerable influence on this assembly. He was appointed minister of finance, and shortly after called to Berlin, to construct a cabinet; but in this he failed. His strictly constitutional advice was not apparently agreeable to the court, and he returned to Frankfort. An advocate for German unity, it was he who made use of the expression: 'This waiting for Austria is death to the union of Germany.' But he refused his assent to any revolutionary measure. When the retrograde movement set in, he resigned the posts he held under government, but continued, as a member of the second Prussian chamber, a vigorous opposition to the Manteuffel ministry, which had deserted the cause of German unity. He withdrew from the arena of political strife in 1852. After the return of Manteuffel to power, in 1858, B. was again elected a member of the Prussian second chamber; but he was obliged to decline the honor, on account of failing health. He devoted his later years to the affairs of Krefeld, his native town, where he died in May 1870.

BECKET, Thomas à', Archbishop of Canterbury, was the son of a merchant, and was born in London in 1119. The story which makes his mother a Saracen is charmingly romantic, but there are doubts if it has any historical basis. He studied theology at Oxford and Paris, and afterwards law at Bologna, and at Auxerre, in Burgundy. Having been recommended to Henry II. by Theobald, Archbishop of Canterbury who had had experience of his abilities, B. was promoted to the office of high chancellor, and thus (according to Thierry) resuscitated the hopes of the English as the first native Englishman, since the Conquest, who had filled any high office. His duties as high chancellor were numerous and burdensome, but he discharged them vigorously. He was magnificently liberal in his hospitality. Henry himself did not live in a

more sumptuous manner. As yet, B. seems to have regarded himself as a mere layman, though, in point, of fact, he was a deacon; but in 1162, when he was created Archbishop of Canterbury (an office which, as it then involved the abbacy of the cathedral monastery, had never but twice before been held by any but a monk or canon-regular), a remarkable change became manifest in his whole deportment. He resigned the chancellorship, threw aside suddenly his luxurious and courtly habits, assumed an austere religious character, exhibited his liberality only in his 'charities,' and soon appeared as a zealous champion of the church against all aggressions by the king and the nobility. Several noblemen and laymen were excommunicated for their alienation of church property. Henry II., who, like all the Norman kings, endeavored to keep the clergy in the subordination to the state, convoked the nobility with the clergy to a council in 1164, at Clarendon (near Salisbury), where the so-called 'constitutions' (or laws relative to the respective powers of church and state) were adopted. To these, the primate, at first, declared he would never consent; but afterwards, through the efforts of the nobles, some of the bishops, and, finally, of the pope himself, he was induced to give his unwilling approbation. Henry now began to perceive that B.'s notions and his were utterly antagonistic, and clearly exhibited his hostility to the prelate, whereupon B. tried to leave the country. For this offence the king charged B. with breach of allegiance, in a parliament summoned at Northampton in 1164, confiscated his goods, and sequestered the revenues of his see. A claim was also made on him for not less than 44,000 marks, as the balance due by him to the crown when he ceased to be chancellor. B. appealed to the pope, and next day leaving Northampton in disguise fled to France, where he spent two years in retirement at Pontigny, in Burgundy.

The French monarch and the pope, however, now took up his cause. B. went to Rome, pleaded personally before his holiness, who reinstated him in the see of Canterbury. B. now returned to France, whence he wrote angry letters to the English bishops, threatening them with excommunication. Several efforts were made to reconcile Henry and B., which, however, proved futile; but at length, in 1170, a formal agreement was come to at Fretville, on the borders of Touraine. The result was, that B. returned to England, entering Canterbury amid the rejoicings of the people, who were unquestionably proud of B., and regarded him —whether wisely or not is another question—as a shield from the oppressions of the nobility; but he soon manifested all his former boldness of opposition to royal authority. At last, it is said, the king, while in Normandy, expressed his impatience that none of his followers would rid him of an insolent priest. The fatal suggestion was immediately understood, and carried into effect by four barons, who departed by separate ways for England. On the evening of the 29th December 1170, they entered the cathedral, and having failed in an attempt to drag him out of the church, there slew B. before the altar of St. Benedict, in the north transept. Henry was compelled to make heavy concessions to avoid the ban of excommunication. The murderers, having repaired to Rome as penitents, were sent on a pilgrimage to Palestine; and, two years after his death, B. was canonized by Pope Alexander III., and the anniversary of his death was set apart as the yearly festival of St. Thomas of Canterbury. In 1220, his bones were raised from the grave in the crypt where they had been hastily buried two days after his murder, and were by order of King Henry III. deposited in a splendid shrine, which for three centuries continued to be the object of one of the great pilgrimages of Christendom, and still lives in English literature in connection with Chaucer's *Canterbury Tales*. At the Reformation, Henry VIII. despoiled the shrine, erased B.'s name from the calendar, and caused his bones to be burnt, and scattered to the winds. It is extremely difficult to estimate properly the character of Becket. We do not know what his ultimate aims were, whether, as some suppose, they were patriotic, i.e., *Saxon*, as opposed to *Norman*, or, as others believe, purely sacredotal. At all events, the means he used for the attainment of them was a despotic and irresponsible ecclesiasticism. He admitted nothing done by churchmen to be secular, or within the jurisdiction of civil courts, not even murder or larceny. Fortunately, the Plantagenets were as dogged believers in their own powers and privileges as B. in those of the church; and by their obstinate good sense, England was kept wholesomely jealous of the pretensions of Rome. See Dr. Giles's *Vita et Epistolæ S. Thomæ Cantuariensis*; Canon Morris's *Life of St. Thomas Becket*; Canon Robertson's *Life of Becket*; Canon Stanley's *Historical Memorials of Canterbury*; Freeman's *Historical Essays*; Hook's *Lives of the Archbishops of Canterbury*; Froude's articles on B. in the *Nineteenth Century*.

BE'CKETS, on shipboard, a general name for any large hooks, short pieces of rope, or wooden brackets, used for confining ropes, tackles, oars, or spars, in a convenient place.

BECKFORD, William, the only legitimate son of Alderman Beckford, was born in 1760. When he was about nine years of age, his father died, and he inherited the larger portion of an enormous property, consisting for the main part of estates in Jamaica, and of the estate of Fonthill, in Wiltshire. His annual revenue is said to have exceeded £100,000. Young B. envinced unusual intellectual precocity; for in 1780 he printed a satirical essay, entitled *Biographical Memoirs of Extraordinary Painters*, in which he does not spare living artists, and assails the cant of criticism with the polished weapon of his wit. In 1778 he visited the continent, and met Voltaire at Paris. Two years thereafter, he started on his first great continental tour, and spent twelve months in rambling through Flanders, Germany, and Italy. In 1782 he made a second visit to Italy, and 1787 he wandered through Portugal and Spain. In 1783 he married the Lady Margaret Gordon, daughter of Charles, fourth Earl of Aboyne; and in the following year he entered parliament as one of the members for Wells. In the same year he published *Vathek* in French. B. informs us that he wrote this tale, as it now stands, at twenty-two years of age, and that it was composed at one sitting. 'It took me,' he says, 'three days and two nights of hard labor. I never took off my clothes the whole time. This severe application made me very ill.' Immediately on its publication, *Vathek* was translated into English; B. professes never to have known the translator, but thought his work well done. In 1790 he sat for Hindon; in 1794 he accepted the Chiltern Hundreds, and again left England. He fixed his residence in Portugal, purchased an estate near Cintra, and occupied for a time that 'paradise' which Byron commemorated in *Childe Harold*. Tormented by unrest, he returned to England; and in 1801 the splendid furniture of Fonthill was sold by auction, and the next year his valuable collection of pictures was disposed of in London. These dispersions were no sooner made than he began a new collection of books, pictures, furniture, curiosities, and proceeded to erect a new building at Fonthill, the most prominent feature of which was a tower above 260 feet high.

B. resided at Fonthill till 1822, when in one of those strange vagaries of feeling, of which his life was so full, he sold the estate and house, with all its rare and far-gathered contents, to Colonel Farquhar for £350,000. Soon after, the great tower, which had been raised on an insecure foundation, came to the ground. On the sale of Fonthill, B. removed to Bath, and immediately proceeded to erect another lofty building, the plan of which also included, a tower, but this time not more than 100 feet high. While residing there, he did not mingle in Bath society, and the most improbable stories concerning the rich and morose genius in their neighborhood were circulated among the citizens, and were believed by them. During all his life, B. was a hard-working student, and was devoured by a passion for books. Some of his purchases were perfectly imperial in their way. He bought Gibbon's library at Lausanne, to amuse himself when he happened to be in that neighborhood. He went there; read in the fierce way that he wrote, three days and two nights at a sitting; grew weary of his purchase; and handed it over to his physician, Dr. Scholl. Up till 1834 he had published nothing since *Vathek*, but in that year the literary silence of half a century was broken by the appearance of a series of letters, entitled *Italy, with Sketches of Spain and Portugal*, in two volumes. In the same year he republished his *Memoirs of extraordinary Painters*; and in 1835 he issued another volume, entitled *Recollections of an Excursion to the Monasteries of Alcobaca and Batalha*, made in June, 1794. From the period of this last publication till his death, which took place on the 2d of May, 1844, he lived in the deepest retirement.

B., since the publication of his Arabian tale, had been a power in English literature. His wit, his sarcasm, his power of graphic description, may be seen in his journal and letters; and his higher faculties of imaginative conception and delineation reign in the unmatched passages that shadow forth in gloom and glory the 'Hall of Eblis.'

BECKMANN, Johann, a German author, known by his works on natural history and agriculture, was born at Hoya, in Hanover, June 4, 1739. After holding, for about two years, a professorship of physics and natural history in St. Petersburg, he made a tour through Sweden, where he gained an acquaintance with the working of mines, and received for some time instructions from Linnæus. In 1766 he was appointed professor of philosophy, and in 1770 ordinary professor of political economy at Göttingen, where he died, February 4, 1811. He was the first German author who wrote on agriculture in a scientific style. Among his works may be mentioned: *Principles of German Agriculture* (6th ed. 1806), *Introduction to Technology* (5th ed. 1809), *Introduction to the Science of Commerce* (1789), *and Contributions to the History of Inventions* (1780—1805).

BECQUEREL, Antoine Cesar, a distinguished French physicist, was born 7th March 1788, at Chatillon-sur-Loing, in the department of Loiret. In 1808, he entered the French army as an officer of engineers, and served with distinction in Spain under Marshal Suchet. He took part in the sieges of Tortosa, Tarragona,

Valencia, and other places. On his return to France, he was appointed inspector of the *Ecole Polytechnique;* in 1814, he went through the campaign of France; and at the peace of 1815, retired from the service, that he might pursue his scientific studies with greater advantage. In 1819, he published a volume of geological and mineralogical researches, after which, his attention was principally devoted to electricity and magnetism. While studying the physical properties of yellow amber, B. had occasion to make experiments on the liberation of electricity by pressure. This led him to investigate the laws by which the phenomena of liberation are governed in chemical action. The result of his inquiries was the overthrow of Volta's theory of contact, and the construction, by him, of the first constant pile. He next discovered a method of determining the internal temperature of human and animal bodies, and by physiological applications demonstrated that, when a muscle contracts, there is a development of heat. B. is besides one of the creators of electro-chemistry. His labors in this branch of science opened for him, in 1829, the door of the *Académie de Sciences.* Since 1828, he had begun to apply electro-chemistry in the reproduction of mineral substances, and in the treatment by the humid way of silver, lead, and copper ores. In 1837 he was elected a member of the Royal Society of London. Among his works were the *Traité de l'Electricité et du Magnetisme; Traité d'Electrochimie; Traité de Physique; Eléments de Physique terrestre et de Météorologie.* He died on the 19th January 1878.—BECQUEREL, ALEXANDRE EDMOND, son of Antoine César B., an eminent physicist, was born at Paris, 24th March 1820. He was decorated with the Legion of Honor in 1851; and was appointed Professor of Physics in the *Conservatoire des Arts et Métiers,* 1853. He is a member of the *Académie de Sciences.*

To his conjoint labors with his father are due interesting researches concerning the solar spectrum, and the elements of electric light (*Comptes Rendues de l'Académie,* 1839—1840); *Eléments de Physique Terrestre et de Météorologie* (1847); *Memoires sur les Lois qui president e la Decomposition électro-chimique des Corps* (1849); and a *Note sur le tracé des Lignes Isothermes en France; des Recherches sur les Effets Electriques* (1852 and 1855); and *La Lumière, ses Causes et ses Effets* (1868).

BE'CSE, NEW, a market-town of Austria, about four miles east from old Becse. Pop. 6472.

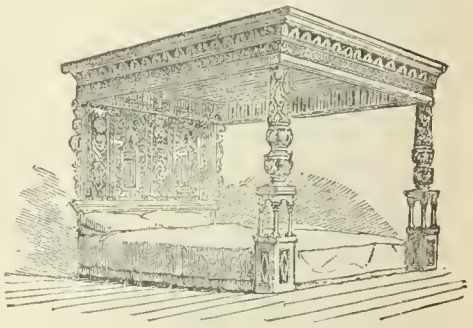
BECSE, OLD, a market-town of the Austrian Empire, in the Servian Woiwodschaft, 24 miles north-north-east from Neusatz. Pop. (1880) 15,040

BECSKERE'K NA'GY, or GREAT BECSKEREK, a town of Hungary, in the county of Torontal, situated on the left bank of the Bega, about 45 miles south-west of Temesvar, with which place it is connected by canal. B. N. is an important market-town, and has a population (1880) of 19,529.

BED (with some variations in spelling, the word is common to all Germanic languages), an article of household furniture on which to sleep. Beds have been, and are of various forms, almost every country having its own kind of bed. In ancient times in Palestine, the B. seems to have been a simple kind of couch for reclining on during the day, and sleeping on at night, and readily removable from place to place, as is referred to in different parts of Scripture. About the heat of the day, Ishbosheth lay on his B. at noon (2 Sam. iv. 5). In receiving visitors, the king bowed himself upon the bed (1 Kings i. 47). Jesus saith, 'Take up thy B., and go unto thine house' (Mat. ix. 6). Yet, in these early times, beds or couches must, in some instances, have been highly ornamented: thus, 'I have decked my B. with coverings of tapestry, with carved works, with fine linen of Egypt' (Prov. vii. 16). The ancient Greeks had an elegant kind of beds in the form of open couches; they rested on a frame-work with posts; their mattresses were stuffed with wool or feathers; and they had coverings of a costly nature. The Romans had latterly beds of great richness and magnificence. They were of two kinds—the *lectus tricliniaris,* or couch for reclining upon at meals; and the *lectus cubicularis,* or B. placed in bed-chambers for sleeping in during the night. In eastern countries, at the present day, beds are for the most part simple couches or mattresses, which can be easily rolled up and carried away. In India, these couches are called *charpoys.* It will be understood that, in hot climates, few bed-clothes are used—in general, there being only a single sheet employed; care is taken, however, to use mosquito-curtains, without which rest would be impracticable. See MOSQUITO.

Throughout the continent of Europe, beds are of the open couch form, suitable in width for one person. They consist of a frame or bedstead, less or more ornamental, bearing one or two hair or wool mattresses; they are often provided with curtains, which depend from the ceiling of the room. In French hotels, such beds, neatly done up, are seen in sitting-rooms. In Germany, there is a common practice of placing large flat bags of down above the other coverings of beds, for the sake of warmth; and sometimes a bed of down altogether supplies the place of blankets. Throughout America, the beds are usually of the French, or open couch, form. The simplest kind of B. yet invented—except, indeed, the Oriental rug spread on the floor—is one frequently to be seen in America. The bedstead consists of a folding tressel, constructed with canvas on the principle of a camp-stool, with a movable head-board at one end to retain the pillow. With a hair mattress, a pillow, and the necessary coverings laid on it, this makes one of the most comfortable beds imaginable. Its great advantage consists in its being easily folded up and put away in small space. In some of the hotels in the United States, when the arrival of guests exceeds the ordinary accommodation, a number of tressel-beds can be improvised in a few minutes in one of the large halls.

To prevent the falling of dust on the face, the Romans, in some instances, used canopies (*aulæa*) over their beds; in no country but England, however, has the canopied bedstead been thoroughly perfected and naturalized. The English four-posted B., or B. proper, is a gigantic piece of furniture, to which all persons aspire; and when tastefully fitted up, it offers that degree of comfort and seclusion which is characteristic of the domestic habits of the people. Like most English beds, it is made of sufficient size to accommodate two persons—the husband and wife—and is hence



Bed of Ware.

known as the family bed. The dimensions of a good family B. are as follows: lying part, 6 feet 6 inches in length, by 5 feet 2 inches in breadth; height from the floor, 2 feet 9 inches; height of the posts from the floor to the top of the cornice, 9 feet. The roof or canopy is supported by the four posts, which are of mahogany, finely turned and carved. On rods along the cornice, hang curtains, which can be drawn around the sides and foot. The top stands towards the wall, so that the B. can be approached on the two sides. The curtains are composed of silk or worsted damask; in old times, they were of tapestry. With a spring mattress below, and a wool-mattress above, the B. is complete, all but the blankets, sheets, bolster, and pillows. Ticks with feathers, laid on a hair-mattress, are also common. Fully equipped, a B., as just described, costs from £50 to £80. The great B. at Ware, in Hertfordshire, is one of the curiosities of England, and is referred to in the *Twelfth Night* of Shakspeare: 'Although the sheet were big enough for the Bed of Ware in England.' This famous B., which is still seen in one of the inns at Ware, measures twelve feet square, and is said to be capable of holding a dozen persons.

Latterly, a species of B. has been introduced into England, called the Elizabethan Bed. In point of size, it resembles the four-poster, but it has only two tall posts, with a canopy and curtains at the head, leaving more than half of the B. exposed. The tent-B. is an inferior kind of four-poster; it has a semicircular light frame roof, and light calico curtains. A more novel variety of bedsteads are those made of iron or brass, formed like open couches, which have come into very general employment. The cold and humid climate of the British Islands, independently of the habits of the people, has greatly influenced the form of the B.; for although it may be more wholesome to sleep without than with curtains, it has been difficult to make the practice of doing so general, particularly during the winter and spring months. In the humbler class of rural cottages in Scotland, there still lingers the old custom of sleeping in wooden bedsteads with sliding doors. This box variety of B. is considered as unfavorable to ventilation, but it is the only kind of sleeping-place which is endurable where there are damp earthen floors and imperfect ceilings. Its use is disappearing in the progress of cottage improvement.

In old times in England, beds were formed with straw instead of wool, hair, or feathers, as at present; hence the phrase of a 'lady in the straw,' signifying that she is being confined. By the humbler classes in the rural districts, straw is still used for beds, and also ticks stuffed with chaff. According to an old superstition, no person could die calmly on a B. of feathers of game birds.

For invalids, there have been invented air-beds and water-beds, which are now in use, and justly appreciated. See AIR-BEDS, also WATER-BED.

BED, or STRATUM, is a layer of sedimentary rock of similar materials, and of some thickness, cohering together so as to be quarried and lifted in single blocks. Beds are often composed of many fine laminæ or plates. The laminæ are the result of intermissions in the supply of materials, produced by such causes as the ebb and flow of the tide, river-floods, or the more or less turbid state of the water under which they were deposited. When the intervals between the supply of materials were short, the numerous laminæ closely adhere, and form a bed cut off from the superior deposit, by the occurrence of a longer interval, during which the bed became consolidated more or less before the next was deposited. When the lamination is obscure, or not distinct from the stratification, it would seem to indicate that the materials had been supplied without any intermission.

BED OF JUSTICE (Fr. *lit de justice*), literally, the seat or throne occupied by the French monarch when he was present at the deliberations of parliament. Historically, a B. of J. signified a solemn session, in which the king was present, to overrule the decisions of parliament, and to enforce the acceptance of edicts or ordinances which it had previously rejected. The theory of the old French constitution was, that the authority of parliament was derived solely from the crown: consequently, when the king, the source of authority, was present, that which was delegated ceased. Acknowledging such a principle, the parliament was logically incapable of resisting any demand that the king in a B. of J. might make, and decrees promulgated during a sitting of this kind were held to be of more authority than ordinary decisions of parliament. Monarchs were not slow to take advantage of this power to overawe any parliament that exhibited signs of independence. The last B. of J. was held by Louis XVI. at Versailles in September 1787.

BEDA, or BEDE (surnamed, on account of his learning, piety, and talents, VENERABLE), the greatest name in the ancient literature of Britain, and probably the most distinguished scholar in the world of his age, was born about the year 673 A.D. The exact spot of his birth is a point in dispute among antiquaries, but is commonly believed to have been in what is now the parish of Monkton, near Wearmouth, in Durham. In his seventh year he entered the neighboring monastery of St. Peter, at Wearmouth, where he remained for 13 years, and was educated under the care of the Abbot Benedict Biscop, and his successor, Ceolfrid. His religious instructor was the monk Trumberct; his music-master, John, chief-singer (*archicantor*) in St. Peter's Church, Rome, who had been called to England by the Abbot Benedict. After these studies at Wearmouth, B. removed to the twin-monastery of St. Paul at Gyruum (now written Jarrow), founded in 682; here he took deacon's orders in his nineteenth year, and was ordained priest in his thirtieth, by John of Beverley, then bishop of Hexham. In the shelter of his quiet and sacred retreat, while the tempest of barbaric strife raged without, and the hearts of all men in England were torn by sanguinary passions, B. now began earnestly to consecrate his life to such literature as was possible in those days, including Latin and Greek, and at least some acquaintance with Hebrew, medicine, astronomy, and prosody. He wrote homilies, lives of saints, hymns, epigrams, works on chronology and grammar, and comments on the books of the Old and New Testament.

His calm and gentle spirit, the humanizing character of his pursuits, and the holiness of his life, present a striking contrast to the violence and slaughter which prevailed in the whole island. To none is the beautiful language of Scripture more applicable—'a light shining in a dark place.' When laboring under disease, and near the close of his life, he engaged in a translation of St. John's Gospel into Anglo-Saxon, and dictated his version to his pupils. He died May 26, 735, and was buried in the monastery of Jarrow; long afterwards (in the middle of the 11th c.), his bones were removed to Durham. His most valuable work is the *Historia Ecclesiastica Gentis Anglorum*, an ecclesiastical history of England, in five books, to which we are indebted for almost all our information on the ancient history of England down to 731 A.D. B. gained the materials for this work partly from Roman writers, but chiefly from native chronicles and biographies, records, and public documents, and oral and written communications from his contemporaries. King Alfred translated it into Anglo-Saxon. In chronology, the labors of B. were important, as he first introduced the Dionysian reckoning of dates in his work, *De Sex Ætatibus Mundi*, which served as a basis for most of the medieval chroniclers of leading events in the world's history. Among the editions of B.'s History may be noticed: the first, published at Strasburg about 1500; a much better edition, by Smith (Cambridge, 1722); one not less valuable, by Stevenson (Lond. 1838); another, by the late Dr. Hussey (Oxf. 1846); a fourth in the *Monumenta Historica Britannica* (Lond. 1848); that included by Dr. Giles in his edition of the whole works of B. (6 vols., 1844); that at the Clarendon Press (1869); and that by Holder (Freiburg, 1882). Entire editions of B.'s writings have been published in Paris (1544—1554), Basel (1563), and Cologne (1612 and 1688). English versions of his *Ecclesiastical History* were published by Stapleton, in 1565; by Stevens, in 1723; by Hurst, in 1814; by Wilcock, in 1818; and by Giles, in 1840. See Gehle's *De Bedæ Venerabilis Vita et Scriptis* (Leyden, 1838); Wright's *Biographia Britannica Litteraria*, vol. i. (Lond. 1843); Surtees's *History of Durham*, vol. ii., pp. 2—6, 66—69.

BÉDARIEUX, a town of France, department of Herault, situated on the river Orb, well built, and second to none of its size in industry. Pop. (1876) 7372, who are engaged in the manufacture of fine and coarse cloths, stuffs, cotton and woollen stockings, hats, paper, oil, soap, leather, &c.

BE'DCHAMBER, LORDS OF THE, officers in the British royal household, twelve in number, who in the reign of a king, wait in turn upon the sovereign's person. They are under the groom of the stole, who attends his majesty only on state occasions. There are also thirteen grooms of the B., who take their turns of attendance. The salary of the groom of the stole is £2000; of the lords of the B., £1000; and of the grooms, £500 a year. These offices in the reign of a queen are performed by ladies. Corresponding to the groom of the stole is the mistress of the robes, and to the grooms of the B. are B. women. Her Majesty, Queen Victoria, has usually had from ten to twelve ladies, and extra ladies of the B., and eight B. women. These offices are objects of high ambition, from the access they give to the person of the sovereign, and are for the most part filled by 'the prime nobility of England.' They are not usually vacated on a change of ministry, and Sir Robert Peel's departure from the usual etiquette on this point, in 1839, excited no small commotion.

BEDDOES, THOMAS, a physician of remarkable talents, and a popular writer on chemistry, physics, physiology, disease, &c., was born at Shiffnall, in Shropshire, 1760. In his studies at Oxford and Edinburgh, he distinguished himself by his knowledge of ancient and modern languages—the modern he acquired without the aid of a teacher—and by his varied attainments in botany, mineralogy, geology, chemistry, &c. In Edinburgh he attracted the notice of Dr. Cullen, who employed him to add notes to Bergman's *Physical and Chemical Essays*. In 1785, he published a translation of Bergman's *Essays on Elective Attractions*, with valuable original notes. In 1787, he was appointed to the chemical lectureship in the university of Oxford. Here his lectures became exceedingly popular; but his unconcealed sympathies with the French revolutionary party in England, appear to have rendered his post so uncomfortable that he resigned it in 1792, and retired into the country. While in retirement, he wrote his work *On the Nature of Demonstrative Evidence, with an Explanation of Certain Difficulties occurring in the Elements of Geometry*, which was intended to show that mathematical reasoning proceeds entirely on the evidence afforded by the senses, and that geometry is based on experiment. Several patriotic pamphlets followed, and the *History of Isaac Jenkins*, in which he laid down, in a popular style, rules of sobriety, health, &c., for the benefit of the working-classes.

Of this work, 40,000 copies were sold in a short time. In 1798, after having spent considerable time in studying the use of artificial or medicated gases in the cure of diseases, especially consumption, aided by his father-in-law, Mr. Edgeworth, and pecuniarily assisted by his friend, Thomas Wedgwood, he opened a pneumatic hospital at Bristol. This institution did not succeed in its main object, which was to show that all diseases being, as B. maintained, referrible to an undue proportion or deficiency of some elementary principle in the human organism, could be cured by breathing a medicated atmosphere; and B., whose zeal had abated, retired from it about a year before his death, in 1808. The only results of the enterprise were several works by B. on the application of medicated air to diseases, and the introduction to the world of Davy (afterwards Sir Humphry), who was the superintendent of the institution. Sir Humphry Davy says of B.: 'He had talents which would have exalted him to the pinnacle of philosophical eminence, if they had been applied with discretion.' A life of B. was published in 1811 by Dr. Stock.

BEDDOES, LOVELL THOMAS, eldest son of Dr. Thomas B., and of Anna, third daughter of Richard Lovell Edgeworth, of Edgeworthstown, Ireland, sister of Maria Edgeworth, the distinguished novelist, was born at Rodney Place, Clifton, on the 20th July 1803. In 1809 Dr. Beddoes died, leaving his son to the guardianship of Mr. Davies Giddy, who, under his after-name of Sir Davies Gilbert, became the president of the Royal Society. By this gentleman, young B. was placed at the Bath grammar school; from thence, in 1817, he removed to the Charter House; and in May 1820, he entered as a commoner at Pembroke College, Oxford. In 1821 he published the *Improvisatore*. On this, his earliest poetic offspring, he looked with no favor at a later period, and was wont to hunt after stray copies in the libraries of his friends, and to disembowel them mercilessly when he effected a capture. In 1822 he published *The Bride's Tragedy*, which achieved for its author a great reputation. In 1824, he went to Göttingen to study medi-

cine, and from this time forth continued to live in Germany and Switzerland, with occasional visits to England. While engaged at Frankfort (1847) in dissecting, he received a slight wound, which was the means of infusing a noxious virus into his system. His health now began to fail. In 1848 he went to Basel, where he fell from his horse, and injured his leg. An amputation following, he died on the 26th January 1849, and was buried in the cemetery of the hospital.

During his wanderings in Germany, B. was engaged at intervals in the composition of a drama entitled *Death's Jest-Book*. This work, together with his other manuscripts, consisting chiefly of poetry, he, on his death-bed, confided to the care of a friend in England, desiring him to use his descretion as to their publication. In consequence, in 1851, his poetical works, with a memoir attached, appeared in two volumes. The merits of these dramatic fragments are quite peculiar. The author exhibits no power of characterization, no ability in the conduct of a story; and on the other hand, the crush of thought and image, the tone of music, and the depth of color, are quite wonderful. Mr. B. never could have become a dramatist, and of this, during his later years, he seems to have become aware. His works pall with splendor, and are monotonous by very richness. They are like a wilderness where nature has been allowed to pour herself forth in all her waste and tropical excess, unrestrained by a pruning hand, and unpierced by any path.

BEDEAU, Marie Alphonse, a distinguished French general, was born at Verton, near Nantes, August 1804. In 1817 he entered the military school of La Flèche; in 1820, St. Cyr; and in 1825 received a commission in the army. In the Belgian campaign of 1831—1832, he was aide-de-camp to General Gérard, and attracted notice at the siege of Antwerp. In 1836 he was sent to Algeria, as commandant of a battalion of the Foreign Legion. Here he acquired his great military reputation. He took part in most of the military operations by which the dominion of France was established over the natives, and rose to the rank of general of brigade. In 1847, he was for a short time governor of Algeria, but was superceded by the Duc d'Aumale.

When the revolution of February broke out, B., who was in Paris on leave of absence, was commissioned by Marshal Bugeaud to suppress the insurrection. This he found it impossible to do, but his conduct on the occasion has been severely blamed. By the Provisional Government he was appointed Minister of War, an office, however, which he immediately changed for the command of the city of Paris. On the formation of the Constituent Assembly, he was named vice-president, and always voted with the republican party. Along with Cavaignac, Lamoricière, and others, he was arrested on the 2d December 1851, and went into exile. B. was a Roman Catholic, and the fervor of his convictions gave rise to the groundless rumor that he had entered into holy orders. He died in 1863.

BEDEGU'AR, a remarkable gall (q. v.), often found on the branches of various species of rose, particularly of the sweet-brier, upon which account it is sometimes called Sweet-brier Sponge. It is produced sometimes by *Cynips rosæ*, sometimes by other species of gall insect. It is usually of a roundish shape, often an inch or more in diameter; its nucleus is spongy and fibrous, containing numerous cells, in each of which is a small larva; externally it is shaggy, being covered with moss-like branching fibres, which are at first green, afterwards purple or red. It was formerly in some repute as a diuretic and as a remedy for stone; it has more recently been recommended as a vermifuge, and as a cure for toothache.

BEDELL, William, one of the best prelates that have adorned the English Church, was born at Black Notley, Essex, in 1570. He was educated at Emmanuel College, Cambridge, and after his ordination, officiated as a clergyman for several years at Bury St. Edmunds. In 1604, he accompanied Sir Henry Wotton as his chaplain to Venice. There he resided eight years, deeply engaged in study, and honored by the friendship of many distinguished men, in particular of Father Paul Sarpi, then engaged in the composition of his celebrated *History of the Council of Trent*. While residing here, he translated the English *Common Prayer Book* into Italian, which was highly appreciated by many of the Venetian clergy. On his return home, he resumed his pastorial duties at Bury, where he lived for some time in such retirement, that when his friend Diodati came to England, he inquired in vain for the admirable B., whose merits were so well known at Venice. He had given up hopes of finding him, when one day he encountered him in the streets of London. In 1615, B. was presented to the living of Horingsheath, in Suffolk, where he remained twelve years. His retired life and his Calvanistic theology long hindered the recognition of his merits. At length, in 1627, he was unanimously elected provost of Trinity College, Dublin, to which the fame of his learning and piety had extended. He refused to undertake the charge till positively commanded by the king. At the end of two years, he was promoted to the united bishoprics of Kilmore and Ardagh, the latter of which he resigned in the following year, 1630. He immediately set himself to reform the crying abuses that prevailed in his diocese, and with so happy a combination of wisdom, firmness, and charity, that even his enemies were constrained to do homage to his virtues.

Among his other remarkable acts, he removed his lay-chancellor, and took upon himself the ancient episcopal jurisdiction of hearing and deciding causes. The chancellor obtained a decree against him in Chancery, with costs, but was so impressed with the superiority of the bishop's services to his own, that he dropped his claim, and even appointed a surrogate, with orders to pay implicit obedience to the authority of the bishop. The translation of the Old Testament into Irish was accomplished under B.'s direction (the New had been already translated), as well as of some of the homilies of Chrysostom and Leo on the reading of the Scriptures. On the breaking out of the rebellion in 1641, his popularity for some time saved his family from violence, his being the only English house in the county of Cavan that was spared. At length, on his refusal to dismiss his flock, he was seized, and imprisoned in the castle of Clonghboughter. Thence he was removed to the house of a Protestant clergyman, where he continued to minister officially till his death, at the end of a few weeks, February 7, 1642, in the seventy-first year of his age. The rebels followed his body to the grave in the church-yard of Kilmore. Besides some other works, B. translated the last two books of Father Paul's History. His life was written by Burnet.

BE'DFORD (Saxon, *Bedcanford*, town of the ford), the chief town of Bedfordshire, is situated on the Ouse (which is navigable thence to the sea, a distance of 74 miles), about 63 miles north-north-west of London by rail, and in the midst of a broad expanse of rich pasture, wheat, and barley lands. The town is clean and well paved, and the drainage has been recently greatly improved by the Board of Health. The charitable and educational institutions of B. are mostly due to Sir W. Harpur, alderman of London, in 1561, who founded a free school, and endowed it with 13 acres of land. The enormous increase in the value of the property (from £150 to £14,000 or upwards a year) enables the trustees to maintain grammar, modern, and preparatory school for boys, the same class of schools for girls, and 45 alms-houses. Formerly, much of the charity was under the control of popularly elected trustees, but under the Endowed Schools Act the constitution has been changed. Now, the governing body consists of 27, instead of 52 members—6 *ex officio* (the mayor of B., the lord-lieutenant of the county, and the members of parliament for the town and county), 9 nominated, and 12 representative. The eleemosynary element—shown in the maintenance of alms-houses, the giving of marriage-portions and apprentice-fees, &c.—used to be predominant in the distribution of the charity, but now the educational prevails, the funds being annually divided thus: One-eleventh to the maintenance of the alms-houses; two-elevenths to elementary education; four-elevenths to the grammar-school, and high-school for girls; and four-elevenths to the modern schools. The only important manufacture of B. is that of iron goods, especially agricultural implements. Lace-making and straw-plaiting employ many poor women and children.

A considerable traffic in malt, timber, coals, and iron is maintained with Lynn Regis, by means of the Ouse. B. is of great antiquity, and is mentioned in the Saxon Chronicle under the name of Bedcanford, as the scene of a battle between the Britons and Saxons in 571. The Danes burnt it in 1010. Afterwards its old castle, said to be built by Edward the Elder, is frequently mentioned in history. B. returns two members to parliament. Pop. (1871) 16,850; (1881) 19,532. John Bunyan was born near Bedford. He dreamed his immortal dream in B. jail, and ministered to the Baptist congregation in Mill Lane from 1671 to his death in 1688. The inhabitants still hold his memory in deep veneration, and some relics of him are preserved. A handsome new building, Italian in style, for the Bunyan schools was completed in 1867. A bronze statue of Bunyan was erected by the Duke of Bedford in 1874.

BEDFORD, Duke of. There have been two distinct dukedoms of B. That to be noticed here existed in the person of John Plantagenet, Regent of France, and third son of Henry IV. of England, who was born about 1389. During his father's lifetime, he was governor of Berwick-upon-Tweed, and warden of the Scottish marches. In 1414, the second year of his brother's reign, he was created Duke of B.; and he was made commander-in-chief of the forces in England while Henry V. was carrying on the war in France. After the death of Henry V. (1422), B., in accordance with the dying wish of the king, left the affairs of England in the hands of his brother Gloucester, and went to France to look after the interests of the infant prince, his nephew. The regency of France, in compliance with a request of his deceased brother, he offered to the Duke of Burgundy, who refused it; he then assumed it himself, but not without consulting Burgundy as to the best method of carrying out the treaty of Troyes,

by which Charles VI. declared Henry V. next heir to the French crown. On the death of Charles VI., a few months after Henry V., B. had his nephew proclaimed king of France and England, as Henry VI. In the wars with the dauphin which followed, B. displayed great generalship, and defeated the French in several battles—most disastrously at Verneuil, in 1424. But, in consequence of the rather parsimonious way in which men and money were doled out to him from England, and the withdrawal of the forces of the Duke of Burgundy, he was unable to take full advantage of his victories. The appearance of Joan of Arc, notwithstanding the utmost energy of B., was followed by disaster to the English arms; and in 1435, B. was mortified by the treaty of peace negotiated at Rouen between Charles VII. and the Duke of Burgundy, which effectually ruined English interests in France. The death of the regent, which took place September 19, 1435, fourteen days before the ratification of the treaty, was mainly, if not altogether, occasioned by his anxiety and vexation on account of the union thus formed. B., who was a patron of letters, purchased and removed to London the Royal Library of Paris, consisting of 900 volumes. For the present family of B., see RUSSELL, HOUSE OF.

BE'DFORD LEVEL, an extensive tract of flat land on the east coast of England, embracing nearly all the marshy district called the Fens. It extends inland around the Wash into the six counties of Northampton, Huntingdon, Cambridge, Lincoln, Norfolk, and Suffolk, and has an area of about 450,000 acres. Its inland boundary forms a horse-shoe of high lands, and reaches the towns of Brandon, Milton—3 miles north-north-east of Cambridge—Earith, Peterborough, and Bollingbroke. It is divided into three parts—the north level, between the rivers Welland and Nene; the middle, between the Nene and the Old Bedford River; and the south, extending to Stoke, Feltwell, and Mildenhall. It is intersected by many artificial channels, as well as by the lower parts of the Rivers Nene, Cam, Ouse (Great and Little), Welland, Glen, Lark, and Stoke. It receives the waters of the whole or parts of nine counties. This district seems to have been a great forest at the time of the Romans, who cut the forest down; formed great embankments, to exclude the tide; and rendered the tract for a time a fertile inhabited region. The Emperor Severus, in the 3d c., made roads through it, one of which is now covered with two to five feet of water. In the 13th c., violent incursions of the sea stopped the outflow of the rivers, and it became a morass. The practicability of draining this extensive region seems to have been thought of as early as 1436, and many partial attempts were made after this. The first effectual effort was in 1634, when Francis, Earl of Bedford, after whom the district was thenceforth called, obtained, along with 13 others, a charter to drain the level, on condition of receiving 95,000 acres of the reclaimed land. The work was partially accomplished in 3 years, at the expense of £100,000; but was pronounced by the government to be inadequate. Charles I. tried to get the work, with a greatly increased premium, into his own hands; but the civil war stopped further progress. In 1649, parliament confirmed William, Earl of Bedford, in the rights granted to his father; and after a fresh outlay of £300,000, the contract was fulfilled. In 1688, a corporation was formed for the management of the level. The middle level has always been the most difficult to manage. St. Germain's sluice, at the confluence of the great drain in this district with the Ouse, was considered perfectly secure. But in May 1862, this sluice gave way under the pressure of a strong tide, and the western bank of the middle level drain burst, speedily flooding about 6000 acres of fertile land. This led to the construction of a permanent coffer-dam of pile work, to shut off the tidal waters; and for the drainage of the middle level, Slater's Lode sluice, the old outlet to the Ouse, was taken advantage of; and siphon pipes were laid over the coffer-dam, the flood-waters led off by them and by drains; the siphons acting a a permanent sluice.

BE'DFORDSHIRE, a midland county of England, bounded N.E. by Huntingdon; E. by Cambridge; S.E. and S. by Hertford; S.W. and W. by Buckingham; and N.W. by Northampton. It stands 37th of the 40 English counties in size, and 37th also in population. Extreme length, 31 miles; breadth, 25. Area, 463 square miles, five-sixths being arable, meadow, and pasture lands. The general surface is level, with gentle undulations. In the south, a range of chalk-hills, branching from the Chilterns, crosses B. in a north-east direction from Dunstable, and another parallel range runs from Ampthill to near the junction of the Ivel with the Ouse. Between the latter ridge and the north-west part of the county, where the land is also somewhat hilly, lies the corn vale of Bedford. No hill in B. much exceeds 900 feet in height. The chief rivers are the Ouse (running through the center of the county, 17 miles in a direct line, but 45 by its windings), navigable to Bedford; and its tributary, the Ivel, navigable to Shefford. By these rivers, B. communicates with the counties of Cambridge, Huntingdon, and Norfolk. The south and south-east parts of the county consist of chalk, and the north and north-west of oolitic strata. Freestone is quarried, as well as chalk or clunch, to be burnt for lime. The soil varies greatly. In the south of the county, it is chalk, thinly covered with earth, and fit only for sheep-walks; but three-fourths of the county is clay, which is very stiff between the Ivel and Ouse. A rich gravelly loam exists along the rivers. In the vale of Bedford, the soil is chiefly rich clay and deep loam; and to the north, the clay is stiff, poor, and wet. There are extensive market-gardens, especially on the rich deep loams. B. is the most exclusively agricultural county in England. The total acreage of B. is 295,509 acres, of which, in 1881, 259,171 were in crop, fallow, and grass (wheat, 46,379 acres; barley, 31,053; green crops, 31,868 acres); while the county possessed above 32,000 cattle and 140,000 sheep. Pop. of the county (1871) 146,257; (1881) 149,461. The principal proprietors are the Duke of Bedford, the Marquises of Tavistock and Bute, Earl de Grey, Lords Holland, Carteret, and St. John. Lace-making and straw-plaiting—for which Dunstable is celebrated—are the only branches of industry practised to any extent, and they are carried on almost entirely by women. B. is divided into 9 hundreds, and contains 10 market-towns, 124 parishes, and 6 poor-law unions. Two members of parliament are returned for the county of B., and two for the town of Bedford. Many British and Roman antiquities exist in B., as well as the ruins of several monasteries, and some fine relics of Anglo-Saxon, Early English, and Norman architecture among the parish churches. Three Roman ways crossed the county, and several earthwork camps remain.

BE'DLAM, a popular corruption of Bethlehem, the name of a hospital for lunatics, in St. George's Fields, London. It was originally founded in Bishopsgate Street Without, in 1246, by Simon Fitz-Mary, one of the sheriffs of London, as 'a priory of canons with brethren and sisters.' When the religious houses were suppressed by Henry VIII., the one in Bishopsgate Street fell into the possession of the corporation of London, who converted it into an asylum for 50 or 60 insane persons. In the year 1675, the hospital was taken down, and a new one, affording accommodation for about 150 patients, was erected in Moorfields, at a cost of about £17,000. In 1814, the hospital was again pulled down, and the patients transferred to a new hospital in St. George's Fields, erected for 198 patients; but in 1838 extended so as to accommodate 166 more. The building, with its grounds, now covers an area of 14 acres, and is lacking in nothing likely to insure the comfort or promote the recovery of patients. In former times, the management of B. was deplorable. The patients were exhibited to the public, like wild beasts in cages, at so much per head, and were treated and made sport of by visitors, as if they had been animals in a menagerie. The funds of the hospital not being sufficient to meet the expenditure, partially convalescent patients, with badges affixed to their arms, and known as Tom-o'Bedlams, or 'Bedlam Beggars,' were turned out to wander and beg in the streets. Edgar, in Shakspeare's *Lear*, assumes the character of one of these. This practice, however, appears to have been stopped before 1675; an advertisement in the *London Gazette* of that date, from the governors of B., cautions the public against giving alms to vagrants representing themselves as from the hospital, no permission to beg being at that time given to patients. Now, the moral and physical management of the patients is so excellent, that annually more than one half of their number are returned as cured.

BE'DLINGTON TE'RRIER, a dog so called from a village and parish of that name in Northumberland, one of the districts in which the race has been extensively bred. The chief points of

Bedlington Terrier.

a model B. T. are the following: Muzzle, rather long and fine, but powerful; head, high and rather narrow, the hair on the top being more silky and of a lighter color than on the rest of the body; eyes, small, round and rather sunk; ears, filbert-shaped, hanging close to the head, slightly feathered at the tips; neck, long, slender, but muscular; body, well proportioned, slender and deep chested; toes, well arched; legs, straight and rather long; tail tapering to a point, with no feather; coat, somewhat fine but

not silky, short and rather thin; color, liver or sandy, with dark flesh-colored nose, or blue-black, with black nose; height, 13 to 15 inches. The B. T. is greatly valued on account of its unsurpassed courage, its speed, and its sagacity. It is determinedly hostile to all kinds of vermin, and will face even the otter, fox, or badger without flinching. It is also a capital water-dog. The north of England is the district *par excellence* of the true B. T., the dogs reared by breeders at or in the neighborhood of Newcastle usually receiving the awards of merit at dog-shows. The origin of the B. T. is not very certainly known, but it seems proved that the breed existed in Rothbury (also in Northumberland, to the north of Bedlington) before it was known in the district whence it takes its name.

BEDMAR, Alfonso de Cueva, Marquis de, was born in 1572. He has won an enduring notoriety on account of his daring and unscrupulous plot for the destruction of Venice, to which city he had been appointed ambassador from the court of Spain in 1607. It was a difficult office to fill, for Venice and Spain cherished most unfriendly feelings towards each other. B. probably conceived that he was acting a patriotic and justifiable part, in taking advantage of his position to play the spy and conspirator; but whether or not, his scheme was contrived with admirable ingenuity. He first leagued himself secretly with the Duke of Ossuna, viceroy of Naples, and Don Pedro of Toledo, governor of Milan, whom he made his confidants and coadjutors. He then purchased the services of a large number of foreign mercenaries, and scattered them through the city, to prevent suspicion. Ossuna furnished him with a band of semi-pirates, who were to enter the Venetian fleet, corrupt the sailors, and hinder operations in any way they could. The conspirators were to set fire to the arsenal of the republic, and seize all the important posts. At this precise moment, the Milanese troops were to appear at the extremity of the mainland, and those sailors who had been seduced from their allegiance were to convey them rapidly over to Venice. A Spanish fleet was to creep up the Adriatic, in order to assist if necessary. The city was then to be plundered and destroyed. The day chosen was that on which the doge wedded the Adriatic, when all Venice was intent on beholding the august ceremony. Fortunately, the night before the crime was to have been perpetrated, one of the conspirators betrayed the whole. Several persons were executed; but curiously enough, B., the arch-delinquent, was only dismissed. This has excited the scepticism of many writers as to the truth of the accusation; but the evidence in favor of the historic reality of the plot is generally held to be incontestable. The event forms the subject of Otway's popular and pathetic play, *Venice Preserved*. B. now went to Flanders, where he became president of the council, and, in 1622, was made a cardinal by the pope. He then went to Rome, and finally returned to Spain as Bishop of Oviedo, where he died in 1655. He is said to have been the author of a pamphlet published in 1612, directed against the liberties of Venice. It is entitled *Squittino della Liberta Veneta*.

BEDNO'RE, or NUGGUR, a decayed city of Mysore, India, situated in the midst of a basin in a rugged tableland of the Western Ghauts, at an elevation of more than 4000 feet above the sea, in N. lat. 13° 50', E. long. 75° 6', 150 miles north-west from Seringapatam. It was at one time the seat of government of a rajah, and its pop. exceeded 100,000. In 1763, it was taken by Hyder Ali, who pillaged it of property to the estimated value of £12,000,000, and subsequently made it the seat of his own government, calling it Hyder-nuggur (Hyder's Town), of which the name Nuggur is an abridgment. It was taken by the British under General Matthews in 1783, but soon retaken by Tippoo, at the head of a vastly superior force, when General Matthews and all the principal British officers were put to death. The neighboring country is mostly covered with dense and luxuriant forests.

BEDOS DE CELLES, Don Jean François, a Benedictine monk of the congregation of St. Maur, and the most learned and practical master of the art of organ-building in the 18th c., whose work on the art is to the present day of the greatest importance. He was born about 1714 at Chaux, and entered his order in 1726 at Toulouse, where he built several large and superior church-organs. He was elected a member of the Academy of Sciences in 1758; in 1770, he completed for the Academy his great work, *L'Art du Facteur d'Orgues*, in 4 vols., large folio, with 137 copperplates, beautifully executed. This work has never been translated into English, but the greater part of it has been translated into German. B. de C died in 1797.

BED-SORES are often a very troublesome complication of disease, to which a patient is liable when for a long time confined to bed, and is either unable or not allowed to change his position. Thus they are liable to occur in cases of continued fever, or any other prolonged debilitating disorder, in paralysis from injury of the spinal cord, and in cases of fracture of the thigh. The skin, at certain projecting bony parts, chiefly about the region of the buttocks, or on the heel, is apt to inflame, ulcerate, and slough, especially if the patient is not kept perfectly clean—as, for example, when the evacuations and urine escape involuntarily. The patient sometimes complains of a sense of discomfort at the parts, as if he were lying on dry crumbs of bread; at other times, he seems to feel nothing. Hence, in all cases of prolonged supine position, the parts naturally pressed upon by the weight of the body should be carefully examined every day or two, as prevention is far easier than cure. When a long confinement to bed is expected, attempts should be made to thicken the cuticle, and enable it to bear pressure better, by rubbing the skin with a stimulant such as spirits of eau-de-Cologne. If the part, when first seen, looks red and rough, further damage is often prevented by covering it with a piece of calico, on which soap-plaster has been spread; the local pressure may be removed by air-cushions specially constructed for cases of this kind, and in many instances, Arnott's Water-bed (q. v.) affords great comfort. If the case is one in which it is admissible, the patient should be made to alter his position frequently. When there are excoriations, and a threatening of sloughing, a poultice composed of equal parts of bread-crumbs and of finely-grated mutton suet, mixed over the fire in a saucepan, with a little boiling water, is often a comforting and useful application. After sloughing has fairly begun, stimulating applications, such as resin ointment, must be applied. It is worthy of notice, that bed-sores come on earlier in cases of fractured spine than in any other: they generally appear by the fourth day, and have been seen two days after the accident. They commonly form one of the most powerful agents in destroying life in cases of this accident, diseases of the urinary organs being the other.

BE'DSTRAW (*Galium*), a genus of plants belonging to the natural order *Rubiaceæ* (q. v.), and distinguished by a small wheel-shaped calyx, and a dry two-lobed fruit, each lobe containing a single seed. The leaves, as in the rest of the order, are whorled, and the flowers minute; but in many of the species the panicles are so large and many-flowered that they are amongst the ornaments of the banks and other situations in which they grow. The species are very numerous, natives chiefly of the colder parts of the northern hemisphere, or of mountainous regions within or near the tropics. About 16 species are found in Britain, some of them very common weeds. Amongst these is the Yellow B. (*G. verum*)—sometimes called Cheese Rennet, because it has the property of curdling milk, and is used for that purpose—a small plant with linear deflexed leaves and dense panicles of bright yellow flowers, very abundant on dry banks. The flowering tops, boiled in alum, afford a dye of a bright yellow color, much used in Iceland; and the Highlanders of Scotland have long been accustomed to employ the roots, and especially the bark of them, for dyeing yarn red. They are said to yield a red color fully equal to that of madder, and the cultivation of the plant has been attempted in England. The roots of other species of the same genus possess similar properties, as those of *G. tinctorium*, a species abundant in low marshy grounds in Canada; and those of *G. septentrionale*, another North American species, used by some of the Indian tribes. Like madder, they possess the property of imparting a red color to the bones and milk of animals which feed upon them. Medicinal virtues have been ascribed to some of the species, as *G. rigidum* and *G. Mollugo*, which have been extolled as useful in epilepsy.—The roasted seeds of some, as *G. Aparine*, the troublesome *Goosegrass*, or *Cleavers*, of our hedges—remarkable for the hooked prickles of its stem, leaves, and fruit—have been recommended as a substitute for coffee; but it does not appear that they contain any principle analogous to caffeine. This plant is a native of the northern parts equally of Europe, Asia, and America. Its expressed juice is in some countries a popular remedy for cutaneous disorders.—The roots of *G. tuberosum* are farinaceous, and it is cultivated in China for food.—The name B. is supposed to be derived from the ancient employment of some of the species, the herbage of which is soft and fine, for strewing beds.

Yellow Bedstraw (*Galium verum*).
a, top of stem, showing leaves and flowers: *b*, *c*, two views of a flower.

BE'DUINS (Ar. *Bedawi*, plur. *Beduân*, 'dwellers in the desert') are Arabs who lead a nomadic life, and are generally regarded, according to tradition, as the descendants of Ishmael, and the aborigines of Arabia. The most ancient notices found in Scripture agree, in their descriptions of the manners and customs of

the B., with the facts of the present time. As nomads, the Beduin Arabs have no united history, but only a collection of genealogies. They have but seldom appeared as a united people, taking a prominent part in the world's politics, and have never been entirely held in subjection by any foreign power. The desert of Arabia, especially the plateau of Nedjid, is their central place of abode; but, even in ancient times, they had spread themselves over the deserts of Egypt and Syria; and in later times, after the decay of ancient civilization, they entered Syria, Mesopotamia, and Chaldæa. The conquest of Northern Africa, in the 7th c., opened up to them still vaster tracts, and they soon extended themselves over the Great Desert to the shores of the Atlantic Ocean. At present, they are to be found scattered over an immense breadth of territory —viz., from the western boundary of Persia to the Atlantic, and from the mountains of Kurdistan to the negro countries of Sudan. In the cultivated lands of Mesopotamia, Chaldæa, the Syrian continues, Barbary, Nubia, and the north of Sudan, the Arabs are found interminglied with other nations; but in the deserts they have maintained their distinct character and independence. The characteristics of the B., as herdsmen and robbers in the desert, are intimately connected with the nature of their habitation. Their abstinent, precarious, and often solitary mode of life, makes them disposed to exercise mutual hospitality; but their independence, love of liberty, and other good qualities, are associated with violent passions and an infamous love of plunder, which is utterly reckless of the rights of property. They are generally well-made men, lean, sinewy, and active; but, on account of frequent hardships and privations, are commonly below middle stature. Their senses, especially sight, are keen, and their carriage is free and independent. The nose is commonly aquiline, the face rather lengthened, and the eyes are well shaped and expressive of both daring and cunning. In complexion, they have various shades of brown. With the exception of certain tribes in Syria, all the B. are professedly Mohammedans, but by no means strict in the observance of their religious rites and duties. Their *Marabuts* (q. v.)—a class of asceties—take the place of priests, and exercise considerable influence in all social and public affairs. As the Arabs have no settled government or policy, religious traditions and customs form the only bond of order and union among them.

Though their intellectual powers are naturally good, they are miserably destitute of solid knowledge. Their endless tales and poetical effusions show a wonderful activity of imagination and an oriental love of hyperbole. The relation of the sexes to each other is less constrained than among the settled peoples of the East, and a substitute for polygamy is found in a frequent interchange of wives. Their favorite pastimes are the chase, ball-play, dancing, songs, stories, and the *dolce far niente* (pleasant laziness) of drinking coffee and smoking narghiles. Their diet is principally derived from their herds, but includes a few vegetables, and even locusts and lizards. Honey is also a principal luxury with all classes, and, moreover, one which has a religious sanction, for it was indulged in by Mohammed himself, who makes copious mention of it in the Koran. They manufacture their own woollen clothing, which consists of the *kaikh*—a long, wide garment fastened on the head, and descending to the feet—and the *burnoose*, a large mantle. Only superior men wear breeches and linen or cotton shirts. The hair of the head is shaven, but the beard is a favorite object of cultivation. The political condition of the B. may be styled patriarchal. One or more families, the males of which bear the title of *sheik*, form the core of a tribe, and along with the marabouts, or priests, constitute a kind of aristocracy. Out of their number, the superior *sheik*, or kaid, is elected, who rules in patriarchal style over the whole tribe. This general sketch of the B. applies chiefly to the true nomads, or 'dwellers in the desert,' and is subject to several modifications with regard to tribes located in Barbary, Syria, and Mesopotamia, who practice agriculture, and dwell in houses.

BE'DWIN, Great, a town of Wiltshire, on the Kennet and Avon Canal, and the Great Western Railway, 69 miles west-by-south of London. Pop. (1871) 2068. A fierce, indecisive battle occurred here in 674, between the kings of Mercia and Wessex. St. Mary's Church was built in the beginning of the 14th c., and is constructed of flint, except the piers, arches, and dressings, which are of freestone. Jane Seymour, one of the queens of Henry VIII., and Dr. Willis, an eminent physician of the 17th c., were born here. In the end of last century, the remains of a Roman villa were discovered, including tesseræ, bricks, a tesselated pavement, a huge leaden cistern, and the foundations of baths.

BE'DWORTH, a town in Warwickshire, five miles north of Coventry, and ninety-six miles north-west of London. Ribbons and trimmings are made in the town to some extent, and silk-mills, malt-kilns, lime-kilns, brick-fields, and collieries in the neighborhood furnish employment to a large number of the inhabitants. B. is a station on the Coventry and Nuneaton Railway. The population in 1871 was 3405, a decrease from that of 1861, which amounted to 3968.

BEE, the common name of a large family of insects, of the order *Hymenoptera* (q. v.), belonging to the section of that order called *Aculeata*, in which the females are furnished not with an ovipositor, but (usually) with a sting. Bees were all included by Linnæus in the genus *Apis* (Lat. for B.), but are now divided into many genera; and the name *Anthophila* (Gr. flower-loving) or *Mellifera* (Lat. honey-bearing) is given to the family which they constitute. All bees in a perfect state feed exclusively or chiefly on saccharine juices, particularly the nectar or honey of flowers; and the ordinary food of their young, in the larva state, is the pollen of flowers, or a paste, often called B.-bread, composed of pollen and honey. They evidently perform a very important part in the economy of nature, in the fertilization of flowers, which depends upon the contact of particles of the pollen with the stigma; and, as if to secure this object more perfectly, in their search for honey and pollen, they usually—some have perhaps too hastily said always—pass from flower to flower of the same kind, and not to flowers of different kinds indiscriminately. They abound in almost all parts of the world, but particularly in the warmer parts of it. Not fewer than 250 species are known as natives of Britain.

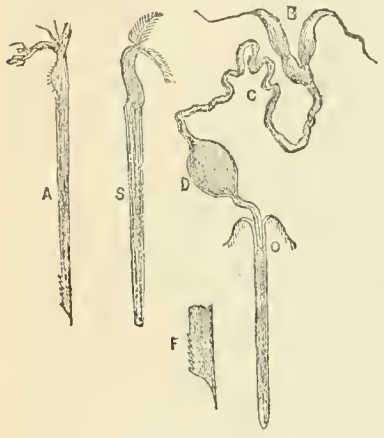
To enable them to reach their liquid food at the bottom of the tubes of flowers, and in the little receptacles in which it is produced, bees have certain parts of the mouth—the *Maxillæ* and *labium* (see Insects), or lower jaws and lower lip, with their feelers (*palpi*)—elongated into a sort of proboscis; and the *ligula* is elongated, sometimes, as in the common Hive B., assuming the form of a filament, is capable of extension and retraction, and is folded up when not in use. This is the organ sometimes called the tongue of bees, although the name cannot be regarded as very appropriate, it being a part of the labium or lower lip. The other elongated parts of the mouth serve as a sort of sheath for this organ, when it is folded up. It is not tubular, and employed in the manner of suction, as was at one time supposed, but is generally more or less hairy, so that the honey adheres to it as it is rolled and moved about, and is conveyed up through the mouth into the honey-bag, sometimes called the first stomach, an appropriate receptacle, in which it apparently undergoes some change—without, however, being subjected to any process analogous to digestion, and is ready to be given forth again by the mouth, according to the habits of those species of bees which are social, as food for the members of the community that remain at home in the nest, or to be stored up in cells for future provision. See Honey. But the mouth of bees is also adapted for cutting and tearing, and to this purpose their mandibles or upper jaws are especially appropriated. Of these, some of them, as the common Humble B. (q. v.), make use to open their way into the tubes of flowers which are so deep and narrow that they cannot otherwise reach the nectar at the bottom. Others make use of their mandibles to cut out portions of leaves, or of the petals of flowers, to form or line their nests; the common Hive B. uses them in working with wax, in feeding larvæ with pollen, in cleaning out cells, in tearing to pieces old combs, in combats, and in all the great variety of purposes for which organs of prehension are required.

But it is not by means of any of the organs connected with the mouth that bees collect and carry to their nests the supplies of pollen needful for their young. The feathered hairs with which their bodies are partially clothed, and particularly those with which their legs are furnished, serve for the purpose of collecting the pollen, which adheres to them, and it is brushed into a hollow on the outer surface of the first joint of the tarsus of each of the hinder pair of legs, this joint being therefore very large, compressed, and of a square or triangular form—a conformation to which nothing similar is found in any other family of insects. It is also worthy of observation, that in the social species of bees, the males and the queens, which are never to be employed in collecting pollen, do not exhibit this conformation adapted to it, but only the sexually imperfect females, commonly called neuters or workers.

Bees, like other hymenopterous insects, are extremely well provided with organs of sight, and evidently possess that sense in very great perfection. In the front of the head, they have two large eyes, the surface of each consisting of many hexagonal plates, which perhaps may not unaptly be likened to the object-glasses of so many telescopes; and the faculty which these insects certainly possess, of returning in a direct line to their hive or nest, from the utmost distance of their wanderings, has been with greatest probability ascribed to their power of sight. But besides these large eyes, they have, like the rest of the hymenopterous order, three small eyes on the very top of the head, which are supposed to be intended to give a defensive vision upwards from the cups of flowers.—They are evidently, however, possessed of organs which enable them to guide their movements in the dark as accurately as in the full light of day, at least within the nest or hive; and this power is generally ascribed to the *antennæ* (q. v.), which are sometimes supposed to be not merely delicate organs of touch, but also organs of hearing, or of some special sense un-

known to us. It is certain that the social bees have some means of communicating with each other by means of their antennæ; and that they avail themselves of these organs both for their ordinary operations, for recognition of each other, and for what may be called the conduct of the affairs of the hive. There can be no doubt that bees possess in a very high degree the sense of smell; and their possession of the senses of taste and hearing is almost equally unquestionable, whatever difficulty there may be in determining the particular organs of the latter sense.—The wings of bees, like those of other hymenopterous insects, are four in number, thin and membranaceous; the hinder pair always smaller than the others; and in flight, attached to them by a number of small hooks, so that the four wings move as if they were two.

The sting of bees is a very remarkable organ. It consists of two long darts, with a protecting sheath. A venom bag is connected with it, and powerful muscles for its propulsion. The wound appears to be first made by the sheath, along which the poison passes by a groove; and the darts thrust out afterwards in succession, deepen, the wound. The darts are each furnished with a number of barbs, which render it so difficult to withdraw them quickly, that bees often lose their lives by the injury which they sustain in the effort.—The males are destitute of sting.



Bee Sting, highly magnified.

A, sting of bee; S, sheath of sting; F, end of sting, greatly magnified, showing six bars curved upwards; B, glands for secreting poison; C, ducts through which it flows to D, where it is kept ready to ruse; O, circular dilatation to prevent sting bemgt hrust to far out of sheath.

The great family of bees is divided into two principal sections called *Andrenetæ* and *Apiariæ*, or *Andrenidæ* and *Apidæ;* the latter names, however, being sometimes employed in senses more restricted. In the first of these sections, the *ligula* is comparatively short and broad; in the second, it is lengthened, and has the form of a filament. All the *Andrenetæ* live solitarily, as well as several subdivisions of the *Apiariæ*. These solitary bees do not lay up stores for their own winter subsistence; but they display very wonderful and various instincts in the habitations which they construct and the provision which they make for their young. There are among them males and perfect females only, and no neuters. The work of preparing nests and providing food for the young seems, in all of the species, to be performed exclusively by the females. *Colletes succincta*, a common British species of the *Andrenetæ*, affords an example of a mode of nest-making, which, with various modifications, is common to many species of that section. The parent B. excavates a cylindrical hole in the earth, usually horizontal, to the depth of about two inches, in a dry bank or a wall of stones and earth. The sides of this whole are compacted by means of a sort of gelatinous liquid, secreted by the insect, and it is occupied with cells, formed of a transparent and delicate membrane, the substance of which is the same secretion in a dried state. The cells are thimble-shaped, fitting into each other, a little space being left at the furthest end of each for the reception of an egg and a little paste of pollen and honey. The last cell being completed, and its proper contents deposited in it, the mouth of the whole is carefully stopped up with earth.—Some of the solitary bees, possessing great strength of mandibles, excavate their nests in old wood.

Xylocopa violacea, one of the *Apiariæ*, not uncommon in some parts of Europe, makes a tunnel not less than twelve or fifteen inches long, and half an inch wide, which is divided into ten or twelve cells; an egg with store of pollen and honey is deposited in each compartment, and as the lowest egg is hatched first, a second orifice is provided at that part of the tunnel, through which each of the young ones in succession comes forth to the light of day, each larva, as it is about to change into the pupa state, placing itself with its head downwards in the cell.—Numerous species of solitary bees excavate their tunnel-shaped nests in the soft pith of decayed briers or brambles, of the particles of which they also form their cells.—Some species of *Megachile, Osmia*, &c., line them and divide them into cells with portions of leaves or of the petals of flowers. See LEAF-CUTTER BEE. Some of the solitary bees make their nests, not in the earth, but in cavities of decaying trees, or other such situations, where they construct their cells without the same necessity of excavation; but some of them by a very admirable instinct, surround their nest with down collected from the leaves of plants, an excellent non-conductor of heat, so that a nearly uniform temperature is maintained in situations in which the changes would otherwise be great and rapid. Some bees make their little nest in old oak-galls, and there are species which appropriate empty snail-shells to that use.—Some species of the genus *Megachile* build their nest of a sort of mason-work of grains of sand glued together with their viscid saliva. The nest of *M. muraria*, thus constructed, is so hard as not to be easily penetrated by a knife, and very much resembles a splash of mud upon a wall.

The social bees live in communities, like those of ants, which also, like theirs, consist of males, females, and neuters—these last being females with ovaries imperfectly developed, and characterized by peculiarities of form and structure, as well as of instinct and employments, remarkably different from those of the perfect females. The social bees are conveniently divided into Humble Bees (q. v.) and Honey Bees, of the latter of which the common Hive B. (see the next section of this article) may be regarded as the type. Before proceeding to a more particular account of the Hive B., it may be proper to remark that the species of Honey B. (the restricted genus *Apis*) are not few, and that they are natives of the warm parts of the Old World; the Hive bees (*Apis mellifica*) which now abound in some parts of America, and which have become naturalized in the forests to a considerable distance beyond the abodes of civilized men, being the progeny of those which were conveyed from Europe. The Hive B. is said not to have been found to the west of the Mississippi before 1797, but in fourteen years it had advanced 600 miles further in that direction.

The different species of Honey B. in a wild state generally make their nests in hollow trees, or among the branches of trees, sometimes under ledges or in clefts of rocks; and their stores of honey are not only sought after by man, but afford food to numerous animals, some of which equally delight to prey upon their larvæ. The B. was amongst the ancient Egyptians the hieroglyphical emblem of royalty. The B. domesticated or cultivated in Egypt, is not, however, our common Hive B., but another species called *Apis fasciata;* and in Italy and Greece a species called *A. Ligustica* is employed, which has recently been introduced into England, and is now domesticated at the B.-house of the Apiarian Society, Muswell Hill, near London. These species differ little from the common Hive B., and their honey is very similar; but that of some species is considerably different. *A. unicolor*, of Madagascar and the Isle of France, yields an esteemed honey of a green color. It is domesticated, or is the object of human care and attention there, as are also *A. Indica* in some parts of India, and *A. Adansonii* in Senegal. We regret that our limits do not permit us to give a particular account of any of these species.—The genus *Melipona* is nearly allied to *Apis*. The species are natives of South America, and their honey is extremely sweet and agreeable, but very liquid, and apt to ferment. They make their nests in the cavities or on the tops of trees.

The Hive Bee.—Natural History.—The instincts and social economy of the HIVE B. (*Apis mellifica*) have been studied with great attention both in ancient and modern times, and discoveries—than which, perhaps, nature presents nothing more interesting and wonderful—have rewarded the patient observations of Huber and others who have devoted themselves to this subject. *Apiarian societies* have been formed for the purpose of prosecuting this single branch of natural history, and of promoting successful apiculture, or the economical keeping of bees.

The Hive B. is probably not a native of Britain, and may even have been brought to Europe from the East. Its communities seem ordinarily to number from 10,000 to 60,000 individuals, and there appears no reason to think that the care bestowed upon the insect by man, or the *hives* which he has provided for it, have made any important difference in this respect. One member of each community is a perfect female—the queen or mother B.; from 600 to 2000 at certain seasons are males; and the remainder are *neuters* or workers, the real nature of which has been explained in the previous part of this article.

The workers have a body about half an inch in length, and about one-sixth of an inch in greatest breadth, at the upper part of the abdomen. The antennæ are twelve-jointed, and terminate in a knob. The abdomen consists of six joints or rings, and under the scaly coverings of the four middle ones are situated the *wax-pockets* or organs for the secretion of wax. The extremity of the abdomen is provided with a sting, which is straight. The basal joint of the hind tarsi is dilated to form a pollen-basket, and the legs are well provided with hairs for collecting the pollen and brushing it into this receptacle.—The males or *drones*, so called from the peculiar noise which they make in their flight, are much larger than the neuters, and thicker in proportion. The antennæ have an additional joint. The eyes are remarkably large, and meet upon the crown.—The perfect females are considerably longer than either the workers or males; they are also distinguished by the yellow tint of the under part of the body, and very remarkably differ from all the other inmates of the hive in the shortness of their wings, which, instead of reaching to the extremity of the addomen, leave some of its rings uncovered.—Neither males nor queens have wax-pockets, nor have they pollen-baskets. Their

legs also are less hairy. The sting of the queen B. is curved. The mandibles both of the males and perfect females are notched or toothed beneath the tip, which those of the workers are not.—It will be seen from this brief description that the sexes differ so widely as to appear, if the contrary were not well known, insects of different species; but still more remarkable is the difference between the females and the workers when we consider that it is all to be ascribed to the different forms of the cells in which the eggs are hatched and the young bees reared, and to the different kinds of food with which they are supplied. All doubt upon this point is removed by the interesting discovery of Schirach, that when a hive is deprived of its queen, the bees provide themselves with another, if there are eggs or very young larvæ in the cells appropriated to the breeding of workers; proceeding immediately to transform, for this purpose, one of these cells, and sacrificing, without scruple, the eggs or larvæ in the cells adjoining that selected for transformation and enlargement. These are facts well ascertained, but of which science has yet been unable to give any explanation.

Bees:
1, queen; 2, drone; 3, worker.

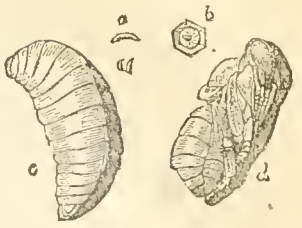
The greater part of the life of the queen or mother B. is spent in laying eggs for the increase of the population of the hive; and this increase goes on at a rapid rate, as the queen not unfrequently lays 300 eggs in a day. The number, however, varies greatly. In cold weather it is very small, but the invariable presence of brood in different stages, in a well-stocked hive, proves that some eggs are laid even in winter. During the later spring months the number is very great; many practical apiarians considering that as many as 1000, or even 2000, are deposited daily. The community, however, is not destined to an indefinite increase; but in certain circumstances, *swarming* takes place, and new colonies are founded.

The impregnation of the queen takes place in the air, and usually within a few days after she herself has emerged from the cell. It is the only occasion of her ever leaving the hive, except that of swarming, and there is no repetition of it during her whole life. The question has therefore been asked, why there are so many males in a B. community; but no satisfactory answer has been given to it. The males are not known to fulfil any other purpose than that of the propagation of their species; and after the swarming season is over, the greater part of them are ruthlessly massacred by the workers, as if in dread of their consuming too much of the common store. The greater part of the workers themselves are supposed scarcely to live for a year; the duration of the life of queen bees is often more than three years.

The queen B., when about to begin to lay eggs, is the object of great attention on the part of the workers, and so continues. She moves about in the hive, attended by a sort of retinue of about ten or fifteen workers, by some of which she is frequently supplied with honey. But the name of queen B. appears to have originated in a mistaken notion that something analogous to a monarchy subsists in the B.-hive; and imagination being permitted very free scope, many things have been invested with a false coloring derived from this analogy. The queen or mother B. appears to be the object of particular regard, as indispensable to the objects for which the B. community subsists, and to which the instincts of all its members are variously directed. She moves about, depositing her eggs in the cells which the workers have prepared, and they are ready to take charge of each egg from the moment that it is deposited. Her employment requires that she should be fed with food collected by others, and many of the workers are in like manner supplied with food whilst busy within the hive, as well as the larvæ in the cells; but there is no evidence whatever of anything like authority exercised by the queen, or, indeed, of any superiority of one over another in the whole multitude.

The queen B. at first lays eggs which give birth to workers, and afterwards there takes place a laying of eggs which become drones. With unerring instinct, she places each egg in the kind of cell appropriate to it; whilst also, at the proper time, cells of the proper kind are prepared beforehand by the workers, the drones' cells being larger than the workers' cells. The cells in which future queens are to be reared are very unlike all the others, but the eggs differ in no respect from those deposited in workers' cells. It is a curious circumstance, that queens, of which the fecundation has been prevented till they are considerably older than usual, lay only drone eggs. It occasionally also happens that some of the worker bees lay eggs, and these invariably produce drones.

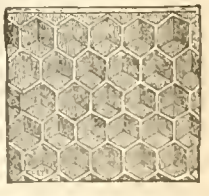
The eggs of bees are of a long shape and bluish-white color, about one-twelfth of an inch in length. They are hatched in about three days. The larvæ are little worm-like creatures, having no feet, and lying coiled up like a ring: they are diligently fed by the working bees, until, in about five days, when large enough nearly to fill the cell, they refuse food, upon which the attendant bees seal up the cell with wax, and the larva, spinning itself a fine silken envelope or cocoon, is transformed into a pupa; and about the eighteenth day—or, in the case of drones, the twenty-fourth day—from the deposition of the egg, the young B., in its perfect state, breaks the covering, and issues from the cell. It is caressed and supplied with food by the attendant bees, and is believed not to try its wings until the following day. The cell from which a young B. has issued is speedily cleaned out, and prepared for the reception of another egg or of honey. The fine silken envelope of the pupa, however, remains attached to the cell, of which the capacity thus becomes gradually smaller, until the cells of old combs are too small to receive eggs, and can be used for honey alone, a fact of which the importance in relation to the economical management of bees is obvious.—The spinneret, by means of which the larva spins the cocoon, is a small organ connected with the mouth.—The food with which the larvæ are supplied is a mixture of pollen, honey, and water, with the addition, possibly, of some secretion from the stomachs of the working bees, in which it is prepared. It varies a little, according to the age and kind of the larva, and the peculiarities of that given to young queens appear to be indispensable to their fitness for their future functions. Pollen is constantly found stored up in the cells of the hive, as is often called B.-bread. Most people have met with such cells in honey-comb, and have observed the bitter and peculiar taste of the contents.



Egg, Larva, and Pupa of Hive Bee
a, egg, and very young larva; *b*, young larva coiled up at the bottom of the cell; *c*, larva when ready to undergo metamorphosis; *d*, pupa.

The combs of a bee-hive are parallel to each other, forming vertical strata of about an inch in thickness, and distant about half an inch from each other. The cells are therefore nearly horizontal, having a slight and somewhat variable dip towards the center of each comb. The central comb is generally first begun, and next after it those next to it on each side. Circumstances frequently cause some departure from this uniform and symmetrical plan, which, however, still remains obvious. Each comb consists of two sets of cells, one on each side; and it may be mentioned as an illustration of the wonderful industry of bees, and the results of their combined labors, that a piece of comb, 14 inches long by 7 inches wide, and containing about 4000 cells, has been frequently constructed in 24 hours. The greater part of the comb usually consists of the kind of cells fitted for breeding workers, a smaller part of it of the larger or drone cells. After the principal breeding-season is over, the cells of some parts of the comb are often elongated for the reception of honey; and somtimes comb of great thickness, or with unusually long cells, is constructed for that purpose alone, in which case the mouths of the cells are inclined upwards, more than is usual with the ordinary brood cells. When a cell has been completely filled with honey, its mouth is *sealed* or covered with wax.

It is impossible to look at a piece of comb taken from a B.-hive, without admiring, not only its beauty, but the perfect regularity of the size, form, and arrangement of the cells; and the more carefully that it is examined, the more must it be admired. For in it are practically solved, by an instinct which can only be referred to the infinite wisdom of the Creator, some problems difficult to human science, particularly in the combination of the greatest economy of materials and of space, with the most perfect convenience and the greatest strength. It appears even at a glance, that the cells are hexagonal or six-sided, the hexagons perfectly regular, and in this way there are no interstices between the cells. Now, the mathematician knows that there are only three regular figures, that is, figures of which all the sides and angles are equal, bounded by straight lines, with which a space can be perfectly filled up in this way—the equilateral triangle, the square, and the hexagon; and of these the hexagon is at once the most suitable for the larva of the B. in its form, and the strongest in its nearest approach to the circle The circular form itself would have left large interstices. But this is not all: the same wisdom which has given the solitary bees, already noticed, their instinct to surround their nest with a cottony substance, which serves as a non-conductor of heat, has directed the hive B. to the constant adoption of a mode of constructing its combs, which adds greatly to the strength they


Pyramidal bottoms of Cells.

would have possessed with the same amount of materials, if the cells had been merely regular hexagonal prisms, and the partition in the middle of the comb, between the cells of the one side of it, and those of the other, therefore a simple plane.

It is so far from being so, that when carefully examined, it appears, if the expression may be used, the most ingenious part of the whole structure. It is composed of a multitude of little rhombs, or four-sided figures, with equal and parallel sides, and two obtuse and two acute angles, the obtuse angles being invariably angles of 109° 28′, and the acute angles of 70° 32′, agreeing precisely with the results of mathematical analysis, applied to the difficult question of the form of the facets of a three-sided pyramid, which should terminate a six-sided prism, so as to combine the greatest economy of materials with the greatest strength. On looking at a piece of empty honey-comb, placed between the eye and the light, we readily perceive that the cells are not opposite to each other, cell to cell; but that the point of meeting of three sides of three cells, on one side, is opposite to the center of a cell on the other side—a circumstance which of itself we cannot but regard as calculated greatly to increase the strength of the whole fabric. It follows also from this, that the terminating pyramids of the cells on the one side do not interfere with the form of the cells on the other side, but the three rhombic facets, which terminate each cell, belong likewise to three distinct cells on the opposite side of the comb.

The only departure from perfect regularity in the form of the cells, is in the transition from the smaller or workers' cells to the larger or drones' cells, which, when it takes place, is managed with great simplicity and beauty of contrivance. Our limits, however, do not permit us to enter further into this subject.

The material of which the cells are built is chiefly wax (q. v., and see BEES-WAX), which is at first of white color, but becomes brownish-yellow with age, and in very old combs, almost black. Although wax exists as a vegetable product, yet bees-wax is now known to be produced by a chemistry which is carried on in the bodies of bees; and it has been found that they produce wax and build combs when supplied only with honey or saccharine substances. The *wax-pockets* in the abdomen of working-bees have been already referred to. The bees which are about to proceed to wax-making, suspend themselves in clusters in the hive, attaching themselves to each other by means of hooks with which their feet are provided; and whilst they remain motionless in this position, the wax appears to be formed, in small scales, which they afterwards take in their mouths and curiously work up with a secretion from the mouth itself, passing the wax, in the form of a minute riband, through the mouth, first in one direction and then in the opposite one, and finally depositing it in its proper place for the foundation of the comb. One B. always begins the comb alone, the rest, in gradually increasing numbers proceed in accordance with what has been already done. The bees which elaborate and deposit the wax, do not, however, construct the cells, which is done by others, partly at least by a process of excavation in the wax deposited. It is supposed by many naturalists, that some of the working-bees are exclusively wax-workers, some nurses, &c.; but others think that there is only one class of working-bees, all ready for any kind of work according to circumstances.

But wax, although the chief, is not the only material of the combs. *Propolis* (q. v.) is also employed in small bands to give greater strength to the cells, the mouths of which are surrounded with it, and made thicker than their walls. This substance, which is obtained by bees from the viscid buds of trees, is also employed for more firmly attaching the combs to the hive, for closing up apertures in the hive, for covering up obnoxious substances, intruding slugs, &c., which are too large to be removed, and for a variety of similar purposes.

It has been already stated that queen-bees are hatched and reared in cells different from the rest. They are, indeed, very different, being vertical and not horizontal in their position—not hexagonal, but rather oval in form—and much larger than the other cells, even in proportion to the size of the animal that is to inhabit them: they are generally placed on the edge of a comb, and when they have served their purpose, are partially removed, so that during winter they resemble acorn-cups in appearance.

Two queens cannot exist in the community together. There is implanted in them the most deadly rivalry; and the mother-B., if permitted, would even tear open every queen cell of which the inmate has nearly approached maturity, and inflict death by her sting. One of those wonderful instincts, however, with which bees are endowed, counteracts this at those times when, upon account of the increased numbers of the community, and in order to the formation of new colonies, it is requisite, that it should be counteracted. The workers throng around the queen, hem her in, and prevent the execution of her purpose. The cell of the young queen is also carefully guarded, and she is not permitted to leave it. At such times peculiar sounds, produced probably by the action of the wings, are emitted both by the actual queen under restraint in her movements, and by the young one in the cell, which may be heard by an ear applied to the outside of the hive, and are familiar to B. cultivators as one of the surest signs of swarming. The queen now becomes restless; her agitation communicates itself to those around her, and extends through the hive; the ordinary work of the community is in great part neglected; fewer bees than usual are seen to leave or return to the hive; and at last the queen-B. rushes forth, preceded and followed by crowds which press and throng upon each other, form a buzzing cloud in the air, and very generally settle upon a bush in the neighborhood, where they soon congregate closely together, hanging by their claws in a dense cluster. Sometimes they rise up in the air, and fly off at once to a considerable distance, apparently to some previously selected place in the thick top of a tree—in the chimney or roof of a house, where they happen to find an aperture—or in some such situation. More frequently, they settle not far from the hive which they have left, often on some very humble plant, or even on the grass, and soon rise again.

It is the care of the cultivator to prevent this by providing them immediately with a suitable habitation in a new hive, invitingly placed above them, or into which he puts the swarm after they have congregated closely together as above described. It sometimes happens that bees hurry out of their hive without their queen, in which case they do not in general congregate so closely together where they settle, and soon return to the hive again. Swarming generally takes place in a fine day; and when the bees seem on the very point of *coming off*, a cloud passing over the sun is enough to retard it. Bad weather occasionally not only retards but prevents it, the young queen being at last killed in their cells.—When the first swarm of the season has left the hive with the old queen, as is usually, if not always the case, the imprisoned young queen is set at liberty; and if the B. community is a large and prosperous one, other young queens also come forth from their cells, and leave the hive with successive swarms, the number of which depends upon the climate, the season, &c. In Britain, it is not uncommon for a B.-hive to send off three swarms in a summer, the first being almost always the largest, and not unfrequently itself sending off a swarm before the season is over.

Bees left without a queen, and with no means of supplying the want, appear to feel themselves cut off from the very purpose of their existence; the labors of the community are relinquished, and its members are dispersed and die. It has already, however, been stated, that bees left without a queen can provide themselves with one, by transforming and enlarging a worker's cell which contains an egg or very young larva. This process is sometimes carried on as if by several distinct parties, in different parts of the hive at once; and as if aware that time will be gained, the bees generally prefer cells containing larvæ of two or three days old to those containing eggs.

Bees become partially torpid during cold weather, consuming much less food than they would otherwise require. They are readily aroused from this state, however, as may at any time be proved by tapping on a B.-hive, when it will be found that the temperature of the interior of the hive rises rapidly. Respiration is considerably lessened in the state of partial torpidity, and the temperature rises when it is resumed. The respiration of bees takes place by air-tubes or *trachcæ* (see INSECTS), and is very active when the insect is in a state of activity. The respiratory movements are easily seen in looking at a bee. The consumption of oxygen by this process might be expected soon to reduce the atmosphere within a hive to a state in which it could no longer support animal life; but in summer, when respiration is active and the hive populous, a constant circulation of air is maintained by the insects themselves, some of which are employed in a rapid vibration of their wings for this purpose. A greater or smaller number of them, according to circumstances, may frequently be seen thus engaged in fanning the air at the mouth of a bee-hive.

It may well be deemed an extraordinary fact, that among the enemies of bees are to be reckoned certain species of moth, which, notwithstanding the danger of the stings of the bees, enter the hives and deposit their eggs. After the eggs are hatched, the larvæ feed upon the combs. Mice sometimes eat their way into the hives in winter, and destroy and plunder unmolested.

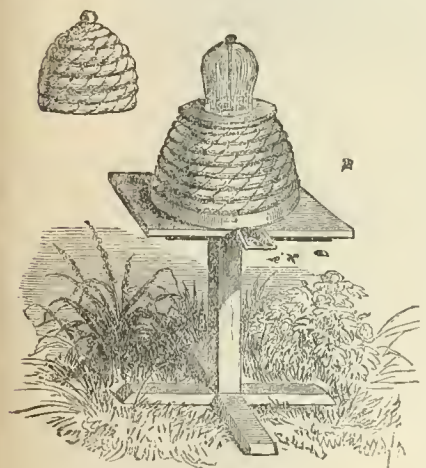
Bees are sometimes very destructive to each other in their combats, as when one B. community is assailed by others for the purpose of plunder. To this the weaker communities are liable, particularly when flowers are few, and bees are awakened to full activity in the warm days of early spring. The narrower that the entrances of the bee-hives are at this season, at least of the less populous hives, the less likely is the B. owner to suffer loss from this cause, as the narrow entrance is more easily defended even against very numerous invaders.

Management of Bees.—We do not think it necessary to enter largely into the subject of *Apiculture*—the cultivation or management of bees.

It is, of course necessary that the *apiary* or stock of B.-hives should be situated in a neighborhood where flowers sufficiently abound for the supply of honey. It is, however, by no means

certain to what distance bees roam. Some authors mention one mile as the probable distance; but the opinion has apparently been hazarded on mere conjecture, and there seems to be good reasons for supposing that a much greater distance might more correctly be named. But whatever distance bees may be capable of traveling in quest of honey, it is undoubtedly of great importance that they should have good feeding-ground in the immediate neighborhood of the apiary; and in many parts of the world, the practice prevails of removing them from place to place, according to the season, in order that advantage may be taken of the greatest abundance of flowers. Thus in the south of Scotland, B.-hives are very frequently removed to heath-covered tracts in the beginning of August, and remain there till the heath is out of flower; and this affords in many parts of the country the most plentiful honey-harvest, although in other parts, especially where the white clover abounds, the greatest quantity of honey is obtained earlier in summer. The difference between *Heather Honey* and *Flower Honey* is well known in Edinburgh. No small number of B.-hives from that city and its immediate vicinity are annually conveyed for a few weeks to the Pentland Hills. The conveyance of bees 'to the heather' is generally accomplished either by a handbarrow or a spring-cart of easy motion, so that the combs may not be displaced by shaking; and the mouth of the hive is carefully closed with a plate of perforated zinc, or other contrivance for keeping in the bees and permitting circulation of air. Fifty or one hundred B.-hives may often be seen collected in one placé, and under the care of one person, during the heather-season.—In Egypt, far greater numbers of hives (of *Apis fasciata*) are often kept in a single vessel on the Nile, and are conveyed from place to place on the river, according to the succession of flowers in the different districts. A somewhat similar practice prevails on the Rhone; and the transporting of bees (*Apis Ligustica*) from pasture to pasture has been usual in Greece, in Asia Minor, and in Persia, from remote antiquity.

As to the form of B.-hives, and the material of which they should be made, there are great differences both of opinion and practice. Glass hives, and hives with glass-windows, which can be covered at pleasure with wooden slides, are employed by those who wish to observe the movements and habits of bees; but for profitable purposes, wood and straw are in Britain the only materials in common use. A simple and useful form of a capped hive is shown in the accompaning illustration. For the material of a hive, wood has the advantage over straw in its greater neatness and durability; but there is a disadvantage in the greater likelihood that, unless shaded from the sun, portions of the comb may be so much melted as to fall in hot weather. In some parts of Europe, cylindrical cork hives are much used, made by removing the wood of a portion of the cork-tree, and leaving the bark uninjured; and hives of earthenware are common in Greece and Turkey. The form of hives is of little consequence; but it is important that the owner should have facilities for giving increased room both above and below the stock hive: increased room above is required for the reception of pure honey-comb unmixed with brood, and the capability of adding to the hive below, by raising it up an additional story, is often requisite to prevent swarming, which is incompatible with the collection of a large store of surplus honey.



Simple form of Bee-hive,
With cap removed to show glass top.

Bees require attention at the time of swarming, that they may not fly away and be lost. They require also to be fed during winter, when, on account of a bad season, the lateness of the swarm, or other cause, they have not enough of honey to support them. A common rule is, that the weight of the contents of the hive must be at least twenty pounds, that the bees may survive the winter without being fed, and even in this case a supply of food for a short time in spring promotes the activity of the bees, and their summer prosperity. The food ordinarily supplied to bees is either the coaser kind of honey or sugar and water. Strong ale and sugar boiled are also frequently given as food. The practice has very largely prevailed in Britain and elsewhere, of killing bees by fumes of sulphur, in order to take from them their honey in the end of autumn, a portion only of the increase of the stock being kept through the winter. This practice still has its advocates; but many now take only what they can by top boxes or *supers*, or by cutting out combs, preserving all hives which are not so light that there is no good hope of their surviving the winter. It may be doubted if, in almost any part of the country, the number of bees kept is so great as nearly to exhaust the floral resources, and in all probability this may yet become a much greater source of wealth than it is in Britain.

When honey is to be taken from bees, the person doing it must be carefully protected from their stings by gloves, veil, &c. It is best done during the heat of a fine day, when the bees more readily leave the combs of the *super* that is taken away, and return to their hive. A little gentle tapping generally causes them to leave the combs, and a feather is used for brushing off those which are slow to do so. The smoke of the common Puff-ball (q. v.) causes them to fall down in a stupefaction from which they speedily recover, and its use is very convenient. It is gathered and dried for the purpose. Chloroform is also sometimes used for the same purpose, but the effect is apt to be fatal, unless care is taken to choose the morning of a fine day, so that the stupified bees may have time to recover in the air and sunshine.

Bees are much less apt to sting when swarming than at other times, and in general all the necessary operations are performed without gloves or veil, and with perfect safety. The sting of a B. is to many persons a thing of no great consequence, although, in some, it causes great local inflammation and swelling, and general derangement of health. The application of a little ammonia usually relieves the pain; or an onion cut through the middle; or the common 'blue-bag' of a washerwoman.

The apiary should, if possible, be in a sheltered place, and where it enjoys a good amount of sunshine. The hives are very generally placed at small distances in the open ground, but some B.-keepers protect them by a shed. In the former case, each hive is usually covered with a straw-hood in winter, to keep away the rain, as damp is particularly injurious to bees. For the avoidance of damp, and to prevent the bees from coming in contact with the ground when they hang in a great cluster at the door of the hive—as they often do before swarming, when the weather is hot, and the hive very populous—each hive is raised to a height of at least fifteen or eighteen inches from the ground.

Bees, Law Relating to. B. are stated by Blackstone to be wild by nature (*feræ naturæ*), but when hived and reclaimed, are regarded in the nature of *property* belonging to the person on whose ground or soil they have swarmed; and in support of this doctrine, he refers to the Charter of the Forest, 9 Henry III. c. 13, which allows every freeman to be entitled to the honey found within his own woods. The qualified property which may be thus held in B. continues while the swarm remains on the soil; and in the event of flight, so long as the owner can pursue it. Indeed, it has been decided that bees may be the subject of Larceny (q. v.).

The same appears to be the Scotch law. Mr. Erskine, founding on the Roman law, lays down that when bees have abandoned their hive, not being observed and followed, they are understood to have recovered their original liberty; and if they light on the grounds of another, and are enclosed by him in a new hive, they become his property. See Ownership. On bee-keeping, see Pettigrew's *Handy Book of Bees* (4th ed. 1880); Robinson's *British Bee Farming* (1880). And see Lubbock's *Ants, Bees, and Wasps* (1882).

Bee, Humble. See Humble-Bee.

BEECH (*Fagus*), a genus of trees of the natural order *Cupuliferæ* (q. v.). The male catkins are almost globose, stalked, their flowers consisting of a bell-shaped 5—6-cleft perianth and 8—15 stamens. The female flowers, which grow on the same trees, consist chiefly of a germen with three awl-shaped styles, and are situated two or rarely three together within a stalked involucre, which bears on its outer surface many fleshy threads. This involucre, after the flowering is over, closes and forms a husk resembling a sort of capsule, which when ripe opens in four valves, is externally covered with soft spines, and encloses one or two (rarely three) triangular nuts, which bear the name of *Beechmast*.—The species are not numerous; all of them are forest-trees of great beauty.—The Common B. (*F. sylvatica*) forms whole forests in many parts of Europe. It grows to a height of 100—120 feet, and a diameter of 4 feet; and particularly when standing alone becomes a very ornamental tree with far-spreading branches which often droop gracefully almost to the ground. It has thin, ovate, obscurely toothed leaves, finely ciliated on their margins. Its bark is smooth, often of a whitish color; and it is remarkable for the frequency with which hard wooden knobs—abortive branches—occur in its bark. Grass does not grow readily under the shade of the B., but in B. woods may sometimes be found rare plants almost peculiar to such situations. The B. thrives best in light soils; and does not send its roots deep into the ground, but rather horizontally under the surface. The wood is more or less of a reddish-brown color, as the tree has grown in a dense forest, or has been freely exposed to sun and air. It is very hard and

solid, but brittle; and, when exposed to the open air, very liable to rot and to be eaten by worms. It is therefore not adapted to the purposes of the house-carpenter; but when kept always under water, it is very durable, and is accordingly employed in the erection of mills, and for weirs, sluices, &c. It is also employed

Common Beech.

for many purposes by cabinet-makers and turners. It is very much used in France for making the *sabots* or wooden shoes of the peasantry, being preferred for this purpose to every other wood except walnut, on account of its property of not absorbing water. It is one of the best kinds of firewood in Europe.

Its ashes yield much potash and of excellent quality. The raspings of the wood are used in the preparation of vinegar. See VINEGAR and PYROLIGNEOUS ACID. The bark is sometimes employed for tanning when oak-bark is scarce. The B. bears lopping well, and is often planted for hedges; and it is a curious fact, that when it is prevented from attaining a tree-like size, and is kept closely pruned, the withered leaves remain on the branches all winter, which is not the case in other circumstances. In some countries, as Dauphiny and Switzerland, the leaves of the B. are collected in autumn before they have been much frost-bitten, and are used for making beds or mattresses. — Beechmast, when fresh, has a sweet taste, like that of a walnut. It contains in large quantity a bland fixed oil, along with a starchy farina, a little sugar, and an astringent substance. A volatile, narcotic, poisonous principle, called *Fagine*, is also found in it, but more in the rind than in the kernel; and when not only the smooth leathery outer rind, but also the thin brown inner pellicle have been removed, it is wholesome food. It is, however, more generally used for feeding swine, poultry, &c., and is much employed in France and other parts of Europe for the manufacture of *Beech Oil*, which, when expressed without the application of heat, and well clarified, has an agreeable taste, is fit for use as food, and keeps long without becoming rancid. When less pure, it is used for lamps and in the arts. The oil-cake which remains is good food for poultry, for swine, and even for oxen, but is injurious to horses. Many manufacturers of cocoa adulterate it with beechmast, first depriving the cocoa of its oil, which they sell separately as cocoa-butter, and trusting to the oil of the B. for supplying its place. B. forests anciently abounded in England, and great herds of swine were fed in them. The B. is not, in general, found in Europe north of lat. 59°, although it occurs two degrees further north in the Scandinavian peninsula. It is found in the temperate parts of Asia and in North America; the WHITE B. of that country being generally regarded as the same species, a very common tree in some parts of the United States.

Common Beech.

a, part of a branchlet with leaves and catkins, reduced; *b*, a single male flower; *c*, a single female flower.

In gardens and pleasure-grounds a variety is very frequently to be seen, of which the leaves have a blood-red color. The same color appears also in some degree in the leaves of the RED B. of North America (*F. ferruginea*), which is distinguished by elongate-ovate, coarsely serrated, and much acuminated leaves. It forms extensive forests in the North-eastern States and the adjoining British possessions; and its wood, which is of a somewhat red or rusty color, is more valued than that of the White B.—Two species of B. are found on the mountains of Java; four are natives of the more elevated parts of the south of New Zealand; several belong to the south of South America. The genus is, in fact, more characteristic of the colder latitudes of the southern than of the northern hemisphere. *F. betuloides* (also known as *F. Forsteri*) is the 'myrtle-tree' of the mountains of Tasmania—a very large tree with evergreen leathery leaves, in form much resembling those of the birch, although the general habit of the tree agrees with that of other beeches. The same species is the evergreen B. of Terra del Fuego, where it forms forests of which the dark green foliage contrasts strikingly in winter with the dazzling snow. There can be little doubt that it will soon become a favorite and common ornamental tree in Britain. The wood is too heavy and brittle for masts, but makes tolerable planks, and is carried to the treeless Falkland Islands for roofing houses. *F. Antarctica* ascends higher on the mountains about the Strait of Magellan. It has deciduous leaves, and much resembles the common B.—*F. procera* grows in the Andes of Chili, and attains a majestic size. It is a valuable timber-tree.

BEECH-DROPS. See CANCER ROOT.

BEECHER, the name of a celebrated American family of preachers and litterateurs.

LYMAN B. was born at Newhaven, Connecticut, U. S., October 1775. He devoted himself to theology; and after holding the pastorate of Congregational churches at Litchfield and at Boston he was in 1832 appointed president of the newly founded Lane Theological Seminary near Cincinnati. He died at Brooklyn in Jan. 1863. He was a powerful preacher and platform orator.

His son EDWARD, born in 1804, became distinguished as a theologian.—Another son HENRY WARD B., was born at Litchfield, Connecticut in 1813, and after graduating at Amherst College, Connecticut, studied theology under his father at Lane Seminary. After ten years' pastorship of two churches in the state of Indiana, he removed to Plymouth Church, Brooklyn, New York, 'an organization of Orthodox Congregational believers.' He is said to have the largest congregation in the United States (3000 members in 1880), and his popularity as a pulpit speaker and as a lecturer speedily became prodigious—owing partly to his rich fund of illustration, his dramatic manner, and his keen sense of humor. For nearly twenty years B. was editor of the *New York Independent*, a religious newspaper; and for nearly twelve, of the *Christian Union*. Intense interest was shown when in 1875 B. was tried for adultery. The jury were unable to agree on a verdict, the majority inclining to acquit him. B.'s influence is said hardly to have suffered, and the fidelity of his congregation is unshaken. His sermons known as the *Plymouth Pulpit*, his *Lectures to Young Men*, *Life Thoughts*, *Life of Christ*, and *Yale Lectures in Preaching*, have been largely read in England and America. He has visited Europe twice, last in 1864. See BEECHER, HENRY WARD, in AM. SUPP.

CATHERINE B., eldest daughter of Lyman B., was born at East Hampton, Long Island, in 1800. From 1822—1832, she was principal of a female seminary at Hartford, Connecticut, and afterwards of a similar institution at Cincinnati. She is a fertile and popular writer, chiefly on subjects coming within the sphere of her own sex, but also on physiology, theology, mental and moral philosophy, &c.

HARRIET B. See STOWE, H. B.

BEECHEY, SIR WILLIAM, R.A., an English portrait-painter of high reputation, was born at Burford, Oxfordshire, December 12, 1753. He entered the Royal Academy as a pupil in 1772, and devoted himself chiefly to portrait-painting, in which he was so successful, that in 1793 he was chosen portrait-painter to Queen Charlotte, of whom he painted a full length. In the same year he was elected an associate of the Royal Academy; and in 1798, he received the honor of knighthood, and was made a Royal Academician for his picture of the Review of the 3d and 10th Dragoons in Hyde Park by George III. (accompanied by the Prince of Wales and Duke of York), which is reckoned B.'s greatest work. B. now received the patronage of the royal family—most of the members of which sat to him—as well as that of the court nobility. Among his portraits are those of Lord Nelson (preserved in the Clothier's Hall, London), Sir William Hamilton, Lord St. Vincent (in Fishmonger's Hall), Lord Cornwallis, John Kemble, and Mrs. Siddons. B. is not a portrait-painter of first rank, but his portraits are generally characterized by easy attitude and naturalness of expression. He retired from his profession in 1836, and died at Hampstead in January 1839.

BEECHEY, FREDERICK WILLIAM, son of Sir William B., the portrait-painter, was born in London, February 17, 1796. He entered the navy when he was ten years of age, and at the age of fifteen was present in an engagement off the coast of Madagascar, in which three French frigates were captured. In 1818, he took part under Franklin in a scientific voyage of discovery to the north pole, of which the results were published by order of the

Admiralty (1843). For the services he rendered with his pencil during this voyage, B. received a grant of £200 from parliament. In 1819, he was engaged in another arctic expedition under Sir Edward Parry; and in 1821, rendered other important services to science by his exploration of part of the north coast of Africa, of which the results were published in 1828. After being appointed commander, Captain B., in 1825, received a commission to proceed by the Pacific Ocean and Behring's Strait to the Polar Sea, in order to communicate, if possible, with Franklin, who was to make the journey overland from North America. The explorers did not meet, although at one time they were within 150 miles of each other. He returned in 1828, having been two years and a half away, and in 1831 published a narrative of his voyage, which was afterwards followed by an account of the botany and zoology of the Arctic regions. Port Clarence and Port Grantley, to the south-east of Cape Prince of Wales, were discovered by B. in 1827. He was afterwards engaged in surveying the coast of Ireland and of South America; and was made Rear-admiral of the Blue in 1854. He died in 1856.

BEE'DER, the capital of a district of the same name in the Nizam's territories. It is about 75 miles to the north-west of Hyderabad, being in lat. 17° 53′ N., and long. 77° 36′ E. It stands near the right bank of the Manjera, a considerable tributary of the Godavery, and occupies a table-land about 2400 feet above the sea, and about 100 feet above the adjacent country. Though B. was formerly a place of grandeur and importance, yet it is at present remarkable chiefly for its manufactures in a compound metal made up of twenty-four parts of tin to one of copper.

BEE-EATER (*Merops*), a genus of birds of the order *Insessores* and tribe *Fissirostres;* the type of a family, *Meropidæ*, nearly allied to that of the Kingfishers. The birds of the B. family have rather long slightly arched beaks, and long pointed wings: they are mostly of a green color; resemble swallows in flight; and, like them, prey on insects, but chiefly on bees, wasps, and other hymenopterous insects. Their skin is very thick. The species of the genus *Me-*

Common Bee-eater (*Merops apiaster*).

rops are numerous in Africa and Asia; none are known in America; two are European, one of which, the Common B. (*M. apiaster*), is common in the south of Europe as a summer bird of passage. It is a very rare bird in Britain. It is mentioned by Aristotle, under the name *Merops*, as very destructive to bees. It seizes them on the wing, and also often watches near their hives, and at the mouths of wasps' nests. It breeds in holes, which it excavates in the banks of rivers. 'When the young are partly fledged, but not yet fit to fly, they creep to the mouth of their holes, where they seem to enjoy the happy summer light and genial sunshine; but on the least alarm, they trundle stern foremost into their inner chambers, where they lie concealed until tranquillity again prevails.' In the banks of the Don and Volga, the excavations made by the flocks of bee-eaters are so numerous, that the bank in many places resembles a honey-comb. Livingstone describes the banks of the Leeba, in South Africa, as perforated in a similar manner. The Hottentots watch the flight of the bee-eaters, that they may be guided to the nests of bees.

BEEF. See Food and Drink, Diet.

BEEF-EATER, a term now applied jocularly to certain functionaries belonging to the Yeomen of the Guard (q. v.), who, ever since the time of Henry VII., have formed part of the train of royality, attending banquets and other state occasions. They have maintained the same costume, with a slight alteration made in 1858, for nearly four centuries; and this costume has had much to do with their attractiveness to sight-seers. The word has of late been usually regarded as a corruptions of *buffetier* (Fr.), or *beaufetier*, one who attends the *buffet* or side-board. It would thus be an instance of what Latham calls 'words of foreign simulating a vernacular origin;' like *sparrow-grass* for *asparagus*, *ancient* for *ensign*. But Skeat holds that *beef-eater* is simply *eater of beef*, a servant or dependant, and quotes *eaters* (from Ben Jonson) and *powder-beef lubbers* used in a similar sense.

BEEF-EATER (*Buphaga*), a genus of birds, of the order *Insessores*, tribe *Conirostres*, to which the name Ox-pecker is also and more correctly given. The beef-eaters have short bills, square at the base, and rather swollen towards the point. They are accustomed to sit upon the backs of buffaloes, camels, and other large animals, and to feed upon the larvæ of gadflies, which they find in their hides. They are exclusively African. One of the species is the Buffalo Bird of South Africa. Livingstone mentions that the sight of the bird being much more acute than that of the buffalo, it is much more easily alarmed by the approach of danger; but the buffaloes always begin to look about them when the birds rise from their backs.

BEEF-TEA is a light and pleasant article of diet, obtained from the flesh of the ox. It is generally prepared by placing the meat (as lean as possible) in cold water, which is gradually heated, and then allowed to *simmer* for two hours or so; but the best method appears to be to commence by chopping the meat small, adding the cold water, and rapidly heating so as to bring it to a boil. A little salt is then added, to suit the taste. Either process, by commencing with cold water, succeeds in dissolving out of the meat the savory natural juices which it contains to the extent of about one-eighth of its weight. Occasionally, hard-toasted bread, in fragments, is added to the tea just before being partaken of, which imparts to it some of the nutritious qualities of the bread. In using the B., the bread may or may not be eaten. The popular notion is, that the B. contains all the nourishing constituents of the entire amount of meat employed in its preparation; but this is erroneous, as much nutritious matter is resident in the seven-eighths of the original meat, left as residuary fleshy fibre, though the latter will no doubt prove of difficult digestion. The chemical constituents of B. are *gelatine; albuminous matter; kreatine*, a substance resembling *theine*, the essential principle of tea and coffee; *extractive matters* (*osmazome*), to which the tea owes most of its odor and flavor, besides a part of its nutritious qualities; *lactic acid; salts;* a *little fat; saccharine matter*, and *water*. B. is highly palatable, and from its very easy digestion, it is recommended to invalids and convalescents. Mutton, treated in a similar manner, yields a broth or tea which is not so easily digested, and is hurtful to persons of weak stomach, especially if the fat be not skimmed off from the liquid. A knuckle of veal affords a similar broth or tea; but it is not so light as B., and, moreover, gelatinises on cooling. A broth or tea prepared from a young chicken is, of all decoctions of animal matter, the most readily digested, and is specially suitable for invalids, where great irritability of the stomach exists.

BEEF-WOOD. See Casuarina.

BEE'HIVE-HOUSE, a name generally given to certain dome-shaped buildings in Ireland, which are believed to be among the oldest architectural remains in that country. They are round edifices, of no great size or height, built without cement, of long thin stones arranged in horizontal layers, the one slightly overlapping the other, and so gradually converging until they meet at the top. The doorway, which is square-headed, is somewhat narrower at the top than at the bottom, as in Egyptian architectnre. Beehive-houses are of two kinds—single or clustered. The former are generally found beside ancient oratories, and are supposed to have been the dwelling-places of the priests; the latter, which are often underground, show two or more hive-shaped chambers, connected by a passage or gallery or opening from a larger central apartment, which is also hive-shaped. Irish antiquaries refer the beehive-houses generally to the period before the Anglo-Norman invasion of the island, in the 12th c., and claim for some of them an antiquity as high as the 7th and 8th c. Ruins of single beehive-houses are found in the Western Isles of Scotland; and some of the 'Picts' houses,' or 'earth-houses,' of the east coast, seem to resemble the subterranean aggregated beehive-houses of Ireland.

BEE'LZEBUB (i. e. 'the god of flies'). Under this name the people of Ekron, in Philistia, worshiped their god Baal (q. v.) or Bel. The Greeks also had their 'Zeus Apomyios' or 'Myiagros'—'the disperser of flies.' As the heathen deities were all regarded as demons by the Jews, the name Beelzebub became, in course of time, commonly applied to the chief of evil spirits, and in this sense it is employed in the Gospels. The more correct reading of the word, as given by the Evangelists, is Beelzebul—an opprobrious change of name, making it signify 'god of dung,' to mark the low and grovelling character of the demon. See Baal.

BEER, derived from the German *Bier* (see Ale), is the term applied to a fermented liquid which has not undergone the process of distillation. It may be prepared from many varieties of vegetable matter, but in Britain the raw material operated upon is generally barley, although pease, beans, wheat, &c., might be employed. In other countries, B. is often prepared from other sources,

to which allusion is made at the close of this article. The process followed in the manufacture of B. is divided into two parts—viz., *malting* and *brewing;* and so distinct are these, that very often the malting proceeds in a building at some distance from that in which the brewing is conducted, and in many cases the malting is superintended and accomplished by a *malster*, as his particular and only branch of trade, the malt thus prepared being afterwards purchased by the brewer.

The variety of barley preferred for the preparation of the finer kinds of B. is the chevalier; but other varieties are extensively used. See BARLEY.

The process of malting, or the conversion of barley into malt, is accomplished in four successive steps. 1st, *Steeping* of the barley, which consists in introducing the grain into a large wooden or stone cistern, *a* (fig. 1), and adding thereto as much water as will cover it. On being thus treated for twenty-four hours, the

Fig. 1.

grains of barley absorb the water, and the contents of the cistern, near the top, even begin to feel dry. The barley swells up much, so as to increase considerably in bulk, and the Excise officers, if they choose, can guage or measure the grain at this stage, and charge by the bulk thus indicated. The amount of water which barley takes up in the steeping, affords good evidence of the excellence of the grain for brewing. Thus, the better kinds of barley, on the average, take up sufficient water to increase their weight by one half. Occasionally, however, the increase is not more than a tenth. The time during which the grain lies in the steeping-cistern is about 40 hours, when the excess of water is drained off; but a regulation exists that the cistern cannot have a second charge of barley till four days have elapsed after the introduction of the first charge. 2d, *Couching.*—The grain is thrown out of the steeping cistern in a heap on the floor, *b*. At this stage, the barley is soft, and when pressed between the fingers, it is readily bruised. It lies in the couch or heap for 26 hours or so, and during that time, it rises in temperature about 10° F., and gives out some of its extra water. This *sweating*, as it is called, is the result of the partial germination or growth of the barley; and little rootlets or fibrils of the radicle, and a primitive stem (plumula or acrospire), begin to form and present themselves. As the temperature rises, the radicles lengthen rapidly, and means are then taken to check the germination. 3d, *Flooring.*—The heated barley is spread by the workmen with spades on the floor to the depth of about 15 inches at first, *cc*. It is repeatedly turned and respread over a larger area, with a thickness of layer decreasing to 6 inches.

At this stage, the radicles have attained their greatest length. 4th, *Kiln-drying.*—the half-germinated barley is now introduced into a kiln (fig. 2), on the perforated floor of which it is spread. The apartment beneath the kiln-room is fitted up with stoves or choffers, A, which evolve much heat; and this rising and passing through the slits or perforations in the floor of the kiln, B. necessarily dries any moist barley laid thereon, and the steam escapes at the roof, C. The heat which the barley is subjected to in the kiln is, at the commencement, 90° F., but this gradually is raised to about 150° F. While drying, the radicles — called *cornings* or *cummings*—break off from the grain, and are afterwards removed by a wire-sieve. The color which the barley assumes as it becomes dry malt in the kiln is determined by the heat to which it is subjected, the higher temperature yielding the darker-colored malt. *Pale* and *amber colored malt* are used in the brewing of the lighter varieties of B.—such as bitter-B., table-B., and small B.; whilst a darker kind of malt is used in sweet ale, and a very dark malt in the preparation of porter. During the conversion of barley into malt, a loss of material occurs. Thus, 100 parts of barley yield 80 parts of malt; but as the 100 parts of barley contain 12 of water, it follows that there are present only 88 parts of dry matter, and these yield 80 parts of dry malt, giving a loss of 8 per cent. of the original weight of the barley. While there is a decrease in weight, there is an increase in bulk, 100 measures of barley becoming 101 to 109 measures of malt. Certain chemical changes likewise occur as the barley is transformed into malt, which may be noticed from the following table:

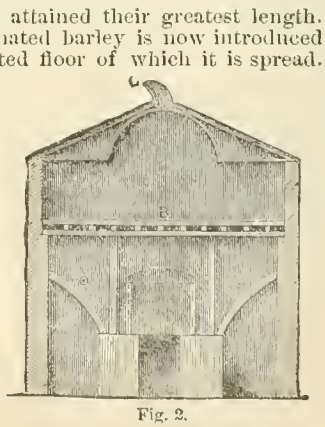


Fig. 2.

	Composition of Barley.	Malt.
Hordein (q. v.)	55	12
Starch	32	56
Sugar	5	15
Gluten	3	1
Gum	4	15
Resin	1	1
	100	100

The principal chemical change is, therefore, the transformation of much hordein (a form of starch) into starch, gum, and sugar. The mechanical condition of the contents of the grain is also altered; the grain is now of a fine mealy nature, and is readily broken between the fingers, when the flour in the interior is found to be soft and distinctly sweet to taste.

The *brewing* of the malt comprehends no less than six stages. 1st, *Grinding the malt*, which may be accomplished in several ways: either by placing the malt between two revolving horizontal circular stones, such as are employed in flour-grinding; or passing the malt through a mill like a large coffee-mill; or bruising it between revolving steel rollers. The last plan is the best, as it is desirable that the grinding should not be too perfect, which would give a fine flour, readily becoming pasty on the addition of water. When coarsely bruised, however, the water can find its way into all parts of the grain, and thoroughly soak it.

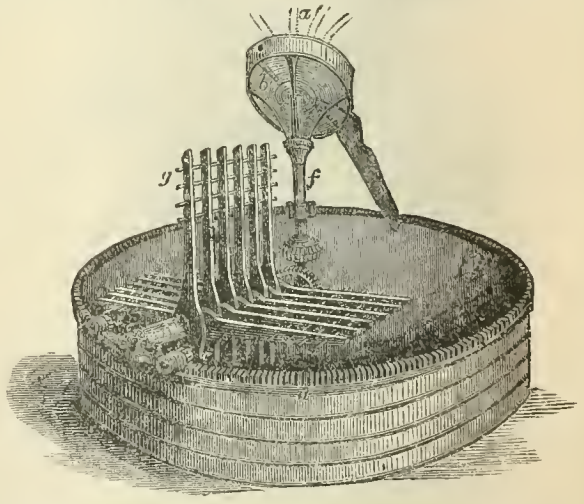


Fig. 3.

2d, *Mashing the bruised malt.*—This operation is conducted in a large tun (fig. 3), built up of wooden staves, and surrounded by hoops—somewhat similar in construction to an ordinary domestic churn. Water, which has been previously heated in a copper, is allowed to run into the comparatively cold mashtun, while the bruised malt at the same time descends by the hopper, *ab*; the water thereby becoming reduced to 160° F., or slightly below that temperature. The whole is then thoroughly agitated by long poles, *g*, worked by the hand or by machinery, *def*, till every particle of the malt is brought into contact with the water. The result is that the malt absorbs the water in part, and a very active change begins to take place. In the malt, there is developed a substance called *diastase* (q. v.), which reacts on the starch of the malted barley, and changes it into the variety of sugar called grape-sugar. See SUGAR. So rapidly does this transformation of starch into sugar occur, that almost immediately on the mixing of the water with the bruised malt, the liquid assumes a sweet taste.

In the space of half an hour the temperature of the mash-tun will be found to have decreased to about 140° F.; and then a sec-

ond quantity of water, at a heat of 190° F., is run in, so as to raise the temperature to about 167° F., which degree of heat is found to be the best for enabling the diastase to act most powerfully in transforming the starch into sugar. After two to three hours' action upon the malt, the water, which is now very sweet to the taste, is drawn off into a large vessel called the *underback*, and fresh water, at a temperature of about 190° F., is admitted to the tun, and allowed to soak the malt still remaining there. This part of the process is styled the *second mash;* and as the water is at a higher temperature than in the *first mash*, much of the residuary matter in the malt is changed into sugar, and dissolved. After some hours, the liquid from the second mash is drawn off, and added to that of the first mash already in the underback; and a third quantity of water, at a still higher temperature, about 200° F., is run in upon the malt, which dissolves out all the remaining portions of any value, and leaves the husk skin of the grain and other insoluble matters. The liquid from the *third mash* is not strong enough to be in general mixed with other solutions in the underback, and is either employed in brewing small-B., or is again heated and used in treating new bruised malt.

In order that the brewer may be enabled to prepare the same variety of B. day after day, it is requisite that the liquid in the underback, and which is now called the *sweet-worts*, should be of a definite strength; and to determine this, an instrument called a saccharometer, a form of *areometer* (q. v.), is used, which enables the brewer to determine the strength of the sweet-worts, and, if necessary, to add some of the liquid from the third mash, to reduce the strength of that in the underback.

In the drawing off of the several worts from the mash-tun, advantage is taken of a finely perforated false bottom of plate-iron, which lies about a foot above the true bottom of the tun, and the liquids being drained away through the perforations in the false bottom, the insoluble husk and other matters are left behind. The material left on the false bottom, called *grains* or *draff*, is used for feeding cattle.

3d, *Boiling of the worts with hops.*—When reduced to the proper strength, the worts are pumped up from the underback into a covered-in boiler or copper, AA (fig. 4), and being mixed with hops, are raised to the boiling-point, and kept in a state of ebullition for some time. During the boiling, it is necessary to keep the hops and other sediment from settling at the lower part of the boiler near the fire, DD, and for that purpose, a sort of rake with teeth, BB, turned by a wheel (C) above, is kept turning round, which tends to hold the sediment in mechanical suspension. To economize heat, it is customary to have a tank fitted to the upper part of the boiler in which water or the worts can be heated.

The hops which are obtained from Kent and Sussex are the strongest, and are employed in the brewing of porter, while the Worcester hop is milder, and is preferred for ale. The hops are

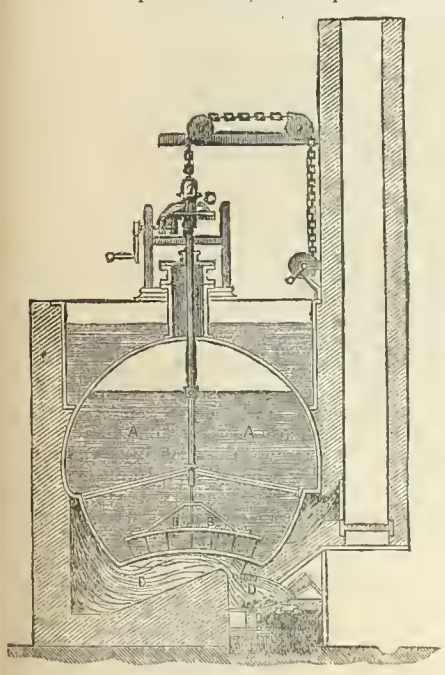


Fig. 4.

useful in the brewing of B. in imparting to the liquor a volatile fragrant aromatic oil, a bitter resin, and a little tannin. The quantity of hops required to be added depends much on the kind of B. which it is intended to brew. The stronger the B. is to be, and above all, the more bitterness is required, the more hops must be added to the boiler. In common ale or B., the quantity of hops does not exceed 2 lb. to the quarter of malt; whilst in bitter-B., and especially that intended for foreign countries, the amount of hops is 8 lb. and upwards. Besides imparting to the worts the active constituents of the hop, the boiling operation serves other important ends. In the sweet-worts, there is a considerable quantity of nitrogenous matter, which is very liable to pass into decomposition, and which, were it to do so, would destroy the beer. During the boiling, the excess of this nitrogenous matter separates as a flaky and stringy solid, called by the brewer *mucilage*. The boiling is continued till the hops have yielded their aromatic and bitter principles, and till the liquid has been concentrated to the extent required by the brewer, and then the whole is run into the *hop-back*, a form of cistern which has a false bottom composed of perforated iron plates (fig. 5.), admitting of the liquid worts percolating through, while all the mucilage and other solid matters are retained on the upper surface of this metallic sieve. 4th, *Cooling the worts.*—As the liquor drains through the false bottom of the hop-back, it is run on to the *cooler* or *refrigerator* (fig. 6), which, in size and appearance, resembles the ordinary wooden floor of a large room. The planks are so closely connected together that the liquid cannot run through, and a wooden ledge, B, runs round the sides of the room, which is also tight. The hot worts, which are spread to the depth of a few inches over the floor, are very rapidly cooled down, by allowing a free current of cold air to pass over the top of the liquid, and often by having a series of fans, CC, revolving rapidly immediately above the liquid, so as to cause a more speedy removal of the heated air loaded with steam, and the substitution of cold air. Occasionally, the brewer is at the expense of having a coil of metal pipe, A, placed up and down the floor of the cooler, through which metal pipe cold water is allowed to run at the time the hot worts are being cooled down. By these means the worts are very soon reduced to a temperature of about 60° F.

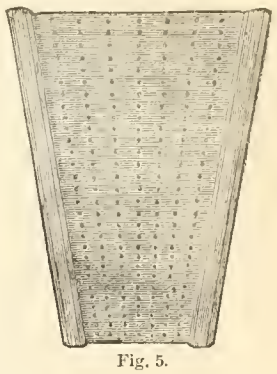


Fig. 5.

This step in the process of brewing is a very important one, as if the cooling is not conducted with the greatest rapidity, the sugar in the worts will become partially converted into acetic acid, or,

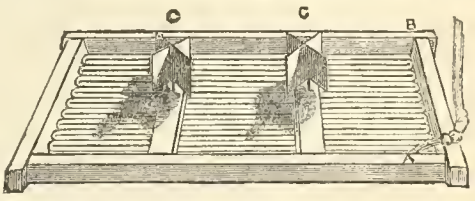


Fig. 6

as it is termed, *foxing* occurs, which communicates bad properties to the worts, and ultimately produces a beer with an unpleasant taste and flavor.—5th, *Fermenting the worts.*—When the liquid has been cooled down to 55°—60° F., it is conveyed to the fermenting tun, where it is mixed with the yeast (q. v.), and the process of fermentation proceeds. The tun or vat, is formed of strong wooden staves, and is either circular or square. The latter form has recently been introduced, and appears to be preferred by some brewers. The yeast is added in varying quantity, according to the strength of the worts, but the more common amount is one gallon to every 100 gallons of the worts. Very soon after the yeast is mixed with the worts, the whole contents of the tun begin to pass into a state of commotion, much gas is evolved, and this, tending to escape, causes a *frothing* on the surface of the liquid termed the *rocks*, from the irregular mountainous appearance of the masses of froth piled on each other. The color of the froth at this period indicates the quality of the beer. Thus if the froth appears of a yellowish-white or yellow tint, the operation is going on satisfactorily; but if the color darkens to a brownish-yellow or a light brown, it is considered a bad sign, and the beer is spoiled as a first-class beverage. The chemical changes which occur during the process of fermentation (q. v.) are due to the action of the particles of yeast on the sugar or saccharine matter. This action proceeds most satisfactorily at a temperature of 72° F., and care is taken in the brewing of the finer varieties of beer, such as India pale ale and bitter beer, that the temperature never exceeds 72° F. The grape-sugar which is present in the worts as they are introduced into the fermenting tun, is composed of carbon, hydrogen, and oxygen in the proportion C_{12}, H_{14}, O_{14}; and when the yeast acts upon it, a greater or less proportion of it is converted into alcohol, carbonic acid, and water. Thus, one atom of sugar, $C_{12}H_{14}O_{14}$, is converted into 2 atoms of alcohol ($C_4H_6O_2$) = $C_8H_{12}O_4$; 4 atoms of carbonic acid (CO_2) = C_4O_8; and 2 atoms of water (HO) = H_2O_2; which, when added together, give the atom of sugar, $C_{12}H_{14}O_{14}$. The carbonic acid tending to escape, causes the frothing or rocks, and the alcohol and water are left in the fermenting tun.

During the progress of the fermentation, a considerable amount of new yeast is formed, which gets entangled in the froth; and when the operation slackens, and the frothy head begins to fall, the upper yeast is skimmed off. This process of the conversion of

the sugar of the worts into alcohol or spirit, is termed attenuation (Lat. *tenuis*, thin); and the degree to which the change is carried depends on the kind of B. and the market it is to be sent to. In sweet ale or B., the attenuation is not allowed to proceed far, and much sugar is left in the beer. Bitter-B., however, is attenuated to a greater degree, and consequently there is less saccharine matter left in it; while in India pale ale, and other beers intended to be sent great distances, the attenuation must be carried on much further, else the liquor would not be preserved during its transit to many parts of the globe. 6th, *Clearing* and *storing*.—The B., when properly fermented, is placed in casks like hogsheads, called *rounds*, where the remaining traces of fermentation proceed, and the B. ceases to appear thick or drumly, and becomes clear; when it is pumped up into store-casks of great size, or at once placed in the casks in which it is sent into market. During the storing of the B., an extra quantity of hops is often added, to increase the bitterness and pungency.

The principal constituents of the various kinds of B. are water, alcohol, sugar, gum, gluten, and the bitter extractive matter of the hop. The amount of alcohol varies: in small-B., it is only about 1 per cent.; in ale, the stronger kinds of B., and porter for home consumption, 5 to 7 per cent.; in East India pale ale, 10 per cent. In B. intended to be forwarded to California from Britain, the attenuation is carried so far, that there is more than 10 per cent. of alcohol, and the B. is then called *dry*.

B. is adulterated in many ways. Burned sugar (caramel) is added to give color; cocculus indicus, to supply an intoxicating agent which will give an appearance of strength to the B.; quassia, to impart bitterness in place of hops; grains of paradise and Cayenne pepper, to communicate pungency; coriander and caraway seeds, to yield flavor; liquorice, treacle, and honey, to supply color and consistence. To stale-beer there is sometimes added green vitriol (sulphate of iron), or alum and common salt, which, when agitated with the B., communicate a fine cauliflower head. It is unnecessary to state that such admixtures are never made in any extensive brewing establishment with respectable connections.

For the home-brewing of B., many recipes have been published, and one of the best is that given by Mr. Donovan in the *Cabinet Cyclopædia*. The apparatus he suggests is of the roughest description, and comparatively inexpensive. A porter-barrel forms the mash tun; the upper end being taken out, perforated with a gimlet, and lowered into the barrel to near the bottom, where it is supported about a couple of inches from the true bottom, and constitutes the false bottom through which the liquid drains from the bruised malt.

A hole is made in the side of the barrel, near the bottom, and between the true and false bottoms, which can be plugged up with a spigot when not required to let the liquor run off. A second porter-barrel will be useful as an underback and fermenting tun. An ordinary household boiler, or a large common tin-plate one, will answer the purpose of boiling the worts. The mash-tun is first well scalded with hot water, and then is supplied with 15 gallons of boiling water and 5 gallons of cold water at 60° F., 2½ bushels of first-class bruised pale malt are shaken in, and well stirred through the water, the top of the barrel being in greater part closed with a thick cloth. In an hour or so, the liquid which is in the tun will be clear when allowed to run out at the spigot-hole; and immediately after it ceases to run, about 20 gallons of nearly boiling water are run over the half-exhausted malt, and this carries off all the soluble matters, yielding altogether about 23 gallons of sweet-worts. These are placed in the copper, 3¼ lb. of the best mild hops are added, and boiled for 20 minutes. The liquor is then strained through a fine sieve into the fermenting tun; and when it has cooled down to below a blood-heat (98° F.), a quart of yeast is added, and the fermentation allowed to proceed. When the frothy head begins to droop, the upper yeast is skimmed off, the liquor put in a cask, bunged up, and allowed to clear for a fortnight, when it will be ready for use.

The foregoing remarks on the manufacture of B. apply to all the varieties of B., ale, and porter (q. v.), brewed and used in Britain. The liquor may differ in strength, from difference in the quantity of water, or in color, from the malt been more or less charred in the kiln-drying. There are, however, many other varieties of beer. In South America, the Indians prepared and drank a B. obtained from Indian corn, and called *chica* or maize B., long before the Spanish conquest. The process followed in making chica is similar to that of B.-brewing in Britain. The maize is moistened with water, allowed partially to germinate, and dried in the sun. The maize malt so prepared is bruised, treated with warm water, and set aside till the fermentation is over. The chica or maize B. has a yellow color, and a pleasant acid taste. In the valleys of the Sierra, the maize malt is chewed between the teeth of the Indians and their households, and the chewed morsel incorporated with the saliva is put in jars with hot water, when the fermentation proceeds more rapidly than before, and a more highly-prized B. is obtained. The chica is also made from barley, rice, pease, manioc, pine-apples, and grapes. The Crim Tatars prepare a B. from millet-seed, called *bouza* or millet-beer. The same seed is used in Sikkim, on the southern slopes of the Lower Himalaya, and yields B. there called *murwa*. The Arabians, Abyssinians, and many African tribes, employ *teff*, or the seeds of *Poa Abyssinica*, and millet-seed, as sources of beer. The Russians prepare a B. from rye, called *quass* or *rye-beer*. The Tatars ferment milk into *koumiss* or milk-beer. The Arabians use the milk to yield their *leban*, and the Turks to produce their *yaourt*. In the north of Scotland, the Orkneys, and some parts of Ireland, buttermilk, or *sour-milk*, is allowed to stand till fermentation begins, and an intoxicating liquor results. The South-sea islanders prepare a B. from the root of *Macropiper methysticum*, or the *intoxicating long pepper*, which is called Ava (q. v.).

The successful brewing of B. depends much on the kind of water employed. The water which is found most suitable contains much common salt, sulphate of lime, and carbonate of lime, in a state of solution. The waters employed in the most extensive breweries contains at least 60 grains of earthy salts dissolved in each imperial gallon. It is important that the water should have the proper saline ingredients, and be free from organic matter.

In 1880, the tax formerly levied upon malt was put upon beer. In his budget speech, Mr. Gladstone alluded to the possible manufacture of maize beer on a large scale, the only drawback being the excess of oil in the germ of the grain. This germ is now extracted by a patent process, and the germless maize has been found to yield a mild and pleasant B. of a brilliant amber color, which keeps well, and is calculated to be popular. German lager beer is now imported into Britain for consumption here. Bitter-B. acts as a tonic and slight stimulant, and in many cases it is recommended by medical men to convalescents in place of wine. Some statistics regarding the consumption of the different kinds of B., and other kindred beverages, will be found under FERMENTED AND DISTILLED LIQUORS.

BEER ACTS, the 11 Geo. IV. and 1 William IV. c. 64, the 4 and 5 William IV. c. 85, and the 3 and 4 Vict. c. 61, amended by the Wine and Beer-house Acts, 32 and 33 Vict. c. 27, 33 and 34 Vict. c. 29, and the Intoxicating Liquor Acts, 35 and 36 Vict. c. 94, 37 and 38 Vict. c. 49. By the earlier of these acts (all relating to England), every householder assessed to the poor-rates, in any parish or place (and not being a sheriff's officer, or officer employed to execute judicial process), could without any license from the magistrates, apply for and obtain an Excise license, to enable him to sell beer and cider, by retail, at some house situate within such parish or place, and specified in such license. But in order to obtain such license, the applicant must produce an overseer's certificate that he was the real resident, holder, and occupant of such house, and rated to the poor-rate in a certain amount; and must enter into a bond with one sufficient surety, in the penal sum of £20, or two sufficient sureties in the penal sum of £10 each, for the payment of such penalties as he may incur under the acts; and if he is also desirous for permission that the liquor should be drunk *on the premises*, he must, moreover, annually deposit with the commissioners of Excise (now the Board of Inland-Revenue), or other persons authorized to grant the license, a certificate 'of good character,' signed by six rated inhabitants of the parish, of whom none shall be malsters, common brewers, or licensed publicans, or owners of licensed public-houses.

These requirements were easily evaded as regards the evidence of good character, and in 1869 the new practice was introduced by the Wine and Beer-house Act, 32 and 33 Vict. c. 27, of not only requiring the house to be of a certain valuation, but the applicant to go first to the justices of his division or borough for a certificate, which thus enabled some inquiry to be made into the respectability of the persons keeping beer-houses. This certificate of justices, sometimes also called a justices' license, is indispensable before getting an Excise license. It is, moreover, required that every person obtaining a license shall paint conspicuously over the door of his premises, in such form and manner as the acts specify, his Christian name and surname at full length, and the words 'licensed to sell beer (or cider) by retail,' with the addition of 'to be drunk on the premises,' or 'not to be drunk on the premises,' as the case may be. Penalties are also imposed on every retailer of beer or cider who shall transgress, or allow to be transgressed, any of the numerous and stringent provisions of the Licensing Acts 1872–4. The license to sell beer is confined to that particular privilege; and persons, under cover of it, attempting to sell wines or spirits, are not only liable in a heavy penalty, but may be deprived of their beer license. On the other hand, a license to sell wines and spirits is quite distinct; but all Excise licenses to retail liquors must be preceded by a justice's certificate.

The Wine and Beer-house Acts of 1869 and 1870 still mainly govern the qualifications of those who sell beer by retail, and a similar law is applied to those who sell wine and liquors by retail in refreshment houses. The law was, however, deemed imperfect as regards the offences which the keepers of licensed houses are prone to commit, and it required the Intoxicating Liquors

Licensing Act of 1872, c. 94, and of 1874, c. 49, to create more uniformity as well as stringency in the requirements. During Sundays, all licensed houses require to be shut except between 12½ or 1 P.M. and 2½ or 3 P.M., and between 6 P.M. and 10 or 11 P.M., the justices having a slight power to vary these hours. A fixed time of opening and closing is also prescribed for week-days. When a keeper of the house is convicted of an offence, it is usually indorsed on his license, and after three indorsements he forfeits the license; and, in some cases, even the landlord's power to relet the house for the sale of liquors is suspended for some years, according to the nature of the offences. Though the houses are closed for part of Sundays, yet travelers and lodgers are exempted in most cases, and can be supplied as usual with liquors. Some of the penalties have been admitted to be too severe, and require modification.

The place where beer is exclusively sold is called a *beer-house*, differing in this respect from an *ale-house*, which means a place where other liquors as well as beer are retailed. The term *public-house* applies to the second most frequently.

The sale of beers or ales in Scotland is regulated by the act 25 and 26 Vict. c. 35, amending the act 9 Geo. IV. c. 58, and the 16 and 17 Vict. c. 67, commonly called the 'Forbes Mackenzie Act.' Justices and Magistrates meet twice a year to grant certificates. By the form of license thereby prescribed, no liquors of any kind can be sold on Sunday in any inn, hotel, shop, or any public-house, except to lodgers and travelers. In the English acts, the words '*bonâ-fide* travelers' are used, which mean the same thing, and they are held to include persons traveling two or three miles for business or pleasure. Many of the penalties of the act 25 and 26 Vict. c. 35 exceeded those of the English acts, but the English act of 1872 far outstripped in stringency (except as regards Sunday) the Scotch acts.*

BEER, J. MEYER. See MEYERBEER.

BEERBHOO'M, or BIRBHOO'M, a district in the lower provinces of Bengal, with an area of 1344 square miles, and a pop. (1871) of 695,921. It extends between N. lat. 23° 32′ and 24° 40′, and between E. long. 86° 25′ and 88° 30′. The chief town is Suri, 100 miles N.N.W. of Calcutta, and after it the district is sometimes named. The inhabitants are generally a rude race, and there appear to be hardly any places worthy of the name of towns.

BEER-MONEY was a peculiar payment to non-commissioned officers and soldiers in the English army. It was established in the year 1806, at the suggestion of the Duke of York, and consisted of one penny per day for troops when on home-service, as a substitute for an issue of beer and spirits. It continued as an addition to the daily pay until 1873, when, the stoppages for rations having been abolished, the opportunity was taken to consolidate Beer-money and pay proper.

BEE'RSHEBA, or BIR-ES-SEBA ('well of the oath,' or 'well of the seven'), so called because here Abraham entered into an alliance with Abimelech, king of Gerar, which he ratified with an oath and a gift of seven ewe lambs. B. was situated on the southern border of Palestine, about 52 miles south-west from Jerusalem, and formed the limit in that direction of the Israelitish dominion. It was one of the most ancient as well as one of the most interesting places in sacred record. While Abraham resided at this place, he received the command to sacrifice Isaac, whose residence it also was. Esau was robbed of his birthright and blessing here, and here Jacob sacrificed to God before departing into Egypt; the sons of Samuel were made judges here, and it was from hence that Elijah was forced to flee into the desert from Jezebel's wrath. After the captivity, B. was occupied for some time by the Jews, and in the 4th c. A.D., it was a Roman garrison. Afterwards, the Crusaders are said to have fortified it, and to have regarded it as a place of importance. Two circular wells of fine pure water—the largest being 44 feet deep to the surface of the water, and 12½ feet in diameter—and a heap of ruins about half a mile long and a quarter broad, remain to mark the place where B. once was.

BEE'SHA, a genus of grasses with the habit and most of the characters of bamboos, but remarkable for the fleshy pericarp which encloses the seed, forming a sort of berry.—The species are few, natives of the East Indies.

BEES-WAX, is principally obtained from the ordinary bee-hive, where it is elaborated by the workers. See BEE. For some time, it was matter of dispute whether the bees really manufactured the wax from other ingredients in their food, or if they performed the simple task of carrying the wax ready made from the plant to the hive. It appears now to be definitely settled, that while, in ordinary circumstances, bees may derive part of the wax from plants, yet, when they are fed entirely upon pure sugar, they continue to elaborate wax, and to build up the walls and partitions of the honey-comb. The wax procured from British hives is considered the purest and best, but the smallness of the amount necessitates the importation of comparatively large quantities from North America, Brazil, Singapore, Ceylon, Gambia, and Mogadore. British B. is naturally of a yellow color, whilst that procured from foreign countries is darker in tint; and in the case of the wax from Brazil, which is yielded by a species of black bee hiving under ground, the color is a dark mahogany, and the material is soft and tenacious. In the separation of the honey from the wax, the honey-comb is subjected to pressure, which squeezes out most of the honey; the residual comb is then treated with water, and heated, with constant stirring, till the wax melts, when the whole is passed through hair-bags.

The wax is received in a vessel of cold water, where it is at the same time washed, and cooled down till it solidifies, as a thick cake, on the surface of the water. For many purposes, it is necessary to bleach the wax, and the common method is to obtain it in thin sheets or ribbons, by melting it under water, and pouring it upon horizontal wooden cylinders, which are kept revolving half immersed in water in a perforated vessel. The sheets or ribbons of wax so obtained are laid out upon a field with a southern aspect, and being repeatedly watered, are subjected to the joint action of the sun's rays, the ozone of the air, and moisture. In a short time, the wax loses its yellow tint, and becomes white. Attempts have been made to perform the bleaching more expeditiously by employing chlorine, bleaching-powder, and other chemical agents. The only process which appears not to injure the wax is to melt it, and for every pound add two ounces of pulverized nitrate of soda, and one ounce oil of vitroil, diluted previously with eight ounces of water. While the latter is gradually poured in, heat is applied, and the whole mixture swells up, necessitating the employment of a capacious vessel. On cooling, the wax gathers on the surface, and being repeatedly treated with hot water, to wash away impurities, is finally allowed to solidify in a cake.

Purified B. has a density of 960 to 966, and is therefore lighter than water, which is taken as 1000. In thin slices, it is translucent, and is tasteless, odorless, and colorless. At 32° F., it is hard, brittle, and solid. When heated to 85°—90° F., it softens, and can then be kneaded between the fingers like moist dough or putty, and at 145° F. it fuses, and becomes a true liquid. It is insoluble in water, and is partly soluble in boiling alcohol, and partly not. The alcoholic solution, which takes up about 80 to 90 per cent. of the wax, contains principally a substance called *cerine*, which separates in crystals as the solution cools, and *ceroleine*, which remains dissolved in the cold alcohol. The matter which resists the solvent action of the alcohol is a substance called *myricine*. B. is largely used in the manufacture of wax-candles and tapers; and though it has recently been very much excluded from the manufacture of ordinary candles, from the readiness with which first-class composite candles can be made indirectly from tallow, yet it is often used as one of the ingredients in composite candles to impart hardness to the manufactured article. The very large candles used in Roman Catholic countries for church-services, are always made of wax alone.

BEET (*Beta*), a genus of plants of the natural order *Chenopodiaceæ* (q. v.), distinguished by a 5-cleft perianth, five stamens inserted on a fleshy ring surrounding the ovary, and the fruit adhering to the calyx, and collected in clusters of two or three. The species are not numerous; they are mostly biennials, with smooth, ovate, stalked leaves, and tall, leafy, flowering-stems. They are natives of the temperate parts of the Old World. The COMMON B. (*B. vulgaris*) is a native of the shores of the Mediterranean, but is now in very general cultivation both in fields and gardens, chiefly for the sake of its large succulent and generally carrot-shaped roots, which are used as food both for man and for cattle, and from which also sugar is largely extracted on the continent of Europe. Beet-roots may be substituted for malt, when deprived of the greater part of their juice by pressure. The variety chiefly cultivated in gardens is known as RED B., from the color of the root, which also more or less appears in the leaves and leaf-stalks. The subvarieties are very numerous. In some, the root is rather turnip-shaped than carrot-shaped, and the size and color also vary much, some being of a deep blood-red, or even almost blackish color, both externally and internally; and others of a much lighter red, and internally, even white. It forms a favorite pickle, and is also very agreeable as a boiled vegetable when properly dressed. The seed is sown so late in spring, that the plants may not produce flowering stems the first year, which, when it occurs, renders the root fibrous and useless.—MANGOLD-WURZEL (q. v.), so valuable as a field-crop for food of cattle, is, in general, regarded as merely a larger and coarser variety of the common B., in which the red color is comparatively little exhibited, although some botanists have, on very slender grounds, endeavored to erect it into a distinct species.—The WHITE B. of our gardens

* A shebeen is the name given in Scotland to a house or place where liquors are sold without a justice's or Excise certificate. Every person found in such a place, drunk or drinking, may be taken before a justice, or detained in a police-station till this can be done, and he may then be fined ten shillings, or, in default, imprisoned ten days.

(*B. cicla* of some botanists) is now also generally supposed to be a mere variety of the common B., with little or no red in its roots or leaves, and a comparatively slender root. It is cultivated for the sake of its leaves, which are used in the same manner as spinach, and form an excellent substitute for it, especially in the beginning of spring. The leaf-stalks and midribs (*chards*) of the leaves, especially of a variety in which these parts are unusually developed, are also dressed for the table.—SEA-B. (*B. maritima*) grows wild upon the shores of Britain, and differs from the common B. in its perennial root, its partly prostrate stems, and other characters. The leaves are used for food in Ireland, as are also those of *B. Bengalensis* in the East Indies.

BEET-FLY (*Anthomyia Betæ*), an insect which infests crops of mangold-wurzel, and other kinds of beet, depositing its eggs on the leaves, the soft parts of which the larvæ devour, causing them to assume a blistered appearance, and when numerous, injuring the health of the plants. It is a two-winged insect (see DIPTERA), of the great family *Muscides*, of which the common house-fly may be regarded as the type, and belongs to a genus of which more than 100 British species are known, the larvæ of some of which are well known as feeding upon the roots of cabbages, turnips, &c. See CABBAGE-FLY, TURNIP-FLY, and POTATOE-FLY. It is not so large as the common house-fly.

BEETHOVEN, LUDWIG VAN, the unrivalled composer, whose works have made a new epoch in the development of music, was born at Bonn, December 17, 1770, and died in Vienna, March 26, 1827. His father, a tenor-singer in the elector's chapel at Bonn, began to cultivate the genius of his son when only five years of age. He next placed him under the court-organist, Van Eden, and shortly after under the composer Neefe. In his eighth year he created astonishment by his performance on the violin; when only eleven, he played the music in Bach's *Wohltemperirtes Klavier;* and in his thirteenth year he published at Manheim, a volume of variations on a march, songs, and sonatas. In 1792, he was sent to Vienna by his patron, the Elector of Cologne, to enjoy the instructions of Haydn, who first made him acquainted with the works of Händel. He also studied composition under Albrechtsberger. There he soon attracted notice by his extraordinary ability as an extempore player of fantasias, and also by some compositions, which, however, did not escape the censure of critics. He became so much attached to Vienna, that, after his patron's death in 1801, he determined to remain, and declined an invitation to England. In 1809, when another offer tempted him to leave Vienna, several friends of music, with the Archduke Rudolf at their head, raised a subscription to provide for the composer a pension sufficient to retain him. At Vienna, therefore, he stayed during the remainder of his life, secluded from the world, of which he knew as little as it knew of him; and in later years, still more isolated from society by a defect of hearing, which gradually became confirmed into entire deafness. In this sad inviolable solitude, he produced his new symphonies, his sublime overtures, his quintetts and quartetts, so full of profound conceptions and mysterious revelations of the highest harmonies, and his pianoforte sonatas, which express, sometimes, a peculiar train of feelings, at other times appear to represent his own recluse character. Shut out in a large measure from the ordinary pleasures of life, ignorant of the sweetness of married life, and able to enjoy only in a slender measure social intercourse, he retired for compensation into the world of his own imagination, and brought forth from its deep resources those treasures of harmony which, though at first received with a shy astonishment rather than a cordial admiration, are now ranked among the works of art which cannot die. These new forms and original creations, which display B.'s majestic powers in music, were only gradually developed; in his early productions, he submitted to established forms of composition.

The works of B. may be divided into three classes, or may be assigned to three distinct periods of his intellectual development. All the works of his first period, though important, show the influence of his teacher Haydn, or of his more highly esteemed model, Mozart. This period of composition may be said to extend to his 16th orchestral work, including, besides several pianoforte sonatas, trios for pianoforte and for stringed instruments, All these early works display the highest cultivation of the forms and principles of art previously established in the Viennese school of music.—The second period of B.'s artistic life, in which his genius was completely self-reliant, extends from the 16th to the 80th work. This was certainly the most productive and brilliant part of his career. To it belong his greatest creations, his magnificent and powerful orchestral works—symphonies, overtures, &c.—all of which display the highest qualities of imaginative composition. Besides the great orchestral works, it includes many sonatas for pianoforte, and various compositions of chamber-music—septetts, quintetts, quartetts, trios, serenades, &c. In dramatic composition, B. produced only one opera, but this was *Fidelio*, the first truly German musical work of a dramatic character. This was the result of great study, and, as it is now given, is the reconstruction of an earlier composition. Other dramatic pieces are—the overture, interludes, and melodramatic music in Goethe's *Egmont*, and the instrumental music and choruses in the *Ruins of Athens*. —In the third and last period of B.'s career we find those two gigantic works, the *Missa Solemnis in D Minor*, and the ninth symphony (D minor) with chorus. These works transcend all common laws and forms, and belong to the highest sphere of art. Their deep mysteries can be apprehended only by those who have deep emotions and profound technical knowledge of music. Other works of this last class approach those just mentioned, though they do not reach the same elevation. But all are alike in passing far beyond the ordinary traditional forms of art. All are pervaded by an impulse as of inspiration. Among these works may be mentioned, the great quartetts for bow-instruments (mostly published after the death of B.), the grand overtures—works 115 and 124—and several sonatas for pianoforte, especially that in B-flat major.

The life of B. has been written by Schlosser, Schindler, Moscheles, Marx, Nohl, Thayer (1866—1871). See also Nottebohm, *Skizzenbuch B.'s.*

BEE'TLE, a name popularly applied to many kinds of coleopterous insects. It is never extended to insects of any other order, and it is sometimes used in works on natural history as a common name for all coleopterous insects; but this makes it to include many kinds to which it is not popularly applied, as fireflies, lady-birds, weevils, cantharides, &c. It is also employed by some authors in a more restricted sense, as a designation of the insects forming the large tribe *Scarabæides;* but the restriction, equally with the extension, is an interference with the popular use of the English word, of which, however, the limits are very uncertain. To frame an article, with strict regard to that popular use, and at the same time to science, would not be easy, nor would it be profitable, as the assemblage of kinds would be not only large, but very miscellaneous. We think it better to refer to the article COLEOPTERA, and to the articles SCARABÆIDÆ, BOMBARDIER BEETLE, STAG BEETLE, BURYING BEETLE, GOLIATH BEETLE, ROSE BEETLE, &c. The name BLACK BEETLE is often given to the COCKROACH (q. v.). See also BLAPS.

BEE'TLE-STONES, the name given by the lapidaries of Edinburgh to hard nodules of clay ironstone, found abundantly in a low cliff, composed of shale, at Newhaven, or strewed upon the beach in that neighborhood. They take a beautiful polish, and have been employed to make letter-weights and other ornamental articles. The name was given in consequence of the supposed origin of the fossil which is of most frequent occurrence as the nucleus of the nodules, which, however, is not a fossil beetle, but a coprolite (q. v.). Some of the nodules contain a fossil fish, and some a fossil of vegetable origin.

BEE'TLING is a finishing mechanical process applied originally to linen shirting, and afterwards to cotton shirting, in imitation of linen, to give the cloth a hard and wiry look, by flattening the yarn irregularly in an angled manner. This is done by the rising and falling of upright wooden stampers, placed close together in a row, with their square buts resting on a roller over which the cloth passes under them, doubled in a particular way so as to give the yarn an angled appearance when struck. The stampers are worked bythe rotation of a horizontal shaft, acting with tapets, like the cylinder of a barrel-organ.

Linen weft is likewise beetled, but by hand-hammering, on a large flat stone, with a wooden mallet, to soften the yarn for easiness of working it, or 'getting it on,' in the language of the craft, in weaving. Beetling is likewise a process in flax-dressing, to separate the woody from the flexible fibres of the plant. See FLAX-DRESSING.

BEET-ROOT SUGAR. See SUGAR. The sugar obtained from the beet is similar to cane-sugar, but inferior in sweetening power. Beet-root contains on an average about 10 per cent. of saccharine matter (sugar-cane, 18 per cent.); of the varieties, the white Silesvig beet is the richest. To obtain the sugar, the roots, after being washed, are first rasped down by machines, so as to tear up the cells. The pulp is then put into bags, and the juice is squeezed out by presses. The juice is next treated with lime or sulphuric acid, to clarify it, and also filtered till no deposit is formed; after which it is boiled in large boilers to concentrate it. When it has attained a certain density (25° Beaumé), it is poured through flannel, and is now a dark-colored sirup, which, in order to yield pure sugar, must be deprived of its coloring-matter and mucilage. This is effected by filtering it through animal charcoal or bone-black. The filtered juice is now treated with lime-water beat up with a little white of egg to a lather, till it is slightly alkaline, and is then further concentrated by boiling in copper pans, care being taken to stir and scum it all the while. When sufficiently concentrated, it is put into vessels, and allowed to stand several days in a warm room to crystallize; the uncrystallized part, or molasses, is then drained off, and what remains is raw sugar. This is still further refined by again dissolving and treating it with albumen

and blood. In separating the crystallized from the uncrystallized part, centrifugal machines are now much used. Another improvement is the vacuum-pan, which allows the juice to be boiled down without burning. The molasses drained off from beet-root sugar has a disagreeable taste, and cannot be used for sweetening, like cane molasses.

About the middle of the 18th c., Marggraf, an apothecary in Berlin, drew attention to the sugar contained in beet-root; but Achard, the Prussian chemist, was the first who was tolerably successful in extracting it. Still, as only 2 or 3 per cent. of sugar was obtained, the product did not pay the cost, until Napoleon's continental system raised the price of sugar, and gave rise to improved methods of manufacturing it. Even after the fall of Napoleon, protective duties kept alive this manufacture in France; and when numerous improvements of method had raised the percentage of sugar realized to about 5 lb. from 100 lb. of beet, it took a fresh start (about 1825) in France and Belgium, was revived in Germany, and spread even to Russia. The falling of the custom's duties on the import of colonial sugar obliged the German governments to impose a small duty on beet-sugar, which checked the manufacture for a time; but owing to the protective measures of the Zollverein, the trade soon recovered and is still brisk. Large quantities are annually imported from the continent of Europe, and are used by our refiners mixed with cane sugar, without which it is not successful, for producing the best qualities of refined or loaf-sugar. The imports into Great Britain have at present an annual value of seven or eight millions sterling.

BEET-ROOT SUGAR. The production of beet-sugar is an industry entirely of modern growth, taking root first in France during the reign of Napoleon I., and subsequently establishing itself after many difficulties in Belgium, Germany, Austria, Russia, and Holland. The table shows the produce of beet-sugar in the four principal beet-growing countries for the year 1871–72, as compared with the year 1881–82.

	1871-72.	1881-82.
Germany (Empire)	190,000 tons.	606,000 tons.
Austria-Hungary	162,000 "	411,000 "
France	335,000 "	393,000 "
Russia (with Poland)	90,000 "	270,000 "

The imports into Great Britain have increased as below:

	1870.	1881.
Raw beet-sugar	84,000 tons.	310,700 tons.
Refined beet-sugar	82,000 "	140,000 "

The produce of Holland and Belgium is also large and increasing; but inconsiderable compared with that of the four countries given above. In Sweden, Denmark, England (at Lavenham), and California, beet-sugar factories have also been established; and attempts have been made to promote the manufacture in Ireland, but none have as yet been quite successful. The following figures show how rapidly the beet-sugar manufacture has on the whole prospered. Total produce of all countries:

1853	200,000 tons of sugar.
1863	452,000 "
1867	650,000 "
1876	1,154,200 "

This large annual yield of $1\frac{1}{6}$ million tons has been maintained for some years, and forms about one-fourth of the sugar now produced from all sources.

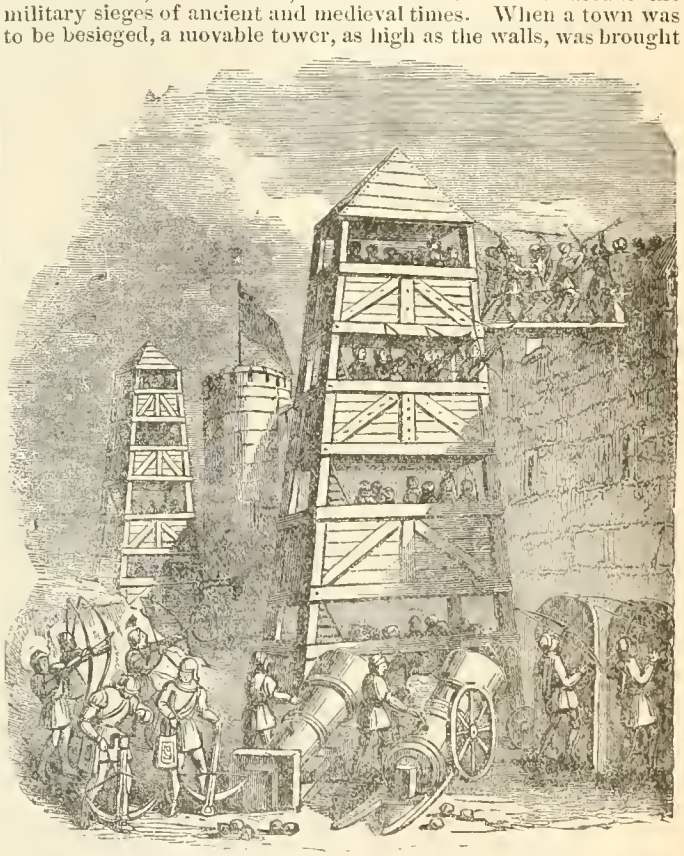
An acre of land planted with beet can be made without difficulty to yield at least a ton of sugar, worth from £20 to £24, and there are certain by-products besides. The average percentage composition of the root of the sugar-beet is as follows: Sugar, $10\frac{1}{2}$; fibre, &c., 5; gluten, soluble organic compounds, and ash, 3; water, $81\frac{1}{2}$. But the proportion of sugar varies much—it being greater in small than in large beets, in dry than in moist climates, in light than in heavy soils, in the part of the root under than in that above ground, and when manure has not been directly applied to the crop.

Crystallized sugar although by far the most valuable, is not the only useful product of beet-root, as the following list of its products will show: (1) Crystallized sugar; (2) Exhausted pulp useful for cattle-food; (3) Coarse spirit obtained by fermenting the uncrystallizable sugar; (4) Potash salts. The fibrous portion of the root is sometimes used to mix with other material for making paper.

The distillation of spirits from beet is largely practised on the continent, and many good judges maintain that it is really a more profitable business than the manufacture of beet-root sugar. In Belgium and Germany the two industries are frequently combined, an arrangement which possesses the advantage that, in a season when the proportion of sugar in the roots is too small to yield more than a bare profit, the manufacturer may ferment the sugar-containing juice. The spirit thus obtained yields a fair return even when the beets contain only from 5 to 6 per cent. of sugar. This manufacture has been tried in England with but little success as yet; but there really seems no good reason why both sugar and spirits should not be profitably made from beet either in England, Scotland, or Ireland.

BEFFA'NA, a corruption of *Epiphania* (Epiphany), is the name given in Italy to a singular custom prevailing on Three Kings' Day (see BEAN-KING'S FESTIVAL), or Twelfth Night. According to tradition, the B. was an old woman who, being busy cleaning the house when the three wise men of the East passed by on their way to offer their treasures to the infant Saviour, excused herself for not going out to see them on the ground that she would have an opportunity of doing so when they returned. They, however, went home by another way; and the B., not knowing this, has ever since been watching for their return. She is supposed to take a great interest in children, who on Twelfth Night are put earlier to bed, and a stocking of each is hung before the fire. Shortly, the cry, '*Ecco la B.*' is raised; and the children, who have not gone to sleep, dart out of the bed, and seize their stockings, in which each finds a present bearing some proportion in value to his conduct during the year. If any one has been conspicuously ill-behaved, he finds his stocking full of ashes—the method the B. takes of expressing her disapprobation. It was also customary in Italy, on Twelfth Night, to carry an effigy called the B. in procession through the streets amid great rejoicings; but this, which was probably the relic of the celebration of the middle-age 'mystery,' has fallen greatly into disuse. The word is also used to awe naughty children.

BE'FFROI, or BELFRY, was the name of a tower used in the military sieges of ancient and medieval times. When a town was to be besieged, a movable tower, as high as the walls, was brought



Beffroi, or Breaching Tower.—From Grose's *Military Antiquities*.

near it; and this tower was the beffroi. Its use is more than once spoken of by Cæsar in his account of his campaigns in Gaul. Froissart describes, with his usual spirit, a B. employed at the siege of the castle of Breteuil in 1356. At the siege of Jerusalem by the Crusaders, a B. was carried in pieces, put together just beyond bow-shot, and then pushed on wheels to a proper position. The object of such towers was to cover the approach of troops. Sometimes they were pushed on by pressure, sometimes by capstans and ropes. The highest were on six or eight wheels, and had as many as twelve or fifteen stories or stages; but it was usual to limit the height to three or four stages. They were often covered with raw hides, to protect them from the flames of boiling grease and oil directed against them by the besieged; and there was a hinged drawbridge at the top, to let down upon the parapet of the wall, to aid in landing. The lower stage frequently had a ram (see BATTERING RAM); while the others were crowded with archers, arbalestiers, and slingers; or there were bowmen on all the stages except the top, which had a storming or boarding party.

During the wars under Charles I., the royalists made a B. to aid in the besieging of a town or castle in Herefordshire; it was higher than the defence-works, and was provided with loop-holes, a bridge, &c.; but the Roundheads captured it before it could be applied to use. Ducange thinks that the name of belfry (q. v.) given to a bell-tower, was derived from the warlike machine called the belfroi or belfry.

BEG, or BEY, a Turkish title, rather vague in its import, and commonly given to superior military officers, ship-captains, and distinguished foreigners. More strictly, it applies to the governor of a small district, who bears a horse-tail as a sign of his rank. The governor of Tunis has this title—'Beglerbeg,' or, more correctly, Beilerbegi ('lord of lord'), is the title given to the governor of a province who bears three horse-tails as his badge of honor, and has authority over several begs, agas, &c. This superior title belongs to the governors of Rumelia, Anatolia, and Syria.

BEGAS, Karl, court-painter to the king of Prussia, professor and member of the Academy of Art in Berlin, was born there in 1794. He had been destined for the law, but early manifested a love for art, and while at Bonn, received his first lessons in painting from Philippart. In 1811, he proceeded to Paris, and there spent eighteen months in the studio of the celebrated Gros. In 1815, Frederick-William III., on the occasion of his visit to Paris, bought a large original painting by B., 'Job surrounded by his Friends,' and gave him two commissions for different churches in Berlin. This led to his moving thither in 1818, and to his subsequently residing in Italy at the king's expense. On his return to Berlin in 1825, he painted a great many biblical subjects for churches, as well as other pictures. He died 23d November 1854. There are frescoes of colossal size by him in the new church of Sacrow, near Potsdam. He is especially distinguished for the animation and individuality of his portraits, and has painted for the king a gallery of celebrated authors and artists, including Humboldt, Schelling, &c. Several of his *genre* paintings have been rendered familiar by repeated engravings; and his works, in general, are eminent for expression, rich coloring, and a peculiarly clear chiaro oscuro.

BE'GGAR, a person who solicits charitable aid from the public at large. The word is supposed to have some connection with the fraternity known as Beghards. See Beguin. The actual begging or solicitation of temporal aid became, however, so conspicuous a feature among these medicant orders, that the term originally applied to their sacred duties seems at a very early period to have acquired its modern vulgar acceptation. There is no class of men who have had their lot and condition so varied by ethnical and social conditions as beggars. In a civilized industrious country, the B., to have any chance of relief, must manage to get it believed, whether it be true or false, that he is on the verge of want, and requires the solicited alms to keep him from starvation. Among oriental nations, on the other hand, beggars have often been a potent class, who may be rather considered as endowed with the privilege of taxing their fellow-creatures, than as objects of compassion. It has sometimes been supposed that a residue of this feeling of superiority characterizes the mental physiology even of the mendicant of civilization, and that, abject as he seems, he considers himself to some extent a privileged person, entitled to support from his fellows, without being amenable to the slavish drudgery by which the working-classes live. In Europe, during the middle ages, those doctrines of Christianity which are intended to teach us to abjure selfishness and worldly-mindedness, were exaggerated into a profession of total abstraction from worldly cares and pursuits. Hence arose the large body of religionists who, as hermits or members of the mendicant orders, lived on the contributions of others.

In later times, the mendicant orders became the proudest and the richest of the clergy; but while the chiefs lived in affluence, the practices of the lower adherents fostered throughout Europe a system of mendicancy very inimical to civilization and industrial progress. In Great Britain its evil results have been long felt, in the inveterate establishment of practices naturally out of harmony with the independent, industrious character of the British people. Ever since the Reformation, the British laws have had a death-struggle with the B.; but neither by the kindness of a liberal poor-law, nor by the severity of a merciless criminal code, have they been able to suppress him. When a country provides, as Britain does, that no one shall be permitted to starve, it would naturally be expected that the springs of miscellaneous charity would be dried. But it is not so, and it is indeed often plausibly urged, that entirely to supersede all acts of kindly generosity between man and man, through rigid legal provisions, must lower the standard of human character, by depriving it of all opportunity for the exercise of the generous emotions. It is clear that, in the light of political economy, promiscuous charity is the most costly and most corrupting way of administering relief to indigence. No one will maintain that the idle B. on the street deserves such a luxurious table as the industrious mechanic cannot afford to himself. But, at the same time, no one who drops a coin in a beggar's hat can say how many others may be deposited there during the day, and whether the B. is merely drawing a wretched pittance, or deriving a good income. Begging being a trade, it is not always those that are the poorest, but those who are the most expert, who will practice it to the best results. The great object is to seize on and appropiate any characteristic calculated, whether permanently or temporarily, to excite compassion. Hence periods of general distress are often the harvest of the B., and his trade rises and falls in an inverse ratio with that of the working community. Times of prosperity are not favorable to him, because he is then told that there is plenty of work for him. But when workmen are dismissed in thousands, and their families turned on the road to seek alms, the professional beggars, by their superior skill and experience, will be sure to draw the prizes in the distribution. Many surprising statements have been made of the large incomes made by skilful professional beggars, especially in London. The most remarkable anecdotes on the subject will be found in Grose's *Olio*, whence they have often been repeated. Attempts have been made, but with questionable success, to set forth an average statement of the earnings in different departments of the B. trade. A good deal of information of this kind will be found in the *Report of the Constabulary Force Commission of* 1839 (see p. 60, et seq.). It does not appear, however, that this trade is, like others, dependent on the law of supply and demand. The B. generally is so constitutionally, whether from hereditary or other physical causes. He has a loathing, even to horror, of steady systematic labor, and he will rather submit to all the hardships and privations of the wanderer's lot, than endure this dreaded evil.

Beggars, The Law of England Relating to, is regulated by the 5 Geo. IV. c. 83 (amended in regard to other points by the 1 and 2 Vict. c. 38). By the third section of the 5 Geo. IV. it is enacted that every person wandering abroad, or placing him or her self in any public place, street, highway, court, or passage, to beg or gather alms, or causing or procuring, or encouraging any child or children so to do, shall be deemed *an idle and disorderly person;* and it shall be lawful for any justice of the peace to commit such offender to the house of correction, there to be kept for any time not exceeding one calendar month. And by section 4, it is further provided that any person so convicted, and offending in the same way again, shall be deemed *a rogue and a vagabond*, and may be punished by being committed to the house of correction for three months, with hard labor; and by the same section, every person wandering abroad and endeavoring, by the exposure of wounds or deformities, to obtain or gather alms, and every person going about as a gatherer or collector of alms, or endeavoring to procure charitable contributions of any nature or kind under any false or fraudulent pretence, shall be deemed *a rogue and vagabond*, and be punishable as before mentioned. By section 15, however, of the same act, the visiting justices of any county jail, house of correction, or other prison, may grant certificates to persons discharged, to receive alms on their route to their places of settlement; but if such persons shall act in a manner contrary to the directions or provisions of their certificates, or shall loiter upon their route, or shall deviate therefrom, they shall be deemed rogues and vagabonds, and punished accordingly. Other later statutes, however, enable justices to give aid to all prisoners on being discharged from prison, and supersede this doubtful license to beg on their way home. Many prisoners' aid societies are established in different parts of the country, and if their rules are good, they receive a certificate from the visiting justices of jails. When the time arrives for the discharge of a prisoner, the justices have power, out of the moneys under their control, to order a payment of £2, either to the prisoner, or the treasurer of the aid society, for his benefit; and they may also pay his railway fare, so that by this means he can always reach his home without begging.

The attempt or purpose to obtain money or alms by means of shows or entertainments on the streets of London, is also an offence under the Metropolitan Police Act, 2 and 3 Vict. c. 47, s. 54 (No. 14), and punishable by a fine of forty shillings.

In the Scotch law, there are many severe statutes of the Scotch Parliament against beggars and vagabonds, all of which, along with the proclamations of the Scotch Privy Council on the same subject, are renewed and ratified by the act 1698, c. 21, which forms the existing Scotch law in regard to beggars. The Scotch Poor-Law Amendment Act, 8 and 9 Vict. c. 83, contains no provision on the subject. Anciently, in Scotland, legal permission to beg was given to certain sick and infirm poor persons, and in the reign of James V., a system of *tokens* for the same purpose was established.—See Burn's *Justice of the Peace*, vol. vi.; Charnock's *Police Guide*, Dunlop's *Parochial Law of Scotland*, Lorimer's *Hand-book of the Scotch Law*, and the works and authorities referred to in these publications.

BEGGAR-MY-NEIGHBOR, a game of cards usually played by two persons, between whom the cards are divided. Holding their

cards with the backs upwards, the players lay down a card alternately, until an honor is played, which is paid for by the adversary —four cards for an ace, three for a king, two for a queen, and one for a knave; such payment being made, the winner lifts the trick. If, however, an honor should be laid down during the payment, then the opposite party must pay for that in the same way; and so on, till a payment is made without an honor. The game is played chiefly by children.

BEGHA'RMI, or BAGI'RMI, a country in Central Africa, bounded on the N. by Lake Tsad; on the W. by the Shari, or Great River, which divides it from the kingdom of Bornou; and on the E. by the Waday kingdom. It extends southward to about lat. 10° N. Its greatest length is about 240 miles, and its breadth 150. The whole of B. Proper is flat, with a slight inclination towards the north—its general elevation being about 1000 feet above the level of the sea. The outlying provinces in the south-east are slightly mountainous. B. has three considerable rivers flowing through and along its borders—the Bénuwé, Logan, and Shari; the last of which, augmented by the Logon, is upwards of 600 yards across at Mele. There is, in general, however, the utmost scarcity of water in the country, and the inhabitants guard their wells with jealous care. The soil is partly composed of sand, and partly of lime, and produces the grain and fruit common to countries of Central Africa. Worms and ants are very destructive to the crops. The ants appear to be a perfect pest. Dr. Barth describes them as eating through his matting and carpeting, and he had the utmost difficulty in preserving his goods from entire destruction by them. The total population is about a million and a half. From the numerous deserted villages with which the traveler constantly meets, the population would appear to have been much greater at one time. Mohammedanism has been introduced among them, but many are still pagans, and all are grossly superstitious. The only industrial arts are weaving and dyeing. Physically, they are a fine race of people, superior to the tribes around them, the women being especially handsome. The men are subject to a peculiar disease in the little toe, called 'mukárdam.' It seems to be caused by a worm, which eats the toe away. One in ten of the male population are said to have lost their little toes through this cause. The sultan is absolute in his own dominions, and several smaller states are tributary to him; and he, in his turn, is tributary to the more powerful ruler of Bornou. The fighting-force of the kingdom is about 13,000 men. Masena (q. v.), the capital, has a circumference of about 7 miles.—Barth's *Travels in Central Africa.*

BE'GKOS, or BEI'KOS, a large village of Anatolia, on the Bosphorus, 8 miles north-north-east of Scutari, said to be the locality of the contest between Pollux and Amycus, in which the latter was killed. See ARGONAUTS. At the commencement of the Crimean war, the Allied fleets anchored in B. Bay, prior to their entering the Black Sea in January 1854.

BE'GLERBEG. See BEG.

BEGONIA'CEÆ, a natural order of exogenous plants, the place of which in the system is doubtful, but is supposed by Lindley to be near *Cucurbitaceæ* (q. v.). The B. are herbaceous or suffruticose plants, with alternate leaves, which are oblique at the base, and have large dry stipules. The flowers are in cymes, unisexual, the perianth colored, with four unequal divisions in the male flowers, and five or eight in the female; the stamens are numerous; the fruit is membranous, winged, 3-celled, bursting by slits at the base, the seeds minute —The order contains about 160 known species, all of which have pink flowers. They are almost all tropical plants, and some of them are often to be seen in British hot-houses; but a small species of *Begonia* ascends the Himalaya to at least 11,500 feet, often growing on the trunks of trees. The leaves of the *Begonias* have a reddish tinge. The leaves and young stems are succulent and acid, and those of *B. Malabarica*, *B. tuberosa* and other species, are used as pot-herbs, or in tarts. The juicy stalks of a large species found in Sikkim, at an elevation of five or six thousand feet, are mentioned by Dr. Hooker as employed to make a pleasant acid sauce. This, and the small Himalayan species already mentioned would probably succeed in the climate of Britain. The roots of some are used in their native countries as astringents, and some of the Mexican species are used as drastic purgatives.

BEG-SHE'HR, a fresh-water lake of Asia Minor, Karamania, 44 miles south-west of Koniyeh, presumed to be the ancient *Caralitis*. It is about 20 miles long, and from 5 to 10 miles broad. It contains many islands, and discharges itself by a river of the same name into Lake Soglah. On its east and north shores are the towns of Begshehr and Kereli, the old *Caralio*, which issued imperial coins, and which is also supposed to have occupied the site of Pamphylia.

BEGTA'SHI, a religious order in the Ottoman empire, which had its origin in the 14th c. The name is believed to be derived from that of a celebrated dervise, Hadji Begtash, to whom also the order appears to owe its institution. The members use secret signs and pass-words as means of recognition, in the same way as is done by the masonic orders, some of them indeed appearing to be identical with those of freemasonry. Although numbering many thousands of influential persons in its ranks, the society does not appear to exercise any material influence in the religion or politics of Turkey.

BE'GUINES, BEGUI'NÆ, or BEGU'TTÆ, the name of the earliest of all lay societies of women united for pious purposes. The reason of their origin is not quite certain, but it is usually attributed—in part, at least—to the disproportion in the numbers of men and women which was occasioned by the Crusades. These wars had robbed Christendom of thousands of its most vigorous sons, and left multitudes of widows and maidens, to whom life had henceforth something of a solemn and sorrowful aspect, and who therefore betook themselves, in earnest and affectionate piety, to the charities and duties of religion. The origin of the word is doubtful. The popular tradition of Brabant since the 17th c., that a St. Begga, daughter of Pepin, and sister of St. Gertrude, founded, in 696, the first sisterhood of B. at Namur, has no historical basis. Hallmann has also shown that the supposed oldest document of the B. (1065), giving an account of their establishment at Vilvorde, near Brussels, is unauthentic. The most probable account is, that a priest named Lambert le Bègue, or Le Bèghe, i. e., the Stammerer, about the year 1180, founded, in Liege, a society of pious women, who were called by his name. The B. were not restricted by vows, nor did they follow the rules of any order, but were united under a *supérieure* for the exercise of piety and benevolence, and lived generally in separate small cottages, which, collectively, formed the *Beginagium*, or '*vineyard*,' as it was scripturally termed. Their establishments were often enriched by liberal donations. A church, a hospital, and a house of reception or common entertainment, generally belonged to every community of Beguines. The sisters were distinguished from the rest of the laity only by their diligence and devotedness, piety, modesty, and zeal for the purity of youthful education. Societies of B. flourished greatly during the 12th and 13th centuries, when they spread themselves over France and Germany. Among the most important were those in Hamburg, Lübeck, Regensburg, Magdeburg, Leipsic, Goslar, Rochlitz, and Görlitz. As the pietists of the middle ages, the B. were often subjected to persecution by the mendicant orders of friars; but, on account of their practical usefulness, were sheltered by the pope and councils as well as by secular authorities. In the 13th and 14th centuries, the B. became united with the persecuted spiritualists among the Franciscans (*Fratricelles*), and with the sect of the 'Brethren and Sisters of the Free Spirit.' Hence arose certain heresies, which, of course, occasioned interference on the part of the Inquisition; and on account of certain immoralities, a synod held at Fritzlar required that all candidates must be forty years old before they could enter a society of Beguines. These sisterhoods maintained their position in Germany and the Netherlands longer than in other countries. In Holland, they existed at the close of the 18th c.; and in the present day we find here and there so-called *Beguinen-häuser* (Beguin-houses) in Germany; but they are now nothing more than almshouses for poor spinsters. At Ghent, there is still a celebrated institution of B., numbering as many as 600 sisters, besides 200 *locataires*, or occasional inmates.

Their houses form a kind of distinct little town, called the Béguinage, which, though environed by a wall is open to the visits of strangers. Living here a life of retirement and piety, the B., in their simple dark dresses, go out as nurses to the hospital, and perform other acts of kindness among the poor. As above stated, they are under no monastic vow, but having attached themselves to the sisterhood, it is their boast that none is known to have quitted it. There are houses of B. also at Antwerp, Mechlin, and Bruges; and in 1854, one was established in France, at Castelnaudary, in the department of Aude.

BEGARDS (Ger. *begehren*, to seek with importunity). Societies of laymen styling themselves *B.*, first appeared in Germany, the Netherlands, and the south of France in the beginning of the 13th c., and were known in Italy as *Bizachi* and *Bocasoti;* but they never obtained the reputation enjoyed by the Beguine sisterhood. Towards the end of the 13th c., they were commonly stigmatized as *bons garçons*, *boni pueri*, 'ministers' men,' 'bedesmen.' 'pietists,' 'vagabonds'—contemptuous titles, which expressed the low estimation in which they were held. On account of heretics of all sorts retreating into these half-spiritual communities, they were subject to severe persecutions after 1367, and were gradually dispersed, or joined the orders of Dominicans and Franciscans. In the Netherlands, where they had preserved a better character than elsewhere, they maintained their ground longer, and were protected by Pope Innocent IV. (1245), in Brussels by Cardinal Hugo (1254), and in Liege by Pope Urban IV. (1261); but their communities disappeared in the 14th c.—See Mosheim, *De Beghardis et Beguniabus* (Leip. 1790), and Hallman's *Geschichte des Ursprungs der*

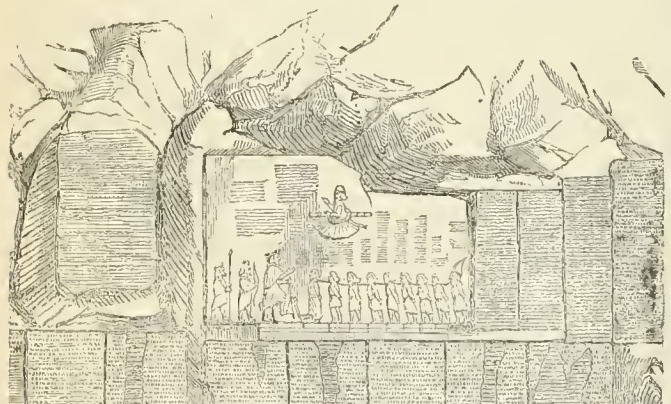
Belg. Beghinen (History of the Origin of Beguines in Belgium), Berlin, 1843.

BEHAIM, MARTIN, a famous cosmographer, descended from a Bohemian family which settled in Nuremberg after the middle of the 13th c., and still flourishes there. B. was born in Nuremberg in 1430 (or, more probably, in 1436). He early entered into mercantile life, and went to Venice (1457), and to Mechlin, Antwerp, and Vienna (1477—1479), in pursuit of trade. In 1480, he was induced to go to Portugal, where he soon acquired a reputation as a skilful maker of maps. From 1484 to 1485, he accompanied the Portuguese navigator, Diego Cam, in a voyage of discovery along the west coast of Africa, and sailed as far as the mouth of the Zaire or Congo river, in lat. 22° S., which was 19½° further than had ever been previously reached. In 1486, B. sailed to Fayal, one of the Azore islands, where a Flemish colony had settled. Here he married the daughter of Jobst von Küster, governor of the colony. In 1490, he left Fayal, and returned to his native city, Nuremberg, where he resided from 1491 to 1493. During this stay, he constructed a large globe, principally from the writings of Ptolemy, Pliny, Strabo, Marco Polo, and Sir John Mandeville. It is still preserved by the family of B. in Nuremberg, and is a valuable record of the progress of discovery, though it indicates that B.'s geographical knowledge did not at that period extend beyond Japan on the east, and the Cape Verd Islands on the west. After traveling through Flanders and France, B. again resided in Fayal from 1494 to 1506, and then removed to Lisbon, where he died, July 29, 1509. The services rendered by B. to geographical discovery and the science of navigation were considerable, though, according to the latest investigations, there is no support for the theory that B. was the discoverer of America, or even that Columbus and Magelhaen were indebted to B. for guidance with regard to their discoveries. B. left no works behind him except his maps and charts.—Murr's *Diplomatische Geschichte des Ritters von B.* (1778—1801); A. von Humboldt's *Examen Critique de l'Histoire de la Géog. du Nouveau Continent* (1836).

BEHAR. See BAHAR.

BEHEA'DING. See CAPITAL PUNISHMENT.

BEHISTU'N, or BISUTU'N (Lat. *Bagistanus;* Persian *Baghistan,* Place of Gardens), a ruined town of the Persian province of Irak-Ajemi, 21 miles east of Kirmanshah, lat. 34° 18′ N., long. 47° 30′ E. B. is chiefly celebrated for a remarkable mountain, which on one side arises almost perpendicularly to the height of 1700 feet, and which was in ancient times sacred to Jupiter or to Ormuzd. According to Diodorus, Semiramis, on her march from Babylon to Ecbatana, in Media Magna, encamped near this rock, and having cut away and polished the lower part of it, had her own likeness and those of a hundred of her guards engraved on it. She further, according to the same historian, caused the following inscription in Assyrian letters to be cut in the rock: 'Semiramis having piled up one upon the other the trapping of the beasts of burden which accompanied her, ascended by these means from the plain to the top of the rock.' No trace of these inscriptions is now to be found, and Sir Henry Rawlinson accounts for their absence by the supposition that they were destroyed 'by Khusraú Parvíz when he was preparing to form of this long scarped surface the back wall of his palace.' Diodorus also mentions that Alexander the Great, on his way to Ecbatana from Susa, visited Behistun. But the rock is especially interesting for its cuneiform inscriptions (q. v.), which within recent years have been successfully deciphered by Sir H. Rawlinson. The principal inscription of B., executed by the command of Darius, is on the north extremity of the rock, at an elevation of 300 feet from the ground, where it could not have been engraved without the aid of scaffolding, and can now only be reached by the adventurous antiquary at considerable risk to his life. The labor of polishing the face of the rock, so as to fit it to receive the inscriptions, must have been very great. In places where the stone was defective, pieces were fitted in and fastened with molten lead with such extreme nicety, that only a careful scrutiny can detect the artifice. 'But the real wonder of the work,' says Sir H. Rawlinson, 'consists in the inscriptions. For extent, for beauty of execution, for uniformity and correctness, they are perhaps unequalled in the world.'



Rock Inscriptions at Behistun.

'After the engraving of the rock had been accomplished, a coating of silicious varnish had been laid on, to give a clearness of outline to each individual letter, and to protect the surface against the action of the elements. This varnish is of infinitely greater hardness than the limestone rock beneath it.' Washed down in some places by the rain of twenty-three centuries, it lies in consistent flakes like thin layers of lava on the foot-ledge; in others, where time has honey-combed the rock beneath, it adheres to the broken surface, still showing with sufficient distinctness the forms of the characters. The inscription—in the three forms of cuneiform writing, Persian, Babylonian, and Median—set forth the hereditary right of Darius to the throne of Persia, tracing his genealogy, through eight generations, up to Achæmenes; they enumerate the provinces of his empire, and recount his triumphs over the rebels who rose against him during the first four years of his reign. The monarch is represented with a bow in hand, and his foot upon the prostrate figure of a man, while nine rebels, chained together by the neck, stand humbly before him, behind him are two of his own warriors, and above him another figure [see cut]. The Persian inscriptions which Sir H. Rawlinson has translated are contained in the five main columns numbered in cut 1, 2, 3, 4, 5. The first column contains 19 paragraphs, and 96 lines. Each paragraph after the first, which commences, 'I am Darius the Great King,' begins with, 'Says Darius the King.' The second column has the same number of lines in 16 paragraphs; the third, 92 lines and 14 paragraphs; the fourth has also 92 lines and 18 paragraphs; and the fifth, which appears to be a supplementary column, 35 lines. With the exception of the first paragraph on the first column, all begin with, 'Says Darius the King.' The second, fourth, and fifth columns are much injured. Sir H. Rawlinson fixes the epoch of the sculpture at 516—515 B.C. See *Journal of Asiatic Society,* vol. x.

BEHME, JACOB. See BÖHME.

BEHN, APHARA, or APHRA, a licentious authoress of the reign of Charles II., the date of whose birth is unknown, was the daughter of Mr. Johnson of Canterbury, a gentleman who, through his aristocratic connections, obtained the appointment of governor of Surinam. He died on his passage out, but the daughter pursued her journey, and resided at Surinam for some considerable time. Here she made the acquaintance of the celebrated slave Oronoka, who afterwards became the subject of one of her novels, and of a tragedy by Southern. Returning to England, she married Mr. Behn, a merchant of Dutch extraction, was presented at court, where her personal appearance and vivacious freedom of manners pleased the 'Merry Monarch,' who deputed her to watch events in Flanders. She accordingly went to Antwerp, where she succeeded in discovering the intention of the Dutch to sail up the Thames and Medway, and communicated the secret to the English court; which, however took no notice of the information, a slight which caused the fair agent to throw up state politics in disgust. On her return to England, she became intimate with all the profligate wits as well as the more staid scholars and poets of the time, and devoted herself to literature. Her numerous plays, poems, tales, letters, &c., are disfigured alike by general impurity of tone and indecency of language; and, in point of intellectual ability, none of her works deserves the high praise lavished on them by Dryden, Cotton, Southern, and others. She died in 1689. Her works were reprinted in 4 vols 1872.

BE'HRING, or BERING, VITUS, a famous navigator, born in 1680 at Horsens in Denmark. In 1704 he entered as captain the newly formed navy of Peter the Great. From the ability and daring he had displayed in the wars with Sweden, he was appointed to conduct an expedition of discovery in the Sea of Kamtchatka. Sailing, in 1728, from a port on the east of Kamtchatka, he followed the coast northward until he believed, from the westward trending of the land, that he had reached the north-east point of Asia. It is now, however, believed that the cape which B. rounded was to the south of the real East Cape (in lat. 66°), and that he never actually reached the strait to which he has given his name. After some years spent in explorations on the coasts of Kamtchatka, Okhotsk, and the north of Siberia, he sailed in 1741 from

Okhotsk towards the American continent, and sighting land about 58½° N. lat., he followed the coast northward for some distance; but sickness and storms obliged him to return, and being wrecked on the desert island of Awatska, since called Behring's Island, he died there, 8th December 1741. The previous year, he had founded the present settlement of Petropaulovski, in the Bay of Awatska.

BE'HRING'S STRAIT separates Asia from America, and connects the Pacific with the Arctic Ocean. The proof that the two continents were not connected was given by the voyage of a Cossack named Deschnew, who, in 1648, sailed from a harbor in Siberia, in the Polar Ocean, into the Sea of Kamtchatka. But the whole voyage was long regarded by Europeans as a fable, until Behring's (q. v.) expedition in 1728. The strait has since been explored by Cook and Beechy. The narrowest part is near 66° lat., between East Cape in Asia, and Cape Prince of Wales in America. The distance between the two capes, in a direction from north-west to south-east, is nearly 50 miles; about midway are three uninhabited islands. The greatest depth, some 30 fathoms, is towards the middle, and the water is shallower towards the American coast than the Asiatic. A very old Japanese map in the British museum shows the leading features of this strait very accurately.—BEHRING'S SEA, a part of the North Pacific Ocean, commonly known as the Sea of Kamtchatka, bounded west by Kamtchatka, east by Alaska, south by the Aleutian Islands, and north by Behring's Strait. There are several islands in this sea, and fogs prevail constantly; but owing to the shallowness of the strait, there are no icebergs of magnitude to be met with.—BEHRING'S ISLAND, the most westerly of the Aleutian Islands in lat. 55° 22′ N., long. 166° E. It has an area of 30 square miles, and is noteworthy as the place where Behring, the discoverer, was wrecked and died in 1741.

BEILA'N, a pass and town in the northern extremity of Syria, on the east shore of the Gulf of Iscanderoon. The pass of B. runs from south-west to north-east, between the mountain-ranges or Rhosus and Amanus, and is the common route from Cilicia into Syria. It is one of the two Amanian passes, supposed to be the lower one, mentioned by Cicero ac capable of easy defence on account of their narrowness. There seems to be no doubt that, in the war between Darius and Alexander, the B. Pass was an important consideration to both commanders, but historians and geographers appear to be at variance as to the precise advantage taken of it in the struggle. The town of B. is situated near the summit-level of the pass, at an elevation of 1584 feet above the Mediterranean Sea. It has a population of about 5000, many of whom are wealthy, and is much esteemed for its salubrity and fine water, which is supplied by numerous aqueducts. Between the north-western foot of the pass and the sea, are caves and springs, supposed to be the site of the ancient Myriandrus. B. was the scene of a battle between the Egyptians and Turks in 1832, when the latter were defeated.

BE'IRA, a Portuguese province, bounded N. by the provinces of Minho and Tras-os-Montes; S. by Estremadura and Alemtejo; E. by Spain; and W. by the Atlantic Ocean. It has an area of about 9222 square miles, and a pop. (1878) of 1,390,092. The surface is mountainous, and the soil on the plains sandy, and generally far from fertile. The mountain-slopes afford good pasturage for sheep and cattle. The products are corn, wine, oil, flax, and various kinds of fruit, and considerable attention is paid to the rearing of bees. Sea-salt is obtained at the coast. The river Douro waters the whole of its northern, and the Tagus, a portion of its southern, boundary. The Mondego and Vouga flow through its center. Iron, coal, and marble are wrought in small quantity. There is little done in manufactures. The inhabitants are an industrious race of people. In 1835, the province was divided into Upper and Lower Beira, the former having Viseu and the latter Castel Branco for its capital.

BEIRAM, or BAIRAM, a Mohammedan festival somewhat analogous to Easter. It commences immediately after the fast of Ramadan, or Ramazan, which corresponds to Lent. Being one of the only two feasts the Moslems have in the year, it is looked forward to with great interest, the zest being enhanced by the previous abstinence. Its advent is announced at Constantinople by the discharge of artillery, the beating of drums, and blowing of trumpets. Properly, it should terminate in one day, but the Moslems in the capital think it no offence to their abstemious prophet to carry the festivities over two days; while in other parts of Turkey and Persia, they are often protracted a week or more. Dances, music, processions, &c., in which the women are permitted greater indulgence than usual, form prominent features of the feast; and at this time the different orders of the empire pay homage to the sultan. Seventy days after, the Moslems celebrate their only other feast ('the festival of the sacrifices'), called the *lesser* B., which is the day appointed by the Mecca pilgrims for slaying the victims, and was instituted in commemoration of the offering up of Isaac by Abraham. The lesser B. usually lasts three days, but it is not celebrated with anything like the pomp of the other. During the continuance of each of the festivals, only one religious service takes place. The Mohammedan year being the lunar one of 354 days, in the course of thirty-three years the festivals run through all the seasons.

BEIT is an Arabic word, signifying house, abode, or place, the equivalent of which in Hebrew is *Beth*. Thus, in the former language, we have *Beit-al-Harâm*, 'the house of the sanctuary,' or 'the sacred house;' and in the latter *Beth-el*, 'house of God;' *Bethany*, 'place of dates;' *Beth-abara*, 'place of fords,' &c.

BEIT-EL-FA'KIH (House of the Saint), a town of Tehama, on the Red Sea. Being the frontier town of the Egyptian government, it has a considerable trade in coffee, wax, gum, &c., which articles are exchanged for Indian piece goods and British shawls. It has a population of about 8000, and a citadel of some strength. The houses are built partly of mud and partly of brick, and roofed with branches of the date-tree. It is described by travelers as the hottest town in Tehama.

BEITU'LLAH (Arab., House of God), the spacious building or temple at Mecca, which contains the Kaaba. See MECCA and KAABA.

BE'JA (the *Pax Julia* of the ancients), a town in the province of Alemtejo, Portugal, 36 miles south-south-west of Evora, with a population of 6500. It is fortified, its walls being flanked by 40 towers, has a castle and a cathedral, and manufactories of leather and earthenwares.

BE'JAN, or BA'JAN, the name of the first or 'freshman' class in some at least of the Scotch, and of old in many continental universities. The word is believed to be derived from the French *bec-jaune*, or yellow neb, a term used to designate a nestling or unfledged bird. The levying of *bejaunia*, or payments for 'first-footing' by students on entering college, was forbidden by the statutes of the university of Orleans in 1365, and of the university of Toulouse in 1401. The election of an *Abbas Bejanorum*, or 'Abbot of the Greenhorns,' was prohibited by the statutes of the university of Paris in 1493. In the university of Vienna, the *bejan* was called *beanus*, a word of the same meaning, and no doubt of the same origin.

BEJAPU'R, a decayed city in the presidency of Bombay, lat. 16° 50′ N., and long. 75° 48′ E. It is situated to the south-east of Bombay, Poonah, and Satara, at the respective distances of 245, 170, and 130 miles, being on an affluent of the Kistna or Krishna, which flows into the Bay of Bengal, and nearly touching the west border of the Nizam's territories. B. was for centuries the flourishing capital of a powerful kingdom, falling therewith under various dynasties in succession, Hindu and Mussulman, till, in 1686, it was captured by Aurungzebe. Thus stripped of its independence, B. speedily sank into the shadow of a mighty name, passing, during the early part of the 18th c., into the hands of the Mahrattas. On the overthrow of the Peishwa in 1818, it was assigned by the British to the dependent Rajah of Satara; but resumed on the extinction of the reigning family in 1848. Now that a gradual decay has done its worst, B. presents a contrast perhaps unequalled in the world. Lofty walls, of hewn stone, still entire, enclose the silent and desolate fragments of a city which is said to have contained 100,000 dwellings. With the exception of an ancient temple, the sole relic of aboriginal domination, the ruins are Mohammedan, and consist of beautiful mosques, colossal tombs, and a fort of more than 6 miles in circuit, with an inner citadel. An additional wonder of the place is, perhaps, the largest piece of brass ordnance in existence, cast at Ahmednuggur, where the mould may still be seen. Latterly, the Rajah of Satara and the British government have done everything to prevent further decay. Pop. (1872) 13,245.

BEJAR, a fortified town of Spain, in the province of Salamanca, and about 45 miles S. of the capital of the province. It has cloth manufactures and an annual fair at which a considerable cattle trade is transacted. It has warm saline springs, and gives its title to a ducal family who have a palace within its walls. Pop. (1877) 11,099.

BEKAA, the Cœle-Syria of the ancients, the 'Plain of Lebanon' of the Old Testament, and El Bekaa (the Valley) of the natives of Syria, is enclosed between the parallel ranges of Lebanon and Anti-Lebanon, which mountains it divides, and extends about 90 miles from north to south, its greatest width being about 12 miles. It is the most rich and beautiful plain in Syria; but although the soil is good and water abundant from the numerous mountain-springs, a very small portion of it is cultivated. It is very much frequented by the Arabs, who bring down their young horses in the spring-time to graze on the plain.

BEKE, CHARLES TILSTONE, Ph.D., &c., a modern English traveler, was born in London, October 10, 1800; received a commercial education; afterwards studied law in Lincoln's Inn, and devoted a great part of his attention to ancient history, philology, and ethnography. The results of these studies first appeared in

his work, *Origines Biblicæ*, or researches in primeval history, vol. i. (Lond. 1834). His historical and geographical studies of the East led B. to consider the great importance of Abyssinia for intercourse with Central Africa; but his proposals to undertake an exploring journey were declined by the government and by several learned societies. Supported only by private individuals, he joined in Abyssinia the party led by Major Harris, and distinguished himself by the exploration of Godshem and the countries lying to the south, previously almost unknown in Europe. The results of these researches appeared partly in several journals, and in *Abyssinia, a Statement of Facts*, &c. (2d ed., Lond. 1846). Having returned to Europe, he excited the attention of geographers by his publications: the *Essay on the Nile and its Tributaries* (Lond. 1847); *On the Sources of the Nile* (1849), and by his *Mémoire Justificatif en Réhabilitation des Pères Paez et Lobo* (Paris 1848). In 1861, Dr. and Mrs. B. made a journey to Harran; and undertook in 1865 a fruitless mission to Abyssinia to obtain the release of the captives. At the commencement of 1874, Dr. B. started for the region at the head of the Red Sea, where he claimed (though his views are disputed) to have discovered Mount Sinai, east of the Gulf of Akabah, and not west as generally supposed. He died in July of the same year, being engaged at the time on an account of his journey to Sinai. He had enjoyed a civil list pension since 1870.

BEKES, or BEKESVAR, a town of Hungary, capital of the county of the same name, and situated at the confluence of the Black and White Körös. Pop. (1880) 23,938, who do a trade in cattle, corn, and honey.

BEKKER, Immanuel, a German philologist, distinguished by his recensions of the texts of Greek and Roman classics, was born in Berlin, 1785; studied in Halle, 1803—1807, and was the most eminent pupil of F. A. Wolf. Afterwards, he was engaged at Paris on the *Corpus Inscriptionum Græcarum*. The results of his researches in the libraries of Italy (1817—1819) appear in his *Anecdota Græca* (3 vols., Berlin, 1814—1821), and his numerous recensions of texts derived solely from MSS., and independently of printed editions. The writers included in these recensions are Plato, the Attic orators, Aristotle, Sextus Empiricus, Thucydides, Theognis, Aristophanes, &c. He became professor at Berlin in 1810, and died in 1871.

BEL AND THE DRAGON, an apocryphal book of the Old Testament. It does not seem to have been accepted as inspired by the Jewish Church, nor is there any proof that a Hebrew or Chaldee version of the story ever existed. Jerome considered it a 'fable,' an opinion in which most modern readers will coincide. It is, nevertheless, read for edification both in the Roman Catholic and Anglo-Catholic churches: in the former on Ash Wednesday; in the latter on the 23d of November. According to Jahn, the aim of the writer was 'to warn against the sin of idolatry some of his brethren who had embraced Egyptian superstitions.'

BELA, the name of four Hungarian kings of the family of Arpad.—B. I. (1061—1063) energetically suppressed the last attempt to restore heathenism, and by the introduction of a fixed standard of measures, weights, and coinage, virtually founded the commerce of Hungary. He was also the first to introduce the representative system into the diet, by appointing, in lieu of the collective nobility, two nobles only from each of the different counties.—B. II., surnamed 'the Blind,' 1131—1141, was entirely under the guidance of his bloodthirsty spouse, Helena, and after her decease, drank himself to death.—B. III., 1174—1196. Educated in Constantinople, he introduced Byzantine customs and culture into his own country, which was certainly favorable to its social development, though, on the other hand, his evident devotion to the Greek emperor Emmanuel threatened its political independence.—B. IV., 1235—1270, son of that Andreas from whom the nobles extorted the 'Golden Bull,' Hungary's Magna Charta. His chief aim was to humble the nobility, and restore the royal power to its former proportions; and he thus roused a spirit of universal discontent, which led to a party among the nobles calling in the Austrian duke, Frederick II., to their aid; but, in the year 1236, he was conquered by B., and forced to pay tribute. Before long, however, the king had to seek a refuge with his discomfited foe; for the Mongols, who invaded Hungary in 1241, defeated him on the Sajo, and put him to flight. It was only after robbing him of all the treasure he had managed to save, and extorting from him three of his counties, that Frederick II. granted the royal fugitive a shelter in Austria, where he remained till the Mongols, having heard of the death of their khan, left the country they had devastated. B. now made it his especial care, by rebuilding the destroyed villages, and inviting new settlers thither, to do away with the tokens of that terrible invasion; and he so far succeeded as to be able, in 1246, to repay Frederick's inhospitality by defeating him at Vienna, and to repulse a second attempt at Mongolian invasion. He died in 1270, his last years having been embittered by an attempt at rebellion on the part of his son Stephen.

BELAYING, one of the many modes of fastening ropes on shipboard. It is effected by winding a rope, generally a part of the running rigging, round a piece of wood called a cleat or a kevel, or else round a belaying-pin, which is an ashen staff from twelve to sixteen inches in length.

BELBEY'S (ancient *Bubastis Agria*), a town of 5000 inhabitants, situated on the east arm of the Nile, Lower Egypt, and 28 miles north-north-east of Cairo. It is enclosed by earthen ramparts, has numerous mosques, and is one of the stations on the route from Cairo to Suez, and from Egypt to Syria.

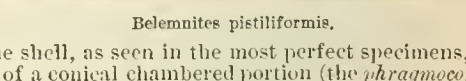
BELCHER, Sir Edward, a distinguished English naval officer, born in 1799, entered the navy in 1812 as a first-class volunteer, was soon made a midshipman, and in 1816 took part in the bombardment of Algiers. In 1825, B. was appointed assistant-surveyor to the expedition about to explore Behring's Strait under Captain Beechey; in 1829, he was raised to the rank of commander. 1836 saw him in command of the *Sulphur*, commissioned to explore the western coasts of America and the Indies. He was absent six years, in which time he had sailed round the world. During this voyage he rendered important services in the Canton river to Lord Gough, whose successes over the Chinese were greatly due to B.'s soundings and reconnaissances pushed into the interior. On his return, he published a narrative of the voyage; and in 1843, in consideration of his services, he was made a post-captain, and knighted. After being employed on surveying service in the East Indies, he was, in 1852, appointed to the command of the expedition sent out by government to search for Sir John Franklin. B. published *The Last of the Arctic Voyages* (Lond. 1855); *Narrative of a Voyage to the East Indies in* 1843—1848; and other works. In 1861 he became rear-admiral of the Red, in 1866 vice-admiral, in 1867 K.C.B., and rear-admiral in 1872. He died 18th March 1877.

BELCHI'TÉ, a town of Spain, in the province of Saragossa, about 22 miles south-south-east of the city of that name, celebrated as the place where, in June 18, 1809, the French, under Suchet, completely routed the Spanish under General Blake, capturing all their guns, 10 in number, with a loss of only 40 men. It has woollen manufactures. Pop. over 3000.

BELE'M, a town of Portugal, on the right bank of the Tagus, 2 miles south-west of Lisbon, of which it may be said to form a fashionable suburb. It has an iron foundry, a custom-house, and quarantine establishment, a tower defending the entrance of the river. It is historically interesting as the place from whence Vasco da Gama set sail on his voyage of oriental discovery. It was taken in November 1807 by the French, the royal family of Portugal embarking from its quay for Brazil as they entered. In 1833 it was occupied by Dom Pedro's troops. Pop. 5000.

BELE'M, or PARA', a city of Brazil, on the right bank of the Para, the most southerly arm of the estuary of the Amazon. See Para.

BE'LEMNITES (Gr. *belemnon*, a dart or arrow), an interesting genus of fossil cephalopodous *Mollusca*, the type of a family called *Belemnitidæ*, to the whole of which the name B. is very generally extended, closely allied to the *Sepiadæ*, or Cuttle (q. v.) family. No recent species of B. is known: fossil species are very numerous, and are found in all the oolitic and cretaceous strata, from the lowest lias to the upper chalk, some of which are filled with myriads of their remains. These remains are generally those of the shell alone, which is now known to have been an internal shell, entirely included within the body of the animal, like that of the



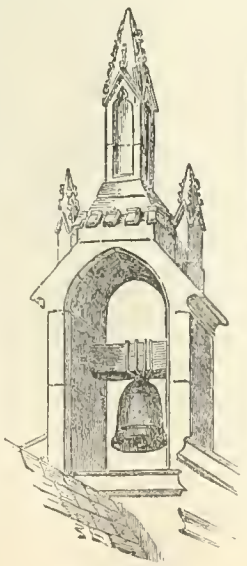
Belemnites pistiliformis.

cuttle. The shell, as seen in the most perfect specimens, is double, consisting of a conical chambered portion (the *phragmocone*), inserted into a longer, solid, somewhat conical or tapering, and pointed sheath. The space between the phragmocone and sheath is occupied either with radiating fibres or conical layers. The chambers of the shell are connected by a tube (*siphuncle*), so that the animal probably had the power of ascending and descending rapidly in the water. Its arms are known, from some singularly perfect specimens, to have been furnished with horny hooks; and these it probably fixed upon a fish, and descended with its prey to the bottom, like the hooked Calamary (q. v.) of the present seas. Remains of an ink-bag, like that of the cuttle, have been found in the last and largest chambers of the B.; but remains of this chamber, which must have contained all the viscera of the animal, are very rarely preserved, the shell having been very thin at this part. The part most commonly found, and generally known by the name of belemnite, is the solid *mucro*, or point into which the sheath was prolonged behind the chambered shell. These have received such popular

names as Arrowheads, Petrified Fingers, Spectre-candles, Picks, Thunder-stones, &c., from their form, or from the notions entertained of their nature and origin. B. appear to have been of very different sizes; in some of the largest, the mere *mucro* is 10 inches long, and the entire animal, with its arms outstretched, must have been several feet in length.

BELFA'ST, the chief town of the county of Antrim and province of Ulster in Ireland. This great seaport stands at the embouchure of the Lagan, at the head of Belfast Lough, 12 miles from the Irish Sea, 101 north of Dublin, 36 north-east of Armagh, 130 south-west of Glasgow, and 150 north-west of Liverpool. The site is chiefly on an alluvial deposit not more than 6 feet above the sea-level, and reclaimed from the marshes, of the Lagan. On the land-side it is picturesquely bounded by the ridges of Divis (1567 feet high), and Cave Hill (1185 feet). The general aspect of B. is indicative of life and prosperity, exhibiting all the trade and manufacture of Glasgow and Manchester, with far less of their smoke and dirt. Many of the streets, especially in the White Linen Hall quarter, are well built and spacious. The mercantile quarter lies chiefly near the extensive and well-built quays. The manufactories are mostly on the rising-ground on the north and west of the town. Numerous villas sprinkle the northern shores of the bay, as well as the elevated suburb of Malone to the south. Of the churches of B., above 30 are Presbyterian, about 20 Episcopalian, 15 Methodist, and 8 Roman Catholic. Queen's College was opened in 1849. The Presbyterian College had the power of granting degrees in theology conferred on it in 1881. The Royal Academical Institution, and the Government School of Art, are also of importance. There are numerous hospitals and banks. The Customs, Inland Revenue, and Post-office have large buildings, and the Town-hall is extensive. The Botanic Gardens occupy 17 acres. B. is the chief seat of the trade and manufactures of Ireland, and is second only to Dublin as an Irish port. The staple manufactures are linen and cotton. The linen manufacture dates from 1637. Cotton-spinning by machinery dates from 1777, and linen from 1806. The other chief branches of industry are linen and cotton weaving, bleaching, dyeing, calico-printing, and iron-founding. There are many flour and oil mills, chemical works, breweries, alabaster and barilla-mills, saw-mills, shipbuilding, rope, and sail-cloth yards. The iron-shipbuilding yard on Queen's Island employs upwards of 2000 hands. The inland trade is carried on by the Lagan, the Ulster Canal and three railways. The harbor has recently undergone very extensive improvements, adding 25 acres of area to the dock accommodation, and a mile of quayage, making B. one of the first-class ports of the United Kingdom. Before 1866 there were only 2 tidal docks; but since, 4 new docks and a tidal basin have been opened. On these a sum of £369,927 was expended. In 1880, 9700 vessels, of an aggregate tonnage of 1,859,293 tons, entered the port; and 9338, of 1,859,384 tons, cleared, mainly in the Channel trade. In 1880, fourteen newspapers were published in B. The town has an unhappy notoriety for riots between Orangemen and Catholics, such as that of July 1880. Pop. (1821) 37,000; (1851) 103,000; (1871) 174,412; (1881) 207,671. B. is governed by a corporation of 10 aldermen—one being mayor—and 30 councillors. It returns 2 members to parliament. B. was destroyed by Edward Bruce in the 14th c., but became an important town since 1604, receiving a charter in 1611. In the great civil war, the inhabitants at first joined the parliament, but afterwards became royalists.

BELFORT, or BEFORT, a town of France, capital of the French remnant of the department of Haut-Rhin. From 1870 to 1879 this remnant (234 sq. m.), taking its name from the town, was called the *Territoire de B.*, and consisted of those portions of Haut-Rhin which, seized by Germans during the war of 1870–71, were restored to France by the preliminaries of peace arranged at Versailles, 26th February 1871. The strategical importance of B. was recognized by France on its cession by Austria in 1648, and it was fortified by Vauban. At the outbreak of the war between France and Germany in 1870, B. was a fortress of the first rank; and as such maintained, from 3d December 1870 till 16th February 1871, a gallant defence against the German troops. It then capitulated, the defenders being permitted to march out with all the honors of war. B. was also besieged by the allies in 1814. B. has a brisk trade. Pop. (1876), 15,103; of territory (1876), 68,600.



Belfry or Bell-gable, Idbury Oxfordshire.

BE'LFRY (Fr. *beffroi*), a word of doubtful origin; a bell-tower, or turret, usually forming part of a church, but sometimes detached from it—as at Evesham and Berkeley, in England, and still more frequently in Italy. See CAMPANILE. Where a church was built in a deep glen, the belfry was perched on a neighboring height, as at St. Feve and elsewhere in Cornwall, and at Ardclach and Auldbar in Scotland. At this last place, the bell was hung upon a tree, as was common enough in Scotland at the close of the 17th c. Where the B. consists of a mere turret, it is often called a *bell-gable* or *bell-cote*, and is always placed on the west end of the church; a smaller one being sometimes placed at the east end, which is for the sanctus bell, for which reason it is placed over the altar. Municipal belfries are more common on the continent than in this country. When the burghs began to rise into importance after the 12th c., they asserted their right to have bells, to call the burghers together for council or for action. Thus detached belfries arose in the heart of towns. At a later date, they often became part of the *maison de ville*, or town-house, as at Glasgow and at Aberdeen, in this country; at St. Quentin and Douai, in France; and at Brussels, in Belgium.

BE'LGÆ, the name given by Cæsar to the war-like tribes which in his time occupied that one of the great divisions of Gallia which embraced part of the basin of the Seine, the basin of the Somme, of the Scheldt, of the Maas, and of the Moselle, which itself belongs to the basin of the Rhine. Their country was level, containing no mountains of any height, except the Vosges in the south. The name seems to have originally designated several powerful tribes inhabiting the basin of the Seine, and to have been afterwards used by Cæsar as a general appellation for all the peoples north of that river. These B. were, in all probability, chiefly of Celtic origin, but within their territories were to be found both pure and mixed Germans.

When South Britain was invaded by Cæsar, he found that B. from the opposite shores of Gaul had preceded him, and were settled in Kent and Sussex, having driven the aborigines into the interior. The B. in Britain resisted for nearly a century the Roman power, but were finally forced to yield to it. Cæsar regarded them as German, but they rather seemed to have belonged to the Celtic portion of the Gallic Belgæ. Certainly none of the names of their three chief towns are Germanic. Aquæ Solis (Bath) is Latin; Ischalis and Venta (Ilchester and Winchester), British.

BELGAU'M, the chief city of a district of the same name in the presidency of Bombay, situated to the east of the dividing ridge of the West Ghauts, at a height of about 2500 feet above the sea. Its lat. is 15° 50′ N., and long. 74° 36′ E., its distance to the north-west of Dharwar being 42 miles. B. possesses a fort, which, in 1818, was taken from the Peishwa by the British. Under its new masters, the place has made considerable progress. It has a superior institution for the education of native youths, which is supported at once by the neighboring princes, the British government, and private individuals. The average annual rainfall at B. is about 36 inches. In 1848, the citizens spontaneously subscribed a considerable sum for the complete reconstruction of their roads and lanes—a liberality which, besides drawing forth a supplementary grant of public money, roused the emulation of adjacent towns and villages. B. is one of the principal military stations of the presidency, and as such it was, in 1857, the scene of plotting, if not of mutiny, in common with Kolapore, Poonah, Satara, &c. Area of B. district, 4591 sq. m.; pop (1872) 938,750; pop. of town, 26,947.

BELGIOJO'SO, a town of Lombardy, North Italy, pleasantly situated in a fruitful plain between the Po and the Olona, 9 miles east of Pavia. It has a fine aqueduct and castle, in which Francis I. spent the night previous to the disastrous battle of Pavia, in which he was made prisoner. The Austrian general Gyulai made B. his head-quarters after his defeat at Magenta, June 4—5, 1859. Pop. 4000.

BE'LGIUM, one of the smaller European states, consists of the southern portion of the former kingdom of the Netherlands, (as created by the Congress of Vienna.

Geography and Statistics.—Belgium lies between lat. 49° 30′ and 51° 30′ N., and between long. 2° 33′ and 6° 5′ E. It is bounded on the N. by Holland; on the E. by Dutch Limbourg, Luxembourg, and Rhenish Prussia; on the S. and S.W. by France; and on the N.W. by the North Sea. Its greatest length, from the north-west to south-east, is 173 English miles; and its greatest breadth, from north to south, 112 English miles. The whole area is 11,373 square miles. The population at the census of 1876 was 5,336,185; of 1880, 5,519,844. Beneath are given the provinces, their areas, their population in 1873, and their chief towns.

Provinces.	Area in Square miles.	Population. Dec. 31, 1873.	Chief Cities.
Antwerp	1,094	513,543	Antwerp.
West Flanders	1,250	682,921	Bruges.
East Flanders	1,160	854,366	Ghent.

Provinces.	Area in Square miles.	Population, Dec. 31, 1873.	Chief Cities.
Hainault	1,436	932,036	Mons.
Liege	1,117	623,165	Liege.
Brabant	1,267	922,468	Brussels.
Limbourg	931	202,922	Hasselt.
Luxembourg	1,705	206,069	Arlon.
Namur	1,413	316,331	Namur.
Total	11,373	5,253,821	

B. is the most densely peopled country in Europe, the population being about 462 to the square mile; and in the particular provinces of East Flanders, Brabant, Hainault, West Flanders, and Liege, respectively, the proportion is 735, 728, 649, 557, and 555 to the square mile. The rural population is to that of the towns as 3 to 1.

Physical Aspect.—B. is, on the whole, a level, and even low-lying country, diversified, however, by hilly districts. In the south-east, a western branch of the Ardennes highlands makes its appearance, separating the basin of the Maas from that of Mosselle, but attains only the moderate elevation of 2000 feet. In Flanders the land becomes so low, that in parts where the natural protection afforded by the downs is deficient, dikes, &c., have been raised to check the encroachments of the sea. In the north-east part of Antwerp, a naturally unfertile district named the Campine, and composed of marshes and barren heaths, extends in a line parallel with the coast. The once impassable morasses of the *Morini* and the *Menapii*, which stayed the progress of Cæsar's legions, are now drained, and converted into fertile fields, surrounded by dense plantations, which make the land at a distance look like a vast green forest—though, when more closely regarded, we see only numerous dwellings interspersed among fields, canals, and meadows.

Hydrography, Climate, Agriculture, &c.—The abundant water-system of B. is chiefly supplied by the rivers Scheldt and Maas, both of which rise in France, and have their embouchures in Holland. At Antwerp, the Scheldt, which, like the Maas, is navigable all through Belgium, is 32 feet deep, and about 480 yards wide. Its tributaries are the Lys, Dender, and Rupel. The Maas, or Meuse, receives in its course the waters of the Sambre, the Ourthe, and the Roer. These natural hydrographical advantages are increased by a system of canals which unite Brussels and Louvain with the Rupel, Brussels with Charleroi, Mons with Condé, Ostend with Bruges and Ghent, and this last place with Ternuse. According to the resolution passed by the government in 1842, the long postponed project of cutting canals through the Campine district was at length commenced, and has been very advantageous to the spread of agriculture. A large portion of the Campine seems destined to perpetual barrenness—a dreary, silent, irreclaimable waste; but wherever it has been possible to rescue a patch from the stubborn heath or the relentless sand, there agricultural colonies have been planted, and cornfields shine, and pastures brighten in the heart of the immemorial wilderness. The climate of B., in the plains near the sea, is cool, humid, and somewhat unhealthy; but in the higher south-east districts, hot summers alternate with very cold winters. April and November are always rainy months. These varieties of climate are favorable to a greater variety of produce than the neighboring country of Holland can supply. The Ardennes districts yield a large supply of wood; while the level provinces raise all kinds of grain—wheat, rye, barley, oats, &c., leguminous plants, hemp, flax, colza, tobacco, hops, dye-plants, and chicory. Belgium contains upwards of 7,000,000 acres, of which one-half are arable, rather more than one-fifth in meadow and pasture, the same in woods and forests, and not above 500,000 acres lying waste. Some hundreds of acres are devoted to vineyards, but the wine produced is of an inferior quality. The forests of Ardennes abound in game and other wild animals. Good pasturage is found on the slopes and in the valleys of the hilly districts, and in the rich meadows of the low provinces. Gardening occupies not less than 130,000 acres; indeed, it has been said that the agriculture of B. is just gardening on a large scale, so carefully and laboriously is every inch of soil cultivated. The spade is still the principal instrument used. In the Campine, the care of bees is very productive, and the cultivation of the silk-worm is encouraged. There are valuable fisheries on the coast, which employ about 200 boats. B. is famous for its horses, and in 1880 contained some 290,000, together with 1,250,000 horned cattle, and 700,000 sheep.

Geology.—The geological formations of B. are closely associated with those of France and Britain. The greater portion of the country is covered with *Tertiary deposits*. A line drawn across the course of the Scheldt, by Mechlin, along the Demar and Maas, will have on its northern and north-western aspect a tract of tertiary deposits, bounded northwards by the sea. In these tertiary strata the different geological periods are fully represented; but only the second, containing the Pleiocene deposits, is rich in fossils. The *Secondary deposits* occupy an extensive tract in the center of Belgium, between the Scheldt and the Demer. The most important district, economically, is the south-western consisting of *Palæozoic rocks*—Silurian, Devonian, and Carboniferous. These beds have a very complicated structure, from the numerous and extensive flexures and folds they have undergone, and these are often accompanied with great upward shifts, by which beds of many different ages are brought to the same level.

Mineral Products.—B. is rich in minerals, which next to its abundant agriculture, constitute the chief source of its national prosperity. The four provinces in which they are found are Hainault, Namur, Liege, and Luxembourg. They include lead, copper, zinc, calamine, alum, peat, marble, limestone, slate, iron, and coal. Lead is wrought, but only to a small extent, in Liege; copper in Hainault and Liege; manganese in Liege and Namur; black marble at Dinant; slates at Herbemont; and calamine principally at Liege. But these products are insignificant compared to the superabundance of coal—from anthracite to the richest gas coal—and iron, in which B. ranks next to England. In 1880, B. had near 300 coal-mines, employing 110,000 persons, and producing 16,887,000 tons, the total value of which was £14,000,000. In the same year the metallic mines produced about 1,000,000 tons of iron ore, 73,000 of pyrites, 60,000 of calamine, 28,000 of blende, 23,000 of lead, and 450 of manganese. These mines gave employment to 13,122 workmen. In the same year there were 437 iron-works, producing manufactured iron to the value of £10,000,000.

The modern industrial character of the Belgians may be traced back to a very early period, even to the time of the Romans, who noticed the love of traffic prevailing in the Celtic districts of *Gallia Belgica*. This characteristic has remained steadfast to the present time. It is impossible not to recognize in the cloth-weaving *Atrebatæ* the ancestors of the industrious race who gradually extended themselves towards the east and north of Belgium. During the early commerce of Europe, when trade was secure only within walled towns, Flanders was the principal seat of productive industry; and its recent separation from Holland has also been indirectly favorable to the development of its internal resources. A state which, like B., begins its career under a burden of debt, which is shut in between nations who possess important ports and colonies, and which is peopled by races not yet sufficiently blended to constitute a perfect nationality, must, before all other things, develop its internal, material resources. This has been well understood in Belgium. Since the commencement of its independent career, it has devoted its attention almost exclusively to those branches of industry and commerce by which its future greatness must be supported.

Manufactures.—The chief manufactures are linen, woollen, cotton, silk, lace, leather, and metals. The great seats of the linen manufacture—recently revived after a long depression—are Courtray and Bruges, in West Flanders; Ghent, in East Flanders; Brussels, in Brabant; Mechlin, or Malines, in Antwerp; and Tournay, in Hainault. The number of linen pieces annually produced is about 900,000. The lawn and damask fabrics of Bruges are celebrated, as well as the lace made in and near Brussels, Malines, Louvain, and Bruges, which sometimes commands a price of £40 per yard. But the Belgian hand-spun yarn, though superior in quality, cannot maintain its ground against machinery. Verviers, Liege, Dolhaim, Ypres, Doperinghe, Limbourg, Bruges, Mons, Thuin, and Hodimont are centers of the woollen manufacture. Ypres alone employs 50,000 workmen in this branch of industry. Brussels and Tournay have large carpet manufactures, and Hainault supplies a considerable amount of hosiery. The principal manufactures of cotton are at Ghent and Lokeren, in East Flanders; Bruges and Courtray, in West Flanders; Malines, Louvain, and Anderlecht, in Brabant; Tournay and Mons, in Hainault; and also at Antwerp. The separation of B. from Holland had at first a prejudical effect on this as on other trades; but the opening of the navigation of the Scheldt, the intersection of the country by railways and canals, and, in consequence, the rapid and extensive communication with other countries, have revived the activity of the cotton trade, which now gives employment to between one and two hundred thousand workmen. Maestricht, which belongs to Holland, is one of the chief seats of manufactures of leather; but this trade is also carried on at Limbourg, Liege, Stadelot, Namur, Dinant, and especially at Bruges and Ghent. The manufacture of gloves has made great progress in recent years. Metallurgy also has rapidly increased in productiveness since 1816, when Cockerill introduced into B. the English method of smelting iron with coke. The principal seats of the metal manufacture are Liege, Namur, Charleroi, Mons, and their neighborhoods. There are large ordnance foundries at Liege and Malines, and celebrated makers of firearms and machinery in Liege; nail-making at Charleroi; tinware, &c., at Liege and in Hainault; wire and brass factories at Namur; zinc manufactures at Liege, lead and shot factories at Ghent; the gold and silver goods of Brussels and Ghent may also be noticed as important branches of Belgian industry. Flax is one of the most extensive and valuable products of B., no fewer than 400,000 persons being employed in its culture and preparation. Besides these, we may

mention the straw-bonnet manufacture in the neighborhood of Liege; the paper fabrics of the provinces Liege, Namur, and Brabant; the glass-works of Hainault, Namur, Val-St-Lambert, and Brabant; the porcelain, &c. of Tournay, Brussels, Mons, and Ghent; and sugar-refineries at Antwerp, Bruges, Ostend, Ghent, &c. Steam-engines have been quite familiar objects in the several manufactories of B. for many years.

The natural wealth and industrial resources of B. have always been more or less modified by the political relations of the country. In the middle of the 13th c., B., with Bruges as its chief seat of manufactures, had surpassed all its neighbors in industry, and had established a flourishing commerce with the Italians. After the discovery of America, Antwerp took the place of Bruges, and was regarded as a northern Venice. But the unhappy period of Spanish oppression and the war in the Netherlands deeply depressed Belgian commerce, which suffered still more at the peace of Westphalia, when Holland monopolized the navigation of the Scheldt. The river was again opened at the close of the 18th c., when the French had invaded the Netherlands, and Napoleon caused the harbor of Antwerp to be restored and enlarged. At the cost of Amsterdam, Belgian commerce received a new impulse by the union of B. with Holland, as settled by the Congress of Vienna; but scarcely were hopes revived, when the revolution of 1830 changed the prospects of the country. The treaty signed in London, April 19, 1839, gave to Holland the right to levy a toll of two-and-sixpence per ton on all vessels navigating the Scheldt. The privilege of navigation on the inland waters between the Scheldt and the Rhine was purchased by B. for an annual payment of £50,000. In June 1839, this privilege was virtually taken away by the government of Holland, and in 1843, with additional expense to B., the new treaty of navigation was ratified by both parties. During this crisis preceding the development of a free commerce, B. had not neglected her internal resources. The Société de Commerce de Bruxelles, the Banque de Belgique, and other associations for the extension of trade, had been formed; and May 1, 1834, the government adopted the scheme for a railway-system the most complete of any on the continent. The center of the Belgian net-work of railways is Malines, whence lines are carried out in all directions. The north line goes to Antwerp and its harbor; the west, by Ghent and Bruges, to Ostend; the south-west, by Brussels and Mons, to Quiévrian and the borders of France, not far from Valenciennes; and the east, by Louvain, Tirlemont, Liege, Verviers, and extending to the confines of Prussia. There were in 1880 open for conveyance in B. 2350 miles of railway lines; of these 838 miles were in the hands of the state, and the rest were worked by companies. The cost of the permanent way and buildings of these lines has been about £18,280 a mile. The net revenue at present is stated to be £1508 a mile. The working of the post-office in B. was, in 1880, as follows: Private letters, 73,419,058; official letters, 11,653,250; post-cards, 18,116,228; newspapers, 71,830,000.

In 1880, there were in that country 765 post-offices, 772 telegraph stations; the total length of telegraph lines was 3473 miles, the length of wires 15,246 miles. B., along with France, Italy, and Switzerland, entered on a monetary league in 1865, in which the four states agreed to adopt the French decimal system of coins, weights, and measures. In 1880, the imports amounted to £67,236,000, and the exports to £48,670,000. These sums include the value of 'goods in transit.' Excluding the latter, the value of purely Belgian imports in 1875 was £52,284,120; of exports, £44,072,080. The commercial intercourse of B. with Great Britain, in 1876, amounted to £13,848,293 for exports, and £5,875,407 for imports. Among the principal articles of export are coal, flax, linen, woollen, and cotton goods, glass, firearms, and nails. More than a third of the whole is consigned to France, and half of the remainder to Germany, England, and Holland. The maritime commerce is chiefly carried on in British ships, the native shipping, which is not increasing, being in 1881 only 66 vessels, of 75,666 tons, with 307 fishing-boats. The unit of the Belgian monetary system is the franc.

The intellectual improvement of B. has not kept equal pace with its material prosperity. The lack of political independence, which has forced the best energies of the country into foreign centers of activity, and the variety and confused mixture of dialects, have retarded the growth of the national intellect, and the formation of national individuality. An independent national literature, acting as the bond of a pure national unanimity, was not possible, under such unfavorable conditions, to which may be added the facilities afforded for supplying the people with cheap reprints of foreign works. The Flemish element—the most important—seems indeed to have become conscious of its capabilities in respect to literature; but a genuine expression of the entire Belgian mind will first become possible when the Walloon element also begins to develop a freer form of speech along with its own peculiar modes of thought. The Royal Academy of Arts and Sciences at Brussels is at the head of several other unions for scientific purposes. Among the most celebrated names in Belgian literature and science, may be mentioned—Quetelet in mathematics, Altmeyer the historian, Fetis the musical critic, Conscience the Flemish poet and novelist, Willems the philologist, and Baron and Moke in literary history and criticism. Painting and architecture formerly flourished in the wealthy old towns of Flanders; but after the brilliant epoch of Rubens and his pupils, a long period of dulness followed. In modern times, a revival of art has taken place, as may be proved by the names of the painters, Wappers, De Keyser, Gallait, De Biefve, Verbockhoven, &c.; the sculptors, W. Geefs, Simonis, Jehotte, Fraikin, &c.; the engravers, Calamatta, Brown, and Meunier; and the medallists, Wiener and Hars.

The Belgian school-system suffered for more than ten years under the freedom of teaching allowed by the constitution, which was chiefly made use of by the wealthy Catholic clergy. The consequence was that education assumed a divided and sectarian character. Since the state, however, has exercised a general superintendence over the universities, gymnasia, and elementary schools, a higher style of education has prevailed. The two universities of Ghent and Liege, united with a school of architecture and mining; ten national schools (*Athénées*), in which a classical is combined with a commercial education; upwards of 50 schools preparatory to these (*Ecoles moyennes*); two seminaries for teachers at Lierre and Nivelle, besides the superintendence now exercised by the state over the institutions formerly maintained by communes and provincial corporations, and, above all, over the primary schools—all this forms a sufficient counterpoise to the numerous schools supported by private individuals and religious bodies. Among the latter may be noticed the Catholic University of Louvain, founded in 1836, and conducted under strict ecclesiastical discipline; the free university of Brussels; and the gymnasia of the Jesuits at Namur, Brugelette, Brussels, and Liege. Journalism in B. has been greatly extended by the abolition of the stamp-duty (1848), and 180 daily newspapers are now published, including 56 Flemish papers; but only a few have obtained a proper degree of respectability and influence.

Population and Religion.—The population of B. is of mixed German and Celtic origin. The Flemings (of Teutonic stock) and Walloons (Celtic in origin), distinguished by their peculiar dialects (see FLEMISH LANGUAGE; WALLOONS), are still conspicuous among the pure Germans, Dutch, and French. The French language has gained the ascendency in educated society, and in the offices of government; but the Flemish dialect prevails numerically in the porportion of 4 to 3. The *Catholic religion* is the prevailing form. There are only about 14,000 or 15,000 Protestants, and 3000 Jews. The supreme Catholic dignitaries of B. are the archbishop of Mechlin, and the five diocesan bishops of Bruges, Ghent, Tournay, Namur, and Liege.

The *government* of B. is a limited constitutional monarchy, and was established in its present form by the revolution of 1830. The legislative body consists of two chambers—that of the senate, and that of the representatives. A responsible ministry, with the king as president, is at the head of all public affairs, and its measures are carried into effect by the governors of the several provinces. The ministry includes departments for home affairs, foreign affairs, finance, justice, public works, and war. The administration of justice retains the forms of French jurisprudence. In 1881, the estimated revenue of B. was £11,454,745; and the estimated expenditure, £11,593,788. The national debt amounted in 1880 to 1,541,347,444 francs, or £61,653,898.

The standing army of B. is formed by conscription, to which every healthy man who has passed his nineteenth year is liable. Substitution is allowed. The legal period of service is eight years, but about five years are allowed on furlough. According to a law passed in 1868, the strength of the army is to be 100,000 men on the war footing, and 40,000 in times of peace. The importance of B. in a military point of view affords a reason for the maintenance of fortifications at Antwerp, Ostend, Nieuport, Ypres, Tournay, Mons, and other places.

History of Belgium to 1830.—In the time of the Romans, the name *Gallia Belgica* was given to the Southern Netherlands lying on the confines of Gaul and Germany. It was peopled by Celtic and German tribes. The latter were predominant in Batavia and Friesland, and, under the rule of the Franks in the 5th and 6th c., gained the ascendency also in the southern districts. Until the close of the 11th c., the feudal system, which arose at the fall of the Carlovingian dynasty, prevailed in the Netherlands, where the several southern provinces were made duchies and counties. The county of Flanders, superior to all the others in industry and commerce, maintained, during a long struggle, its independence against France; and, in 1385, when the male line of the Counts of Flanders expired, was annexed to the powerful House of Burgundy, which, in the beginning of the 15th c., also gained possession of all the other provinces of the Netherlands. The rulers of Burgundy aimed at founding a powerful united state between France and Germany, and therefore endeavored to repress the free republican spirit which manifested itself in the rapidly rising

towns. The work of establishing unlimited sovereignty was interrupted by the fall of Charles the Bold, and the partial division of his territories; but was continued by the Emperor Charles V., the grandson of the Emperor Maximilian, and Maria, the heiress of Burgundy—through the latter of whom the Netherlands passed into the possession of the House of Hapsburg. After the abdication of Charles, these provinces passed into the hands of Philip II., and by the law of primogeniture, should have remained united with Spain. But scarcely had the peace of Château-Cambresis (1559) put an end to the encroachments of France, when the religious disputes of the Reformation, and the despotic measures of Philip, excited in the provinces a long and bloody war for civil and religious freedom, which ended in the independence of the Northern or Teutonic Netherlands, while in the southern or more Celtic provinces (now included under B.), both the sovereignty of Spain and the rule of the Roman Catholic Church continued. In 1598, B. was ceded by Philip II. to his daughter Isabella, wife of the Archduke Albert, when it became a distinct and independent kingdom. Several measures for the better regulation of internal affairs, especially in the administration of justice, and for the revival of industry, which had been injured by the unenlightened policy of Philip, were projected.

Unfortunately, Albert died childless in 1621, and B. fell back into the hands of Spain, and became involved in the wars attending the decline of the Spanish monarchy. Peace was concluded chiefly at the cost of Belgium. By the treaty of the Pyrenees (1659), the counties of Artois, Thionville, and other districts, were given to France. Subsequent conquests by the same powerful neighbor secured to it, at the peace of Aix-la-Chapelle (1668), the possession of Lille, Charleroi, Oudenarde, Courtray, and other places. These were partly restored to B. at the peace of Nimeguen; but as a compensation, Valenciennes, Nieuport, Cambray, St. Omer, Charlemont, and other places were given up, and only partially regained by B. at the peace of Ryswick in 1697. After the conclusion of this treaty, at the close of the reign of Charles II. of Spain, some endeavors were made to create prosperity in B. by a new system of taxation and customs, and by the construction of canals, to counteract the injury done to its commerce by the closing of the navigation of the Scheldt; but these projected improvements were interrupted by the Spanish War of Succession, which was not concluded until the peace of Utrecht, in 1713. By this treaty, B. was given to Austria, Holland retaining the privilege of garrisoning the most important fortresses on the French frontier, and also of exercising a monopoly of the navigation of the Scheldt. The 'Belgian Commercial Company' at Ostend, founded by Charles VI. in 1722, fell in 1731—another sacrifice to the cupidity of Holland. During the Austrian War of Succession (1744), almost the whole country fell into the hands of the French; but was peaceably restored to Austria by the treaty of Aix-la-Chapelle (1748).

B. remained undisturbed by the Seven Years' War, and during the long peace following the treaty of Aix-la-Chapelle, prosperity being restored. Especially during the mild reign of Maria Theresa of Austria, measures of public improvement were promoted by Prince Charles of Lorraine, governor of the Belgian provinces. The reign of Joseph II., son and successor of Maria Theresa, began in disputes with Holland. The latter country consented to the abolition of the *Barrière-contract*, in consequence of which, several important fortresses were demolished, though the emperor failed in his endeavor to make free the navigation of the Scheldt. But the errors of his internal administration were the serious feature of his policy. By his innovations, he offended the religious sympathies of the people, and violated the legal privileges of the states, of which he had made the strict preservation a condition of obedience. In a short time, discontent openly manifested itself. The Austrian authorities were attacked; Brabant refused to pay taxes; while the more violent fled into Holland, and organized an armed expedition. Returning, they were joined by numbers of the inhabitants, defeated the foreign troops, captured Brussels, and in the beginning of 1790, declared their independence. In the course of the year, however, the Austrians succeeded in regaining possession of the country. The privileges of the states as they existed at the close of the reign of Maria Theresa were restored, and at the same time stringent measures were adopted to prevent any renewal of disturbances. But this state of peace was soon interrupted by the outbreak of the war of the French Revolution. B. was conquered by Pichegru in the campaign of 1794, and subsequently united to France by the treaties of Campo-Formio and Luneville. It now shared in the fortunes of France during the Consulate and the Empire; received the *Code Napoleon;* and in all political relations, was organized as a part of France. After the fall of Napoleon, it was united with Holland, and its boundaries defined by the Congress of Vienna (May 31, 1815).

At the introduction of the new constitution, the want of national unity in language, faith, and manners was strikingly manifested by the two great parties—the Dutch Protestant population, with their commercial habits, on the one side, and the Catholic population, of agricultural and manufacturing B., on the other. These natural and unavoidable obstacles to the political harmony of the new kingdom, were further increased by the unfair treatment which B. experienced. All the more important provisions of the constitution had a regard chiefly to the interests of Holland. Repeated attempts were made to supersede the Belgian language by the Dutch in all affairs of administration and jurisprudence, though the former were the more numerous people; the privileges of the Belgian clergy were abridged; the poorer classes were severely taxed, while the government was almost exclusively composed of Dutchmen. In 1830, among seven ministers, there was only *one* Belgian; among 117 functionaries of the ministry of the interior, only 11 Belgians; among 102 subordinates of the ministry at war, only 3 Belgians; and among 1573 officers of infantry, only 274 Belgians. B. was politically divided into two classes—the Liberal and the Catholic. Both of these strongly resented and opposed the encroachments of Holland: the Liberals, from a desire to preserve the national secular institutions; the Catholics, from a desire to preserve the national Church. The government became alarmed at their increasing hostility; and ultimately, when their patriotic fusion rendered its position critical, it made several concessions; the supremacy of the Dutch language, and the taxes on the necessaries of life, were abolished. Efforts were also made to conciliate the Catholic priesthood. But these concessions came too late, and were, in consequence, only construed as signs of weakness. In 1828 and 1829, it was attempted to coerce and intimidate the opposition, by prosecuting the liberal or democratic leaders. This only fanned the fire of discontent, which was already burning fiercely in the hearts of the Belgians, and panting for an opportunity to break out into visible insurrection.

From 1830 to the present time.—The French revolution of 1830 afforded the desired occasion. On the king's birthday (August 24, 1830), several riots occurred in various towns of Belgium. At this period, however, the idea of separation from Holland does not seem to have presented itself consciously to the Belgian mind; the deputies who were sent to the Hague to state the causes of the general dissatisfaction, merely insisted on its possessing a separate administration, with the redress of particular grievances. But the dilatory and obstructive conduct of the Dutch deputies in the states-general assembled at the Hague on the 13th September, exasperated the Belgian nation beyond measure. A new and more resolute insurrection instantly took place. In seven days, the people had deposed the old authorities, and appointed a provisional government. Prince Frederick, the son of the sovereign, who commanded his father's troops, was compelled to retreat from Brussels to Antwerp, having suffered considerable loss. On the 4th of October, B. was declared independent by the provisional government, composed of Messieurs Rogier, D'Hooghvorst (commandant of the civic guard), Joly, an officer of engineers, and the secretaries Vanderlinden and De Coppin; Count Felix de Mérode, Gendebien, Van de Meyer, Nicolai, and De Potter, the democratic leader. They also announced that a sketch of the new constitution was in course of preparation, and that a national congress of 200 deputies would shortly be called together. Freedom of education, of the press, of religious worship, &c., were proclaimed.

Here and there, the new liberty showed a tendency to become anarchic; but its excesses were speedily suppressed; and at the national congress of the 10th November, out of 187 votes, only 13 were in favor of a democratic government. Meanwhile, the London Congress had assembled, and after mature deliberation, recognized the severance of the two kingdoms as a *fait accompli* (December 10). The Belgian Congress, on its assembly appointed Baron Surlet de Chokier provisional regent, but on the 9th July elected Prince Leopold of Saxe-Coburg king, who entered Brussels on the 21st of the same month, and subscribed the laws of the constitution. This prince proved himself one of the wisest monarchs of modern times. He died in 1865, and was succeeded by his son, Leopold II., the present king of Belgium. Holland refused to acknowledge the validity of the decision of the London Congress, and declared war against B., which was speedily terminated by France and England—Holland securing that B. should annually pay 8,400,000 guilders as interest for its share in the national debt of Holland. The latter country, however, was still dissatisfied, and ventured to employ force. England and France were compelled to interfere. The blockade of the coast of Holland brought the Dutch to terms, and the dispute was closed by a treaty signed in London, May 21, 1833.

The monarchy of B. is hereditary, according to the law of primogeniture, but with a perpetual exclusion of females and their descendants. The legislative power is vested in the king and two chambers; and the king has the power to dissolve either the Senate or the House of Representatives, or both. The number of deputies in 1869 was 116, sent by 41 electoral districts. Electors must be Belgians by birth or naturalization, must have attained 25 years of age, and pay taxes, each to the amount of £1, 13s. 4d. Members of the Chamber of Representatives require no property qualifica-

tion. The Senate consist of half the number of representatives, and is elected by the same constituency, but for 8 years instead of 4. A senator must be 40 years of age, and must pay at least 1000 florins of direct taxes. The budget is annually voted by the chambers, and the contingent of the army is also subject to their annual vote.

In 1842, a law was carried in both chambers, by which it was enacted that the parishioners should be bound to provide elementary schools, according to the wants of the population, in all places where the want of education was not fully supplied by voluntary means. The main regulations for the universities were effected by the ministry of De Theux, 1835; but the organization of intermediate instruction (that is, between the *Ecoles Primaires* and the universities) was postponed, as involving some delicate party interests, until 1850; and even then was not concluded in a way satisfactory to the Catholic clergy.

In 1838, it seemed as if Holland and B. were likely to engage in war once more. According to the 'twenty-four articles' of the 'Definitive Treaty,' B. was under obligation to give up Limbourg and a part of Luxembourg during the above-mentioned year. This it now refused to do, and put its army on a war-footing; but its obstinacy finally gave way to the unanimous decision of the five great powers.

After 1840, the opposition of the Catholic to the Liberal party became more and more decided. The elections of June 8, 1841, were attended with great excitement, and it was a significant fact, that the liberal candidates re-elected were everywhere returned by large majorities, while in the principal towns where Catholics were returned, only small majorities appeared. Meantime, however, commerce progressed under a wise and liberal policy.

In July 1845, the liberal Van de Weyer, at the head of a new administration, endeavored to confirm the so-called 'union' of Catholics and Liberals. But he had scarcely asserted the prerogative of the civil power in matters pertaining to the question of education in the 'intermediate schools,' when he was forsaken by his colleagues, who acted under the influence of the Catholic priesthood. In March 1846, a purely Catholic ministry was formed under the presidency of De Theux. This was an anachronism, for the elections of 1845 had secured a victory for the Liberals.

The elections of 1847 at last brought to a close the system of government in subservience to the church. A new liberal ministry was formed by Rogier and others, whose programme of policy promised the maintenance of the independent civil authority in all its subordinate functionaries; a budget favorable to the public with regard to duties on provisions; and measures to promote the interests of agriculture. The institution of numerous agricultural and commercial schools, normal *ateliers*, popular libraries, and other means used for raising the working-classes, were followed by most beneficial results. The revolutionary tempest of 1848, however, menaced the tranquillity of the country; but the king, at the outbreak of the catastrophe in France, promptly declared himself ready to retain or to surrender the crown of B. according to the decision of the people. This frank and ready declaration had a successful result in strengthening the party of order, while it disarmed even those most disaffected to the crown.

In July 1848, the result of the elections was found to be a great strengthening of the liberal-constitutional party. In November 1849, a new commercial treaty for ten years was concluded with France, and the duration of the treaty with the German Zollverein was lengthened. In 1850, the educational question was supposed to be settled on soundly liberal principles; but since then there has been a keen struggle between the Progressists and the Ultramontanes. At present the question of liberal advance in education and religion in B is, as it is in Prussia, France, and Italy, a question of very considerable interest.

Nothomb's *Travaux Publics en Belgium* (Bruss. 1839); *Statistique de la B.*, by the same author (1848); Juste, *Histoire de B.* (5th ed., 1868; Popliment, *La B. depuis l'an* 1830 (Bruss. 1850).

BELGORO'D (Russian, *Bejelgorod*, White Town'), a town of (1880) 16,090 inhabitants, in the Russian government of Kursk. It is situated on the Donetz, in lat. 50° 40' N., long. 36° 35' E. B., which derives its name from a chalk-hill in the vicinity, is divided into two—the old and the new towns. It is built chiefly of wood, is an archbishop's see, has numerous churches, two monasteries, manufactories of leather, soap, &c., and carries on a considerable trade in wax, bristles, and hemp. Three important fairs are held here during the year.

BELGRA'DE, the ancient *Singidunum*, styled by the Turks *Darol-Jihad*, the 'House of the Holy War,' and in German, *Weissenburg*, is an important fortified and commercial town, capital of Servia. It is situated at the confluence of the rivers Save and Danube. The name B. is derived from the Slavonic *bielo*, 'white,' and *grad* or *grod*, 'a fort' or 'town.' B. contains (1880) 26,651 inhabitants, and is divided into four parts—the fortress, a very strong place, which, situated on the tongue of land between the rivers, commands the Danube; the Water Town, also well protected by walls and ditches, on the north; the Raitzen Town on the west; and the Palanka on the south and east of the citadel. B. contains fourteen mosques. The prince's palace, the residence of the metropolitan, the national theater, and the public offices are the principal buildings. Vessels navigating the Danube anchor between the three islands above Belgrade. B. has manufactories of arms, cutlery, saddlery, silk goods, carpets, &c., and is the seat of the chief Servian authorities. It is the entrepôt of the trade between Turkey and Austria. The position of B. has made it the chief point of communication between Constantinople and Vienna, and the key to Hungary on the south-east. It has consequently been the scene of many hard contests. The Greeks held it until 1073, when it was captured by the Hungarian king, Salomon. After this, it passed through the hands of Greeks, Bulgarians, Bosnians, and Servians, and these last proprietors sold it, in the beginning of the 15th c., to the Emperor Sigismund. In 1442, it was unsuccessfully besieged by the Turks, with a large and vain outlay of time and money; and when stormed (July 14, 1456), was retaken from the Turks by the heroism of Hunyades and Capistrano. In 1522, it was carried by the Sultan Soliman II. In 1688, it was stormed and taken by Maximilian, Elector of Bavaria; but in 1690 was recaptured by the Turks, when the Christian garrison had been reduced to 500 men. In 1693, B. was vainly besieged by the Duke of Croy; and in 1717, the citadel surrendered to Prince Eugene, after he had defeated an army of 200,000 Turks, with a loss to them of 20,000 men. But in 1739, B. again changed owners, the Turks obtaining it without a shot. In conformity with the treaty then signed, the fortifications were demolished. In 1789, it was again taken by the Austrians under General Laudon; but by the treaty of peace, 1791, was restored to the Turks. From 1806 to 1813 it was in the possession of the insurgent Servians; and though on the founding of the principality of Servia, B. was made the capital, the citadel remained in the hands of the Turks till 1867. In that year the Porte was constrained by diplomacy to yield up this important possession to the Servian government.

BE'LIAL, or, more accurately, *Beli'al*, a Hebrew word, signifying idle, wicked, or unprofitable. The Scripture phrase, therefore, 'Sons of B.,' was originally, in all prabability, a mere Hebrew figurative expression denoting worthless or dissolute persons. At a later period, the idea of evil which the word embodies, seems to have been elaborated into a personality, and B. is supposed by some to correspond to the Pluto of the Greeks.

BELIE'F. This is a word sufficiently intelligible in common speech; but, nevertheless, various subtle problems and protracted controversies have been connected with it. A brief account of the chief of these may be here given.

1. It has been a matter of no small difficulty with mental philosophers, to give an exact rendering of the state of mind so denominated, or to specify the exact import, test, or criterion of the act of believing. It is easy enough to comprehend what is meant by an idea or a notion, as when we speak of having the idea of a rose, its shape, color, odor, &c.; but when we make the further step of affirming our belief in the sweetness of the rose, it is not so easy to describe the exact change that has come over the mind in so doing. In all belief, there must be something intellectual, something thought of, or conceived by the mind; and hence there has been a disposition to recognize the believing function as one of the properties of our *intelligence*. We believe that the sun will rise and the tides flow to-morrow: here are undoubtedly implied intellectual conceptions of the sun, his rising, and of to-morrow; of the sea, its movements, and so on. But the question comes, what is the difference between conceptions believed in as these are, and conceptions quite as clear and intelligible that are not believed? as the notion that the fluctuation of the sea on the shores of Britain is the same as on the shores of Italy. It is not to the purpose to say, that in the one case we have knowledge and evidence, and not in the other; for what is wanted is to define the change that comes over us, when what is a mere notion or supposition passes into a conviction; when a day-dream or hypothesis comes to take rank as truth.

To answer this inquiry, we must bring in a reference to *action*; for although belief connects itself with our intelligence, as now mentioned, it has action for its root and ultimate criterion. Coming up to the edge of a frozen lake, and looking at the thickness of the ice, we believe that it will bear to be trodden on, and accordingly walk across it. The meaning or purport of the believing state here is, that we do not hesitate to trust our safety to the fact believed. The measure of our confidence is the measure of our readiness to act upon our conviction. If the frozen lake lie between us and our destination, we feel elated by the certainty of arriving there, which we should not under a weak or imperfect trust in the goodness of the ice. Belief, therefore, although embodied in ideas, or intellectual conceptions, is in a reality a moral power, operating on our conduct, and affecting our happiness or misery. Belief in coming good cheers us almost as much as if it

were already come; a like strength of conviction of approaching evil is to the same degree depressing; 'the devils believe, and tremble.' These two tests—readiness to act according to what we believe, and influence on the mental tone—effectually separate the state in question from mere notions, fancies, or suppositions, unaccompanied with credence. We have firm confidence in the food we eat being able to nourish us; we exert ourselves to procure that food, and when we feel hungry, and see it before us, we have the mental elation arising from a near and certain prospect of relief and gratification. If there be anything that we work languidly to procure, and feel little elated by being near or possessing, our conviction is proved to be feeble as to the utility of that thing, or as to the pleasure we shall derive from it. So, in employing means to compass ends, as when we sow that we may reap, work that we may obtain abundance, study that we may be informed—we have a certain confidence in the connection between the means and the ends; in other words, we are energetically urged to use those means, and having done so, we have the feeling as if the end were already attained.

Even in cases the furthest removed in appearance from any action of ours, there is no other criterion. We believe a great many truths respecting the world, in the shape of general propositions, scientific statements, affirmations on testimony, &c., which are so much beyond our own little sphere, that we can rarely have any occasion to involve them in our own procedure, or to feel any hopeful elation on their account. We likewise give credit to innumerable events of past history, although the greater number of them have never any consequences as regards ourselves. Yet, notwithstanding such remoteness of interest, the tests now mentioned must apply; otherwise, there is no real conviction in any one instance.

There is a distinction, first characterized by Aristotle, between potentiality and actuality (*posse* and *esse*), which truly represents two different states of mind of real occurrence. Besides the actual doing of a thing, we know what it is to be in a state of *preparedness* to act, before the emergency has arisen, or while it is still at a distance and uncertain. The thirsty traveler, not knowing of a spring where he may drink, is debarred from the act that his condition prompts him to, but he is in an attitude of mind that we call being ready for action the moment the opportunity arrivese We all carry about us a number of unexecuted resolutions, some of them perhaps remaining so to the last, for want of the occasion. They are not, on that account, to be set aside as having no part in our nature; they are genuine phases of our activity. So it is with many things believed in by us, without any actual prospect of grounding actions, or staking our welfare, upon such things. When we say we believe that the circumference of the globe is 25,000 miles, if not repeating an empty sound, or indulging an idle conception, we give it out that if any occasion arise for acting on this fact, we are ready to do so. If we were about to circumnavigate the earth, we should commit ourselves to this reckoning. Should there be any hesitation on the point when the time for action came, the professed belief would be shown to be hollow, no matter how often we heard the statement, or repeated it, with acquiescence. The genuineness of conviction is notoriously open to question, until an opportunity of proceeding upon it occurs. Very often we deceive ourselves and others on the point—whether we are in full potentiality or preparedness in some matter of truth or falsehood. There is a very large amount of blind acquiescence in, or tacit acceptance of, propositions which never become the subject of any real or practical stake. These beliefs falsely so called confuse the line of demarcation between mere intellectual notions and states of credence and conviction. Of this nature is the acceptance given by the mass of mankind to the statements they are accustomed to hear from the better informed class respecting the facts of science and the transactions of history. They do not dispute those statements; and yet they might be little disposed to commit their serious interests to such facts. So with regard to the religious creed handed down from parent to child. Some are found believing, in the full import of the term; others, opposing no negative in any way, yet never perform any actions, or entertain either hopes or fears, as a consequence of their supposed acceptance of the religion of their fathers; their belief, accordingly, must be set down as a nonentity.

2. There is considerable interest attached to the inquiry into the *sources* of operating causes of this efficacious attribute of our active nature. What are the influences that determine us to adopt some notions as grounds of action and elements of hope or depression, in preference to others? The common answer to this question is the possession of evidence, of which two kinds are reckoned by some schools—namely, experience and intuition; while others recognize experience alone, and reject the intuitive as a sufficient foundation of belief.

As regards the actual sources of men's convictions, it is undeniable that many things are credited without any reference to experience. The existence of superstitions is an example. So the partialities arising out of our likings to particular persons, and the undue depreciation of the merits of those whom we dislike, present instances equally removed from the criterion of experience. It is evident, therefore, that men do not abide by that criterion, even granting that they ought to do so. Accordingly, it is one of the tasks of the mental philosopher to specify the portions of our constitution that give birth to false, mistaken, or unfounded beliefs; and in so doing he indicates, first, certain intuitive impulses connected with our active nature; and secondly, our various feelings, or emotions. Whether the intuitive be a source of authentic beliefs, may be a matter of doubt; there is no doubt as to its being a genuine source of real convictions. We have a decided tendency from the first to believe that the present state of things will continue, and that the absent resembles the present. He that has always seen water liquid, cannot at first be convinced that it is ever or anywhere solid. We have always a great difficulty in surmounting the primitive impulse to consider other men's minds as exactly like our own. It is the tendency of the uncultured human being to over-generalize; and experience comes as a corrective, often very painful to submit to. Then, again, as regards the emotions, it is found that every one of these, if at all strong, is liable to blind us to the realities of the world. Fear is a notable example. Under a fright, a man will believe in the approach of the direst calamities. Superstition is, for the most part, the offspring of men's fears. The effect of a strong emotion is to exclude from the mind every fact or consideration except those in keeping with itself. Intense vanity so lords it over the current of the thoughts and the course of the observations, as to present to one's mind only the very best side of the character. A fit of self-abasement and remorse will work the contrary effect.

It is plain enough, therefore, that we are very often in the wrong, by trusting to our intuitive tendencies, and as often so under our emotions; while we are as ready to act, and to derive comfort or the opposite, under false beliefs, as under the very soundest that we can ever arrive at. The practice of life points to *experience* as the check to wrong believing. If we find on trial that another man's feelings differ very much from ours in the same circumstances, we stand corrected, and are perhaps wiser in future. So, in science, experiment is the ultimate canon of truth. There prevails, notwithstauding, in one school of philosophy, comprising the majority of metaphysical philosophers both in this country and in Germany and France, the opinion that experience is not the only source even of *sound* or true beliefs. There are those who contend for an *à priori* origin of scientific first principles; such, for example, as the axioms of mathematics. 'Things that are equal to the same thing are equal to one another,' is one of the class about which this dispute reigns. There is also a doctrine current that the law of causation has an authority derived from intuition.

Another class of beliefs relates to matters altogether beyond experience; such is the metaphysical doctrine of the infinite. These various convictions—*à priori*, as they are called, being grounded solely in the internal impulses of the human mind—are all open to one common remark. It must be conceded that some intuitive beliefs are unsound, seeing that we are obliged to reject a greater or less number because of their being flatly contradicted by our experience. But if any have to be rejected in this way, why may not all be; and what criterion, apart from experience, can be set up for discriminating those that we are to retain? Man undoubtedly has boundless longings; and the doctrine of the infinite corresponds in a manner to these. But in actual life we find very few of our desires fully gratified, not even those most honorable to the human mind, such as curiosity, the passion for self-improvement, and the desire of doing good. How, then, are we to ascertain which of the longings carries with it its own necessary fulfilment? Moreover, the intuitive tendencies are exceedingly various in men; and all cannot be equally true.

Testimony, which is properly reckoned one of the sources of belief, is, in its operation, partly founded on an intuitive tendency, and partly on experience. We at first believe whatever we are told; the primitive phase of our nature is credulity; the experience that we soon attain to of untrue statements puts us on our guard, and we learn to receive testimony under some circumstances, and from some persons, and not in all cases indiscriminately.

3. *Responsibility for Belief.*—A lengthened controversy arose some time ago, on the saying of Lord Brougham, that 'man is no longer accountable to man for his belief, over which he has himself no control.' Reduced to pecise terms, the meaning of this assertion is: a man's belief being involuntary, he is not punishable for it. The question therefore arises, *how far* is belief a voluntary function? for it is known that the will does to some extent influence it.

What a man shall see when he opens his eyes is not in his own power; but the opening of the eyes is a voluntary act. So, after listening to a train of arguments on a certain dispute, we might be irresistibly inclined to one side; but, supposing us to live in a country where the adhesion to that side is criminal, and punished severely, we should very likely be deterred from hearing or read-

ing anything in its favor. To this extent, the adoption of a belief is voluntary. The application of strong motives of the nature of reward or punishment is sufficient to cause one creed to prevail rather than another, as we see in those countries and in those ages where there has been no toleration of dissent from the established religion. The mass of the people have been in this way so fenced in from knowing any other opinions, that they have become conscientiously attached to the creed of their education.

When the question is asked, therefore, whether punishment can control men's beliefs, and not their professions merely, all history answers in the affirmative, as regards religious and political creeds, on which the majority of mankind, being insufficient judges of themselves, are led by tradition and by education. But in matters of daily practice, where the simplest can judge as well as the wisest, the case is altered. No severity of threat could bring a man into the state of believing that his night's rest was hurtful to him; he might be overawed into saying that it was so, but he would never act out his forced affirmation, and therefore he would show that he did not believe it.

If the sentence of Lord Brougham is held to imply that all beliefs are beyond the power of external motives, and therefore that rewards and punishments can go no further than making outward conformity, we must pronounce it erroneous. For granting that motives cannot have a direct efficacy on the state of a man's convictions—which cannot be conceded in all cases—yet the *indirect* influence is so great as to produce the unanimity of whole nations for centuries in some one creed. But if it is only meant, that such indirect means *ought not* to be applied to sway men's convictions, this is merely a way of affirming the right of free thought and inquiry to all mankind, and the iniquity of employing force on such a matter.—On the subject of Belief generally, see Bain on the Emotions and the Will.

BELISA'RIUS (in Slavonic, *Beli-tzar*, 'White Prince'). This heroic and loyal soldier, to whom the Emperor Justinian was principally indebted for the glory of his reign, was born at Germania, in Illyria, about 505 A.D. He first assumed a conspicuous position when he was appointed to the command of the eastern army of the empire, stationed on the confines of Persia, where, in 530 A.D., he gained a victory over a Persian army nearly twice as large as his own. The historian Procopius was at this time secretary to Belisarius. In the following year, when the Persians had penetrated into Syria, intending to attack Antioch, B. being compelled by the impatience of his troops to offer battle at Callinicum, a town at the junction of the rivers Bilecha and Euphrates, was defeated, and in consequence recalled. This petulant injustice, however, did not weaken that principle of duty which ever controlled and inspired the great soldier. He still remained the firm supporter of his sovereign. In Constantinople, the strife of the two parties, styled respectively 'the green' and 'the blue,' had endanged the authority and even the life of Justinian; already a new emperor, Hypatius, had been elected, when B. at the head of the life-guards, attacked and slew, in the race-course, 30,000 of the green or anti-loyalist party, and thus restored tranquillity. Previous to this, he had married a wealthy but profligate lady, Antonina, whom he loved with the same blind uxoriousness that Marcus Aurelius exhibited towards Faustina. The only points in his history which are not edifying, are those in which he yielded to her noxious solicitations.

The military career of B. may be divided into two great epochs; the war against the Vandals in Africa, and the war against the Goths in Italy, which again subdivides itself into two campaigns, with an interval of four years between them. The first of these epochs was commenced by Justinian sending B., in 533 A.D., with an army of 15,000 men into Africa, in order to recover the provinces there held by the Vandal king, Gelimer. After achieving two victories, B. made the king a prisoner, seized his treasures, and after conquering Sardinia, Corsica, and the Balearic Isles, he brought him to Constantinople, where he appeared in a triumphal procession of the conqueror—the first that a subject had enjoyed since the days of Tiberius. The African Vandals never recovered from this overthrow. Medals were struck in B.'s honor; and on the 1st January, 535, he was invested with the dignity of 'consul,' and granted a second triumph, according to the old republican style. The second war was occasioned by the divisions existing in the royal family of the Ostrogoths, which induced Justinian to attempt to wrest Italy from the hands of the barbarians. In 535, B. conquered Sicily; and in the autumn of 536, he crossed over to Lower Italy, where all the cities submitted to him except Naples, which he carried by storm. On the 10th of December, he entered Rome, having made an amicable arrangement with the inhabitants. As he found his forces not strong enough to contend with the Goths in open field, he allowed himself to be enclosed and besieged in Rome; after the defence had lasted a year, the Goths raised the siege. In 538, Narses had been sent with a reinforcement for the army in Italy; but some misunderstanding occurring between the two generals, they were prevented from relieving Milan, which in 539 was carried and devastated by Braias, nephew of the Gothic king, Vitiges. Consequently, Narses was recalled from Italy; and B., now placed at the head of both armies, refused to assent to a treaty proposed to King Vitiges by Justinian's ambassadors. Vitiges had persuaded the Persian king, Chosroes, to invade the eastern Roman territory. B. now drove the Goths back to Ravenna, which he captured in 540, along with Vitiges himself. But before he could complete his conquest of the Goths, he was recalled by Justinian to Constantinople, where he soon appeared, bringing with him the king Vetiges, several Gothic chieftains, and the royal treasures. In 541—542, he was engaged in a campaign against the Persians, who had captured Antioch; but was again recalled, on account of slanderous representations made to the emperor, and the enterprise necessarily proved indecisive. His second great struggle with the Ostrogoths now begins. In 544, the barbarians, under Totila, again invaded and reconquered Italy. B. was sent against them, but with an insufficient army. He, however, maintained his ground for five years, harassing the enemy by his skilful movements, and even succeeded so far as to regain possession of Rome. But, in spite of his repeated entreaties, no reinforcements were sent to him; and in September 548, he gave up the command, his rival, Narses, being appointed in his place. After ten years of retirement, B. once more came forward at the head of an army hastily collected, and overthrew the Bulgarians, who had threathened Constantinople. Here this faithful servant, who at Ravenna had, in a spirit of noble loyalty unknown to the warriors in those selfish and ambitious times, refused the crown of Italy offered to him by the Goths, was at length accused of a conspiracy against Justinian, and imprisoned, December 563; but according to Malala and Theophanes, Justinian became convinced of B.'s innocence, and restored him, after six months, to all his honors. He died March 564.

The biography of B. has been treated with great license by writers of fiction, especially by Marmontel, who has represented the hero as cruelly deprived of sight, and reduced to beg for his bread in the streets of Constantinople. Tzetzes, a writer of the 12th c., states that, during his half-year's imprisonment, B. suspended a bag from the window of his cell, and exclaimed to those who passed by: 'Give an obolus to B., who rose by merit, and was cast down by envy!' but no writer contemporary with B. mentions this circumstance. Lord Mahon, in his *Life of Belisarius* (Lond. 1829), endeavors, but without success, to confirm the tradition, or rather the fiction, of B. being deprived of sight and reduced to mendicancy. This fiction supplies the subject of a fine picture by the French painter Gérard.

In figure, B. was tall and majestic; in disposition, humane and generous; pure in his morals, temperate in his habits, a valiant soldier, a skilful general, and above all, possessed by a sublime spirit of loyalty to his sovereign.

BELI'ZE. See BALIZE.

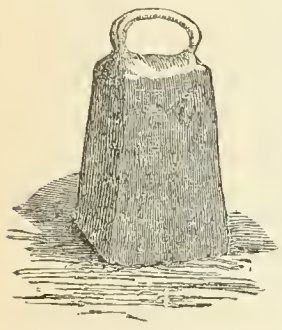
BELJU'RIE, or BAILJURIE, a town of India, in the British district of Moradabad, North-west Provinces, two miles north-west from Kashipur. Pop. (1871), including part of Kashipur, 8253.

BELL. Bells are usually formed of a composition of copper and tin, called bell-metal. When the proper proportions of the two metals are fused together, the compound is poured into a mould. Authorities differ as to the best proportions of the copper and tin. Some give 80 parts of copper to 20 of tin, or 4 to 1; others state the proportions as being 3 to 1. In the reign of Henry III. of England, it would seem to have been 2 to 1; and the small bronze bells discovered by Mr. Layard in the palace of Nimroud, are found to contain 10 of copper to 1 of tin. Hand-bells are often made of brass, antimony alloyed with tin, German silver, real silver, and gold. The notion that in old times silver was mixed with bell-metal to sweeten the tone, is a mistake. Silver, in any quantity, would injure the tone. The quality of a bell depends not only on the composition of the metal it is made of, but very much also on its shape, and on the proportions between its height, width, and thickness; for which the bell-founder has rules derived from experience, and confirmed by science. The pitch of a bell is higher the smaller it is. For a peal of four bells to give the pure chord of ground tone (key-note), third, fifth, and octave, the diameters require to be as 30, 24, 20, 15, and the weights as 80, 41, 24, 10. A less quantity of metal than is due to the calibre of the bell though giving the same note, produces a meagre harsh sound; and the real or fancied superiority in dignity of tone of some old bells, is ascribed to a greater weight of metal

Queen Mary's silver-gilt Hand-bell.

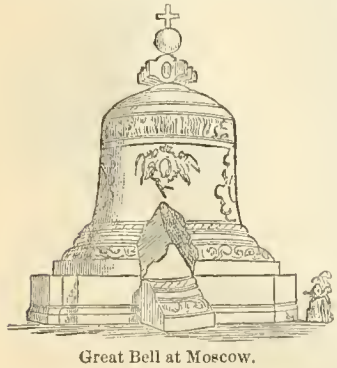
having been allowed for the same note than modern economy would dictate. Bells have been cast of steel, some of which have had a tone nearly equal in fineness to that of the best bell-metal, but deficient in length, having less vibration. Some have also been cast of glass, with a considerable thickness of the material; and these give an extremely fine sound, but are too brittle to stand the continued use of a clapper.

From a remote antiquity, cymbals and hand-bells were used in religious ceremonies. In Egypt, it is certain that the feast of Osiris was announced by ringing bells; Aaron, and other Jewish high-priests, wore golden bells attached to their vestments; and in Athens, the priests of Cybele used bells in their rites. The Greeks employed them (*koda*) in camps and garrison; and the Romans announced the hour of bathing and of business by the *tintinnabulum*. The introduction of bells into Christian churches is usually ascribed to Paulinus, Bishop of Nola in Campania (400 A.D.); but there is no evidence of their existence for a century later. That they were first made in Campania, is inferred from the name given to them—*campanæ;* hence, *campanile*, the bell-tower. Their use in churches and monasteries soon spread through Christendom. They were introduced into France about 550; and Benedict, Abbot of Wearmouth, brought one from Italy for his church about 680. Pope Sabinian (600) ordained that every hour should be announced by sound of bell, that the people might be warned of the approach of the *horæ canonicæ*, or hours of devotion. Bells came into use in the East in the 9th c., and in Switzerland and Germany in the 11th. Most of the bells first used in Western Christendom seem to have been hand-bells. Several examples, some of them, it is believed, as old as the 6th c., are still preserved in Ireland, Scotland, and Wales. They are made of thin plates of hammered iron, bent into a four-sided form, fastened with rivets, and brazed or bronzed. Perhaps the most remarkable is that which is said to have belonged to St. Patrick, called the *Clog-an-eadhachta Phatraic*, or 'The bell of Patrick's Will.' It is 6 inches high, 5 inches broad, and 4 inches deep, and is kept in a case or shrine of brass, enriched with gems and with gold and silver filigree, and made (as an inscription in Irish shows) between the years 1091 and 1105. The bell itself is believed to be mentioned in the *Annals of Ulster* as early as the year 552. Engravings as well of the bell as of its shrine, with a history of both, by the Rev. Dr. Reeves of Lusk, were published at Belfast (where the relic is preserved) in 1850. Some of the Scotch bells, of the same primitive type, are figured and described in the *Illustrated Catalogue of the Archæological Museum at Edinburgh in* 1856 (Edin. 1859). The four-sided bell of St. Gall, an Irish missionary, who died about 646, is still shown in the monastery of the city which bears his name in Switzerland. Church-bells were suspended either in the steeples or church-towers, or in special bell-towers. They were long of comparatively small size: the bell which a king presented to the church of Orleans in the 11th c., and which was remarkable in its age, weighed only 2600 pounds.



St. Ninian's Bell, as figured in the above work.

In the 13th c., much larger bells began to be cast, but it was not until the 15th c. that they reached really considerable dimensions. The bell 'Jacqueline' of Paris, cast in 1400, weighed 15,000 pounds; another Paris bell, cast in 1472, weighed 25,000; the famous bell of Rouen, cast in 1501, weighed 36,364 pounds. The largest bell in the world is the Great Bell or Monarch of Moscow, above 21 feet in height and diameter, and weighing 193 tons. It was cast in 1734, but fell down during a fire in 1737, was injured, and remained sunk in the earth till 1837, when it was raised, and now forms the dome of a chapel made by excavating the space below it. Another Moscow bell, cast in 1819, weighs 80 tons. The Great Bell at Pekin, 14 feet high, with a diameter of 13 feet, weighs 53½ tons; those of Olmütz, Rouen, and Vienna, nearly 18 tons; that first cast for the New Palace at Westminster (but cracked), 14 tons; that of the Roman Catholic cathedral at Montreal (cast 1847), 13½ tons; 'Great Peter,' placed in York Minster 1845, 10¾ tons; 'Great Tom' at Lincoln, 5½ tons; the new Great Bell of St. Paul's, cast in 1881, 17½ tons, the largest in the United Kingdom. See Gatty's *The Bell* (1848); *Quarterly Review* (1854).



Great Bell at Moscow.

From old usage, bells are intimately connected with the services of the Christian church—so much so, that apparently from a spirit of opposition, the Mohammedans reject the use of bells, and substitute for them the cry of the Imaum from the top of the mosques. Associated in various ways with the ancient ritual of the church, bells acquired a kind of sacred character. They were founded with religious ceremonies (see Schiller's ode), and consecrated by a complete baptismal service; received names, had sponsors, were sprinkled with water, anointed, and finally covered with the white garment or chrisom, like infants. This usage is as old as the time of Alcuin, and is still practised in Roman Catholic countries. Bells had mostly pious inscriptions, often indicative of the widespread belief in the mysterious virtue of their sound. They were believed to disperse storms and pestilence, drive away enemies, extinguish fire, &c. A common inscription in the middle ages was:

> Funera plango, fulgura frango, Sabbata pango,
> Excito lentos, dissipo ventos, paco cruentos.

Among the superstitious usages recorded to have taken place in old St. Paul's Church in London, was the 'ringinge the hallowed belle in great tempestes or lightninges' (Brand's *Popular Antiquities*, vol. ii.). From this superstition possibly sprang the later notion, that when the great bell of St. Paul's tolled (which it does only on the death of a member of the royal family, or a distinguished personage in the city) it turned all the beer sour in the neighborhood—a fancy facetiously referred to by Washington Irving in the *Sketch-Book*. It would seem that the strange notion that bells are efficacious in dispelling storms, is by no means extinct. In 1852, the Bishop of Malta ordered the church-bells to be rung for an hour to allay a gale.

Church-bells were at one time tolled for those passing out of the world. It was a prevailing superstition that bells had the power to terrify evil spirits, no less than to dispel storms; and the custom of ringing what was called the *passing-bell* 'grew [we quote the writer in the *Quarterly Review* above referred to] out of the belief that devils troubled the expiring patient, and lay in wait to afflict the soul the moment when it escaped from the body.' . . . The tolling of the passing-bell was retained at the Reformation; and the people were instructed that its use was to admonish the living, and excite them to pray for the dying.' But 'by the beginning of the 18th c., the passing-bell, in the proper sense of the term, had almost ceased to be heard. The tolling, indeed, continued in the old fashion; but it took place after the death, instead of before.' The practice of slowly and solemnly tolling church-bells at deaths, or while funerals are being conducted, is still a usage in various parts of the country, more particularly as a mark of respect for the deceased. There is another use of the bell in religion, called the *pardon* or *ave bell*, abolished among Protestants. The pardon-bell was tolled before and after divine service, for some time prior to the Reformation, to call the worshipers to a preparatory prayer to the Virgin Mary before engaging in the solemnity, and an invocation for pardon at its close. Bishop Burnet has recorded the order of a Bishop of Sarum, in 1538, concerning the discontinuance of the custom. It runs thus: 'That the bell called the pardon or ave bell, which of longe tyme hathe been used to be tolled three tymes after and before divine service, be not hereafter in any part or my diocesse any more tollyd.'

The ringing of the *curfew-bell*, supposed to have been introduced into England by William the Conqueror, was a custom of a civil or political nature, and only strictly observed till the end of the reign of William Rufus. Its object was to warn the public to extinguish their fires and lights at eight o'clock in the evening. The eight o'clock ringing is still continued in many parts of England and Scotland.

As the liberty of public worship in places of meeting by themselves was yielded to dissenters, by the various governments of Europe, only with reluctance, the use of bells in chapels as summons to divine service is not allowed except in the more enlightened countries. Speaking on this subject as referring to England, Lord Chief-justice Jervis, in giving judgment on a case tried at the Croydon assizes in 1851, says: 'With regard to the right of using bells in places of worship at all, by the common law, churches of every denomination have a full right to use bells, and it is a vulgar error to suppose that there is any distinction at the present time in this respect.' Throughout England and Scotland, however, comparatively few dissenting places of worship possess bells—still fewer have steeples. In towns and villages, the places of worship connected with the established church are commonly distinguished by some kind of belfry or bell-cote with bells. The ringing of these for divine service on Sundays, and on other occasions, forms the theme of many poetical allusions. The lines of Cowper will occur to recollection:

> How soft the music of those village bells,
> Falling at interval, upon the ear,
> In cadence sweet! now dying all away,
> Now pealing loud again, and louder still,
> Clear and sonorous as the gale comes on.

On all that belongs to the playing of bells in belfries, the inventive genius of the Netherlands long since arrived at proficiency. In some of the church-towers of that country, the striking, chiming, and playing of bells is incessant; the tinkling called chimes usually accompanies the striking of the hours, half-hours, and quarters; while the playing of tunes comes in as a special divertisement. In some instances, these tune-playing bells are sounded by means of a cylinder, on the principle of a barrel-organ; but in others, they are played with keys by a musician. The French apply the term *carillons* to the tunes played on bells; but in England, it is more usual to give the terms carillons to the suites of bells which yield this kind of music. In this last sense, the tower of *Les Halles*, a large building at Bruges, is allowed to contain the finest carillons in Europe. There is a set of music-bells of this kind in the steeple of St. Giles's Church, Edinburgh. On these, tunes used to be played for an hour daily at certain seasons by a musician, who had a small salary from the civic corporation.

Many of the church-towers in London are provided with peals of bells, the ringing of which is a well-known practice. Eight bells, which form an octave or diatonic scale, make the most perfect peal. The variety of *changes* or permutations of order that can be rung on a peal, increases enormously with the number of bells: 3 bells allow 6 changes; 4 bells, 24; 12 bells give as many as 479,001,600 changes. The ringing of peals differs entirely from tolling— a distinction not sufficiently recognized in those places where an ordinary ringing of bells is made to suffice alike for solemn and festive occasions. The merry peal almost amounts to an English national institution. It consists in ringing the peal in moderately quick time, and in a certain order, without interruption, for the space of an hour. Merry peals are rung at marriages (if ordered), and at other festive events, the ringers being properly paid, according to use and wont. The English appear to be fond of these peals, and the associations which they call up. They actually make bequests to endow periodical peals in their parish church-towers; leaving, for example, so much money to ring a merry peal for an hour on a certain evening of the week, or to commemorate victories, or some other subjects of national rejoicing, in all time coming. One of the most celebrated peals of bells in London is that of St. Mary-le-Bow, Cheapside, which form the basis of a proverbial expression meant to mark emphatically a London nativity—'Born within the sound of Bow-bells.' Brand speaks of a substantial endowment by a citizen for the ringing of Bow-bells early every morning to wake up the London apprentices. The ringing of the bells in token of merriment is an old usage in England, as we learn from Shakspeare:

> Get thee gone, and dig my grave thyself,
> And bid the merry bells ring to thy ear,
> That thou art crowned, not that I am dead.

Sometimes, in compliment to a newly-opened church, efforts are made to furnish its belfry with the proper number of bells, and to endow it at once for a weekly merry peal. It is common for some of the humbler class of parishioners to form a company of bell-ringers, acting under the authority of the church-wardens. Some endowments for peals embrace a supper, as well as a money-payment to the ringers; and of course, in such circumstances, there is little risk of the merry peal falling into desuetude. The consequence is, that what with marriages, and other festive celebrations, and as a result of endowments, merry peals are almost constantly going on somewhere in the metropolis—a fine proof, it may be said, of the naturally cheerful and generous temperament of the English, and of their respect for old customs. In Lancashire, the art of playing on bells is cultivated with much enthusiasm and success. The bells are small, and arranged on a movable stand; they are struck by a small instrument which is held in each hand of the performer, and produce a sweet tinkling kind of music.

The custom of hanging bells on the necks of horses, cows, and other animals, was in use by the Romans, and still survives. The bells give notice of approach in the dark, and hung on cows, goats, or sheep, these animals can be easily found in the woods, or on the mountains. The charming poetical allusion of Gray—

> And drowsy tinklings lull the distant folds—

will be called to remembrance. In some parts of England, as many as eight small bells, forming an octave, are attached to the harness of wagon-horses. The attaching of bells in a fanciful manner to riding and sleigh-horses is common in some parts of Europe and America.

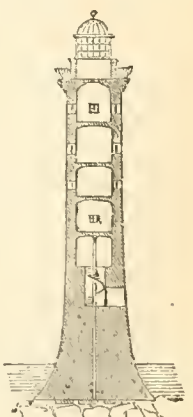
The term bell is infused in much of our conversational phraseology. 'To bear the bell,' is a phrase which we previously attempted to explain. At one period, a silver bell was the prize in horse-races in England, and the winning horse was said to bear away the bell. A less probable explanation is, that the phrase originated in the custom of one of the most forward sheep in a flock carrying a bell. Hence, at least, 'bell-wether of the flock,' a phrase applied disparagingly to the leader of a party. The old fable, in which a sagacious mouse proposes that a bell shall be hung on the neck of the cat, so that all the mice shall be duly warned of her approach, has given rise to the well-known phrase of 'belling the cat.' Any one who openly and courageously does something to lower the offensive pretensions of a powerful and dangerous person, is said 'to bell the cat.'

The *hanging of bells* in dwelling-houses, and ringing them by means of wires from the different apartments, is quite a modern invention; for it was not known in England in the reign of Queen Anne. Lately, there has been a great improvement in domestic bell-hanging. Instead of traversing the apartments, and turning and winding by means of cranks, the wires are carried directly upward in tubes in the walls to the garret: thence from a row of cranks, they descend together to their respective bells, which are hung in one of the lower passages. More recently, there has been introduced a system of electric bells, which is likely to supersede all others. The arrangement consists of an electro-magnet, with its armature fastened at one end by a spring, and terminating at the other in a hammer, by which the bell is struck. The battery may be placed in any part of the building, and as there is no motion in the wires, no cranks or other apparatus are required. Contact is made by pressing a stud, and messages may be sent to any part of the house, by the Morse alphabet, or other code of signals.

BELL, BOOK, AND CANDLE. The excommunication by B., B., and C. is a solemnity belonging to the Church of Rome. The officiating minister pronounces the formula of excommunication, consisting of maledictions on the head of the person anathematized, and closes the pronouncing of the sentence by shutting the book from which it is read, taking a lighted candle and casting it to the ground, and tolling the bell as for the dead. This mode of excommunication appears to have existed in the western churches as early as the 8th c. Its symbolism may be explained by quoting two or three sentences from the conclusion of the form of excommunication used in the Scottish Church before the Reformation: 'Cursed be they from the crown of the head to the sole of the foot. Out be they taken of the book of life. And as this candle is cast from the sight of men, so be their souls cast from the sight of God into the deepest pit of hell. Amen.' The rubric adds: 'And then the candle being dashed on the ground and quenched, let the bell be rung.' So, also, the sentence of excommunication against the murderers of the Archbishop of Dublin in 1534: 'And to the terror and fear of the said damnable persons, in sign and figure that they be accursed of God, and their bodies committed into the hands of Satan, we have rung these bells erected this cross with the figure of Christ; and as ye see this candle's light taken from the cross and the light quenched, so be the said cursed murderers excluded from the light of heaven, the fellowship of angels, and all Christian people, and sent to the low darkness of fiends and damned creatures, among whom everlasting pains do endure.'

BELL OF A CAPITAL is the capital of a pillar denuded of the foliage, in which case it resembles the form of a bell reversed.

BELL ROCK, or INCH CAPE, a reef of old red sandstone rocks in the German Ocean, 12 miles south-east of Arbroath, and nearly opposite the mouth of the Tay. The reef is 2000 feet long; at spring-tides, part of it is uncovered to the height of four feet; and for 100 yards around, the sea is only 3 fathoms deep. It was formerly a fruitful cause of shipwreck, and, according to tradition, the abbot of Aberbrothwick (Arbroath) placed a bell on it, 'fixed upon a tree or timber, which rang continually, being moved by the sea, giving notice to the sailors of the danger.' This tradition has been embodied by Southey in his well-known ballad of *The Inchcape Rock*. A light-house, designed by Robert Stevenson, engineer to the Commissioners of Northern Lighthouses, was commenced in 1807, and completed on the reef in 1811, and a revolving red and white light exhibited. The structure is 115 feet high, is 42 feet in diameter at base, and 15 at top, is solid for the first 30 feet upwards, 15 feet of which is under water at high tide, and cost upwards of £60,000.



Section of Bell Rock Light-house.

BELL, ANDREW, D.D., author of the 'Madras System of Education,' was born at St. Andrews in 1753, and educated at the university of that place. Subsequently, he took orders in the Church of England; and after residing for some time in British America, was appointed one of the chaplains at Fort St. George, Madras. While here, he was intrusted by the directors of the East India Company with the management of an institution for the education of the orphan children of the European military. The arduous character of his new duties compelled him to reflect seriously on the best means of fulfilling them. As he found it impossible to obtain the services of properly qualified ushers, he at length resorted to the expedient of conducting the school by the

aid of the scholars, themselves. Hence originated the far-famed 'Monitorial System' (q. v.). After superintending the institution for seven years, the state of his health forced him to return to Europe. On his departure, he received a most flattering testimonial from the directors of the school. In 1797, after his arrival in England, B. published a pamphlet entitled *An Experiment in Education, made at the Male Asylum of Madras; suggesting a System by which a School or Family may teach itself under the Superintendence of the Master or Parent.* This pamphlet attracted little attention, until Joseph Lancaster, a dissenter, commenced to work upon the system, and succeeded in obtaining for it a large measure of public recognition. In 1803, Lancaster also published a tractate on education, recommending the monitorial system, as it was now called, and admitting B. to be the original inventor of it, an admission which he afterwards discreditably retracted. Lancasterian schools now began to spread over the country. The church grew alarmed at the successful results of the efforts made by dissenters to educate the poor, and resolved to be philanthropical ere it was too late. B. was put up against Lancaster. Money was collected, and an immense amount of emulation was excited in the bosoms of churchmen. Fortunately, however, this rivalry produced only beneficial effects, and the motives which induced it may therefore be forgotten. Later in life, B. was made a prebendary of Westminster, and Master of Sherborn Hospital, Durham. He was also a member of various learned societies. He died at Cheltenham, January 28, 1832. He left (besides a valuable estate) £120,000 for the purpose of founding educational institutions in Edinburgh, Glasgow, Leith, Aberdeen, Inverness, Cupar, and St. Andrews. See Meiklejohn's *An Old Educational Reformer* (1881).

BELL, Sir Charles, an eminent surgeon, whose discoveries in the nervous system have given him a European fame, was born at Edinburgh in 1778, and while a mere youth, assisted his brother John (afterwards noticed) in his anatomical lectures and demonstrations. In 1797, he was admitted a member of the Edinburgh College of Surgeons, and soon after appointed one of the surgeons of the Royal Infirmary. In 1806, he proceeded to London, and for some years lectured with great success on anatomy and surgery at the academy in Great Windmill Street. Admitted, in 1812, a member of the Royal College of Surgeons, London, he was elected one of the surgeons of the Middlesex Hospital, in which institution he delivered clinical lectures, and raised it to the highest repute. To obtain a knowledge of gunshot wounds, he twice relinquished his London engagements—the first time after the battle of Corunna in 1809, when he visited the wounded landed on the southern coasts of England; the other, after the battle of Waterloo, when he repaired to Brussels, and was put in charge of a hospital with 300 men. In 1824, he was appointed senior Professor of Anatomy and Surgery to the Royal College of Surgeons, London, and subsequently a member of the council. On the establishment of the London University, now University College, in 1826, B. was placed at the head of their new medical school. He delivered the general opening lecture in his own section, and followed it by a regular course of characteristic lectures on physiology; but soon resigned, and confined himself to his extensive practice, which was chiefly in nervous affections. In 1831, he was one of the five eminent men in science knighted on the accession of William IV., the others being Sir John Herschel, Sir David Brewster, Sir John Leslie, and Sir James Ivory. In 1836, he was elected Professor of Surgery in the University of Edinburgh. He was a fellow of the Royal Societies of London and Edinburgh, and a member of some other learned bodies. Author of various works on surgery and the nervous system, and editor, jointly with Lord Brougham, of Paley's *Evidences of Natural Religion*, B. was one of the eight distinguished men selected to write the celebrated Bridgewater Treatises, his contribution being on *The Hand, its Mechanism and Vital Endowments, as evincing Design* (1834). He died suddenly, April 30, 1842. Among his principal works are: *The Anatomy of the Brain Explained, in a Series of Engravings*, 12 plates (Lond. 1802, 4to); *A Series of Engravings, explaining the Course of the Nerves* (Lond. 1804, 4to); *Essays on the Anatomy of Expression in Painting*, plates, (Lond. 1806, 4to); posthumous edition, much enlarged, entitled *The Anatomy and Philosophy of Expression as connected with the Fine Arts* (Lond. 1844, 8vo); *A System of Operative Surgery*, 2 vols. (Lond. 1807—1809; 2d ed. 1814); *Dissertation on Gunshot Wounds* (Lond. 1814, 2 vols. 8vo); *Anatomy and Physiology of the Human Body*, 3 vols. (1816); various papers on the nervous system, which originally appeared in the *Philosophical Transactions; Exposition of the Natural System of the Nerves of the Human Body* (1824); *Institutes of Surgery* (Edin. 2 vols. 1838, 12mo); Animal Mechanics, contributed to the *Library for the Diffusion of Useful Knowledge* (1828); *Nervous System of the Human Body* (1830), 4to. See *Correspondence of Sir Charles B.* (1870).

BELL, George Joseph, an eminent lawyer, brother of the above, was born at Edinburgh 26th March 1770, and passed advocate in 1791. Acknowledged one of the greatest masters of commercial jurisprudence of his time, and in particular of that department of it which relates to the laws of bankruptcy, he was, in 1822, appointed Professor of Scots Law in Edinburgh University; and in 1823, a member of the commission for inquiring into Scottish judicial proceedings. Subsequently, he was member of a commission to examine into and simplify the mode of procedure in the Court of Session. On the report, drawn up by B., was founded the Scottish Judicature Act, prepared by him, which effected many important changes in the forms of process in the superior courts of Scotland; the jury court being abolished as a separate judicature, and conjoined with the Court of Session. Appointed in 1831 one of the clerks of the Court of Session, he was, in 1833, chairman of the Royal Commission to examine into the state of the law in general. He also prepared a bill for the establishment of a Court of Bankruptcy in Scotland. His principal works are—*Commentaries on the Laws of Scotland, and on the Principles of Mercantile Jurisprudence* (Edin. 1810, 4to; 5th ed. 1826, 2 vols. 4to); *Principles of the Law of Scotland* (Edin. 1829, 8vo; 4th ed. 1839, 8vo); and *Commentaries on the recent Statutes Relative to Diligence or Execution against the Movable Estate, Imprisonment, Cessio, Bonorum, and Sequestration in Mercantile Bankruptcy* (Edin. 1840, 4to). Bell died 23d September 1843.

BELL, Henry, the successful introducer of steam navigation into Europe, fifth son of Patrick Bell, a mechanic, was born at Torphichen, Linlithgowshire, Scotland, April 7, 1767. After working three years as a stone-mason, he was in 1783, apprenticed to his uncle, a mill-wright. He was instructed in ship-modelling at Borrowstounness, and completed his knowledge of mechanics with an engineer at Bell's Hill. Repairing to London, he was employed by the celebrated Mr. Rennie. About 1790 he returned to Glasgow, and in 1808 removed to Helensburgh, where he kept the principal inn, and devoted himself to mechanical experiments. How far B. was anticipated by Fulton and others, in his application of steam to navigation, will be considered under the head of Steam Navigation. In January 1812, a small vessel, 40 feet in length, called the *Comet*, built under his directions, and an engine constructed by himself, was launched on the Clyde with success—the first on European waters. Five years previously on October 3, 1807, Mr. Fulton, a Scottish engineer in America, had placed the first steam-boat on the Hudson. B. died at Helensburgh, November 14, 1830. A monument was erected to his memory at Dunglass Point on the Clyde.

BELL, John, of Antermony, a celebrated Asiatic traveler, born in the west of Scotland in 1691, studied for the medical profession. In 1714, he went to St. Petersburg, and soon after was appointed physician to an embassy from Russia to Persia. In 1719, he was sent upon another to China, through Siberia. In 1737, he was sent on an embassy to Constantinople, and afterwards settled for some years in the Turkish capital as a merchant. In 1747, he returned to Scotland, and died at Antermony, July 1, 1780. His *Travels from St. Petersburg to various Parts in Asia*, in 2 vols. 4to, were published by subscription at Glasgow in 1763. From its simplicity of style, the work has been described as 'the best model, perhaps, for travel-writing in the English language.'

BELL, John, an eminent surgeon, second son of the Rev. William Bell, an Episcopal minister in Edinburgh, was born in that city, May 12, 1763. He studied under the celebrated Black, Cullen, and Monro *secundus*; and while attending the anatomy classes of Dr. Monro, first conceived the idea of teaching the application of the science of anatomy to practical surgery. He commenced, in 1786, lecturing at Edinburgh on surgery and anatomy, and in 1793 published the first volume of his *Anatomy of the Human Body*; in 1797, appeared the second volume; and in 1802, the third. A volume of anatomical drawings by himself, illustrative of the structure of the bones, muscles, and joints, was published in 1794; and another volume, illustrative of the arteries, with drawings by his brother, afterwards Sir Charles Bell, appeared in 1801. In 1798, B. passed some weeks at Yarmouth among the seamen of Lord Duncan's fleet wounded at Camperdown; and in 1800 he published a *Memorial concerning the Present State of Military Surgery*. His *System of the Aanatomy of the Human Body*, and his *Discourses on the Nature and Cure of Wounds* (Edin. 1793—1795), were translated into German. A good classical scholar, he was distinguished alike for his great conversational powers and general information. Early in 1816, he was thrown from his horse, and, his health declining, he went to Paris, and thence proceeded to Italy. He died at Rome, of dropsy, April 15, 1820. Besides the works mentioned, he was the author of *The Principles of Surgery*, 3 vols. 4to, 1801—1807; new edition, edited by his brother, Sir Charles Bell, 1826. A posthumous work, entitled *Observations on Italy*, edited by Bishop Sandford of Edinburgh, was published by his widow.

BELL, John, an eminent sculptor, remarkable for rejecting the classical antique model, and following nature only in his works, born in Norfolk in 1811, first exhibited at the Royal Academy,

London, in 1832, a religious group. His works are numerous, and of high and original merit. B.'s statues of Lord Falkland, exhibited in model at Westminster Hall, 1847, and Sir Robert Walpole, 1854, were commissioned for the new Houses of Parliament. One of his best known designs is a monument to the Guards who fell in the Crimea, executed in 1858. In decorative art, he has also distinguished himself. He was one of the sculptors of the Prince Consort Memorial in Hyde Park, London, which was unveiled in 1873. B. is the author of a *Free Hand-drawing Book for the Use of Artisans.*

BELL, ROBERT, an industrious and versatile literary writer, the son of a magistrate, was born at Cork, 10th January 1800, and when very young, obtained an appointment in a government department in Dublin. He was for a time editor of the government journal, *The Patriot.* In 1828, he removed to London, and was appointed editor of *The Atlas* newspaper. In 1839, in conjunction with Sir Edward Bulwer Lytton and Dr. Lardner, he started *The Monthly Chronicle,* a literary periodical, published by Longman & Co.; and latterly was editor of it. In 1841, he retired from *The Atlas.* For Lardner's Cyclopædia, B. wrote *The History of Russia,* 3 vols., and *The Lives of the English Poets,* 2 vols. The last volume of Southey's *Naval History,* left unfinished by the author, was also written by him, as was the concluding volume of Mackintosh's *History of England.* At the London theaters, three five-act comedies have been produced by him. He was author, also, of *The Ladder of Gold,* a novel, 3 vols., 1850; *Heart and Altars,* a collection of tales, 3 vols.; *Life of Canning; Outlines of China; Memorials of the Civil War,* consisting of the Fairfax correspondence, 2 vols.; *Wayside Pictures through France, Belgium, and Holland.* In 1854, he commenced an annotated edition of the English poets; and received from the king of the Belgians a gold medal, as a token of his majesty's sense of his services to literature. He died in 1867.

BELL, THOMAS, a distinguished naturalist, the son of a medical practitioner, was born at Poole, Dorsetshire, in 1792. In 1814, he went to London, and studied at Guy's Hospital, and in 1815, passed the College of Surgeons. In 1817, he commenced a course of annual lectures on dental surgery at Guy's Hospital, where he also for some time delivered lectures on comparative anatomy. He was one of the founders of, and a principal contributor to, *The Zoological Journal,* of which five volumes were published; also one of the members of the Zoological Club of the Linnæan Society, afterwards incorporated with the Zoological Society. Elected in 1828 a Fellow of the Royal Society, in 1840 he was appointed its secretary. In 1836, he became Professor of Zoology in King's College, London. On the establishment of the Ray Society, in 1844, for the publication of rare and costly works on natural history, he was elected its first president. In 1853, he resigned the secretaryship of the Royal Society, on being elected President of the Linnæan Society. He is author of a *History of British Reptiles,* in Van Voorst's series of British natural history, 1829; a *History of British Quadrupeds,* same series, 1836; and a *History of the British Stalk-eyed Crustacea,* same series, 1853. In 1833, he commenced a *Monograph of the Testudinata.* The article 'Reptiles,' in Darwin's *Zoology of the Voyage of the Beagle,* was written by Bell. His last work of interest was a new edition of Gilbert White's *Natural History and Antiquities of Selborne,* on which he began to busy himself in 1872. B. is appropriately the proprietor of the manor of Selborne.

BELLA, a thriving town of Italy, in the province of Basilicata, with a population of between 5000 and 6000.

BELLA, STEFANO DELLA, a famous Italian engraver, was born at Florence, 18th May 1610. He was intended for a goldsmith, but he soon left that calling and devoted himself to engraving. He executed upwards of 1400 different works, of almost all subjects—battles, sea-pieces, landscapes, animals, &c. All are characterized by freedom and delicacy, and give evidence of high imagination on the part of the author, and also of much patient and careful manipulation. One of his most admired works is a view of the Pont-Neuf, Paris. He died 12th July 1664.

BELLADO'NNA, DWALE, or DEADLY NIGHTSHADE (*Atropa Belladonna*), a plant of the natural order *Solanaceæ* (q. v.); an herbaceous perennial, growing up every year as a bush, from two to six feet high, with ovate entire leaves, and bell-shaped flowers of a lurid purple color, which are fully larger than those of the common harebell, stalked and solitary in the axils of the leaves. It produces berries, of the size of a middle-sized cherry, and which, when ripe, are of a shining black color, and of a sweetish and not nauseous taste, although the whole plant has a disagreeable heavy smell. It is a native of the southern and middle parts of Europe, and is not uncommon in England, in the neighborhood of towns and of ruins. All parts of the plant are narcotic and poisonous, and fatal consequences not unfrequently follow from eating of its berries, which have an inviting appearance. Its roots have sometimes been mistaken for parsnips. Dryness of the mouth and throat, dilatation of the eyes, obscurity of the vision, paralytic tremblings, loss of sensation, delirium, and stupor, are among the effects of poisoning by belladonna. When death takes place from this cause, corruption ensues with extraordinary rapidity.

B. is, however, of great value in medicine, soothing irritation and pain, particularly in nervous maladies, and is administered both internally and externally, in the form of extract, tincture, ointment, and plaster, which are generally prepared from the dried leaves, sometimes from the root. It is particularly useful, from its power of dilating the pupil of the eye, and is constantly employed by oculists both for examinations and operations. It is also applied to the eye to diminish the sensibility of the retina to light. It has recently been recommended as a preventive of scarlet fever, apparently on the ground of its tendency, when administered in frequent small doses, to produce an eruption and an affection of the throat, somewhat similar to those characteristic of that disease; but the evidence of its utility for this purpose is not sufficient to warrant confidence.—The name B., i. e., Fair Lady, is supposed to have originated in the employment of the juice for staining the skin. The name Dwale is apparently from the same root with the French *deuil,* grief—an allusion to the same qualities which have obtained for the plant the appellation of Deadly Nightshade. *Atropa* is from *Atropos,* one of the Fates.—The other species of *Atropa* are South American.

Belladonna.
a, part of a branch with leaves and flowers; *b*, fruit, with persistent calyx.

B. owes its active properties on the animal system to the presence of the alkaloid *Atropine,* accompanied by another alkaloid, *Belladonnine.* The alkaloid atropine is present in all parts of the plant, and in all the preparation. It is generally procured from the root of B., and then forms needle-shaped crystals, which are sparingly soluble in water, but readily dissolve in alcohol and ether. Atropine is a very active poison, and its effects on the animal system resemble in an intensified degree the manner in which B. acts. It has been introduced into medicine, along with its nitrate, its sulphate, and its hydrochlorate.

BELLADO'NNA LILY (*Amaryllis Belladonna*), a very beautiful species of Amaryllis (q. v.), with rose-colored drooping flowers clustered at the summit of the leafless flowering stem. It is a native of the Cape of Good Hope and of the West Indies, has become naturalized in Madeira, and is a not unfrequent ornament of gardens in England. The flowering stem is about 18 inches high.

BELLAMY, JACOBUS, a distinguished Dutch poet, was born at Vliessingen (Flushing), November 12, 1757, and died March 11, 1786. His parents were very poor, and he was indebted for his education to the patronage of a clergyman, and other persons, who had seen and admired the patriotic effusions of his boyish muse, and who subscribed to send him to the university of Utrecht. Here the talents already remarked in B. were devoted chiefly to poetry, though his benefactors had hoped that he would devote himself to theology. His first sentimental and anacreontic poems, published at Amsterdam in 1782, were followed by a series of earnest patriotic poems (*Vaderlandsche Gezangen*), and in the same year, a third volume full of merit (1785). A collected edition of his works appeared at Haarlem (1826), but it does not contain his most popular poem, *Roosje.* B. was possessed of a glowing spirit and fancy, as well as a fine taste and ease in composition. He deservedly ranks as one of the chief restorers of national literature in Holland.

BELLARMINE, ROBERT, one of the most celebrated Catholic theologians, was born at Monte Pulciano in Tuscany, October 4, 1542. He entered the order of Jesuits in 1560, and was distinguished among his *confrères* by the zeal with which he studied theology, the church-councils, the Fathers, Hebrew, history, and the canon law. In 1563, he gave lessons in polite literature and astronomy at Florence; and in rhetoric, at Mondovi, 1564—1567. In his twenty-seventh year, when he went to Louvain as professor of theology, he began that long controversy with 'heretics' which formed the main business of his life. In 1599, when he was made a cardinal against his own inclination, he used his influence over Pope Clement VIII. to prevent the introduction of the Platonic philosophy into the university of Rome, on the ground of its being 'pernicious;' but though himself a Jesuit, he honorably op-

posed the Dominicans with regard to the Pelagian writings of Molina. He seems, however, to have participated to some extent in that writer's suicidal ethics, for in his *Disputationes* he argues that, as the pope is the supreme authority in doctrine and morals, if he should call virtue vice, and vice virtue we are bound to believe him, and to act accordingly. In 1602, he was appointed Archbishop of Capua. After the death of Clement VIII., he contrived to escape promotion to the papal chair, but was induced by Pius V. (1605) to hold an important place in the Vatican, where he remained until the time of his death, which took place in the Novitiate-house of the Jesuits, September 17, 1621. In his work, *De Potestate Pontificis in Temporalibus* (On the Pope's Power in Secular Matters), he introduced the doctrine that the pope must be held as supreme over all kings. On this account, the book was condemned as treasonable in Paris, Venice, and Mentz.

His chief work contains the disputations held in the Jesuits, College at Rome, 1576—1581, *Disputationes de Controversiis Fidei adversus hujus Temporis Hereticos* (3 vols., Rome, 1581; 4 vols., Prague, 1721; 4 vols., Mayence, 1842). These disputations are regarded by Catholics as the best arguments for their tenets. There can be no question of their merits with regard to erudition and adroitness in controversy; but as Gerhard, in his *Bellarminus Orthodoxias Testis* (Jena, 1631—1633), and Dallæus have shown, many of the conclusions are far from being sound or logical. Industry, clearness, and acuteness are the chief merits of B.'s great work; but it is seriously lessened in value by subtilty, foreed conclusions, and a very defective exegesis—faults which have long been evident to enlightened Catholic writers themselves. Among his other writings, the most able is the *Christianæ Doctrinæ Applicatio*, originally written in Italian, and now translated into all the European languages. Pope Urban VIII., at the instigation of the Jesuits, declared B. to be a 'faithful servant of God;' but his canonization as a saint has hitherto been opposed. Complete editions of his works have been published at Venice, 5 vols., 1721; and Cologne, 7 vols., 1619. His life was written in Italian by the Jesuit Fuligatti (Rome, 1624); and translated into Latin by Petra Sancta (Liege, 1626).

BELLARY, a district of British India in the presidency of Madras, bounded on the N. by the Nizam's territories, on the E. by Cuddapah, on the S. by Mysore, and on the W. by Dharwar. With an area of 11,007 square miles, it extends in N. lat. between 13° 40′ and 15° 58′; and in E. long. between 75° 44′ and 78° 19′. Pop. (1872) 1,668,006. The peculiarities of the district are connected with its situation. Elevated on the east slope of the West Ghauts, B. enjoys so healthy a climate that it has been officially recommended as the site of a sanatorium for the neighboring provinces. Screened by the Ghauts from the south-west monsoon, and protected against the north-east one by its distance from the Bay of Bengal, B. receives, on an average, less rain than any other portion of Southern India—the annual fall ranging between about 12 inches and about 26 inches. Hence all its subordinate streams become, in the dry season, mere expanses of sand, which, excepting when bound together by the growth of the nuth-grass, is apt to encroach from year to year, like a glacier, over the bordering grounds. B., in fact, may in a great measure be said to be habitable through artificial means. Irrigation, though rude, is yet ingenious; dug wells amount to 22,000; of tanks there are 1400; and weirs or dams of huge stones, to the number of 331, cross the various water-courses, so as to form, after the rains, so many reservoirs.

BELLA'RY, the chief town of the above district, is situated about 380 miles south-east of Bombay, and 270 north-west of Madras. Lat. 15° 8′ N., and long. 76° 59′ E. As one of the principal military stations in the presidency of Madras, it is connected by good roads with Belgaum, Bangalore, Hyderabad, and Madras itself. The fort stands on a rock two miles round, and 450 feet high; and is supplied with water from tanks excavated in the solid granite. Besides the fort and adjacent cantonments, B. contains a native town, which numbers about 52,000 inhabitants.

BE'LL-BIRD (*Casmarynchus carunculata*), a bird found in some of the warm parts of South America, remarkable for the metallic resonance of its ery, which resembles the tolling of a bell, with pauses varying from a minute to several minutes. This bird belongs to a genus nearly allied to the Cotingas (q. v.) and Waxwings (q. v.), but characterized by a very broad and much depressed bill, soft and flexible at the base, and hard towards the extremity. It is about the size of a jay; the male is of snow-white plumage, and from his forehead rises a strange tubular appendage, which, when empty, is pendulous, but which can be filled with air by a communication from the palate, and then rises erect to the height of nearly three inches. He generally takes his place on the top of a lofty tree, and his tolling can be heard to the distance of three miles. It resounds through the forest, not only at morning and evening, but also at mid-day, when the heat of the blazing sun has imposed silence on almost every other creature.

BELLE-ALLIANCE, the name of a farm in the province of Brabant, Belgium, 13 miles south of Brussels. It has become famous as the position occupied by the center of the French army in the battle of Waterloo, June 18, 1815. The Prussians gave the name B. to this decisive battle; the French named it from Mont-Saint-Jean, the key of the British position, about two miles to the north; but the English name, Waterloo (q. v.), taken from the village where Wellington had his head-quarters, is now commonly used.

BELLE DE NUIT (Fr. Beauty of the Night), a name given to certain tropical species of *Convolvulacea*, with extremely beautiful and fragrant flowers, which open only during the night. The species to which perhaps the name more particularly belongs, is *Calonyction Bona Nox*, a native of the forests of the West Indies and of tropical America, with twining stem, spiny branches, heart-shaped leaves, and exquisitely beautiful white flowers of five or six inches in diameter, which are produced in large many-flowered corymbs.

BELLEGARDE, a hill-fortress of France, in the department of Pyrénées Orientales. It is situated on the Spanish confines on the road from Perpignan to Figueras, and in the pass between Col de Portus on the east, and Col de Panizas on the west. Here the French, under Philip III., were defeated by Peter III. of Arragon in 1285. In the 14th c. B. consisted only of a fortified tower. It was captured by the Spaniards in 1674, and again by the French under Marshal Schomberg in 1675. After the peace of Nimeguen, 1678—1679, a regular fortress, with five bastions, was erected here by order of Louis XIV. In 1793, it was blockaded and taken by the Spaniards under Ricardos, but was retaken by the French in the following year.

BELLE ISLE, an island in the Atlantic, about midway between the North-west of Newfoundland and the south-east of Labrador, in lat. 52° N., and long. 56° W. Although on the parallel of Essex in England, it yields little but potatoes and ordinary vegetables. It is chiefly known as giving name to the adjacent strait on the south-west, which, separating Labrador from Newfoundland, forms the most northerly of the three channels between the Gulf of St. Lawrence and the open ocean.

BELLEISLE-EN-MER, an island belonging to France in the department Morbihan, in the Atlantic, 8 miles south of Quiberon Point. Its length is 11 miles, and its greatest breadth 7. Pop. (1872) 10,804, chiefly engaged in pilchard-fishing. Salt is made on the island. B. is a place of considerable antiquity. The chief town is *Palais* (pop. 2260), a seaport and fortified place. In the 9th c., B. came into the possession of the Count of Cornouailles, who bestowed it on the abbey of Redon, afterwards on the abbey of Quimperlé. In the 16th c., the monks of Quimperlé ceded the island to Charles IX., who gave it as a marquisate to the Marshal de Retz, who fortified it. His successor sold the island in 1658 to Fouquet, intendant of finance, who further improved and strengthened it. His grandson, the celebrated Marshal Belleisle, ceded the island to Louis XV. in exchange for the comté Gisors, 1718. In 1761, it was captured by the English fleet under Keppel, and restored in 1763.

BELLENDEN (BALLANTYNE), JOHN, Archdeacon of Moray, a Scottish writer in the reigns of James V. and Queen Mary, was born towards the close of the 15th century, somewhere in the east of Scotland, for in the Records of the university of St. Andrews he is entered thus: '1508, *Jo. Ballentyn nac. Laudoniæ*.' He completed his education at the university of Paris, where he took the degree of D.D. B. is best remembered by his translation of Boece's *Scotorum Historiæ* (done in 1533), and of the first five books of Livy (also done in 1533), interesting as specimens of the Scottish prose of that period, and remarkable for the ease and vigor of their style. To both of these works are prefixed poetical *prohemes* or prologues. B.'s *Croniklis of Scotland* professes to be a translation of Boece, but it is a very free one, and contains numerous passages not to be found in the original, so that it is in some respects to be considered almost an original work. The author enjoyed great favor for a long time at the court of James, at whose request he executed the translations. As the reward of his performances, he received grants of considerable value from the treasury, and afterwards was made Archdeacon of Moray and Canon of Ross. Becoming involved, however, in ecclesiastical controversy, he left his country, and, according to Bale and Dempster, went to Rome, where he died about 1550. The translation or 'traductioun' of Livy was first published in 1822 by Mr. Thomas Maitland (afterwards Lord Dundrennan), uniform with his edition of the *Croniklis* in the previous year (Edin., 2 vols. 4to).

BELLENDEN, WILLIAM, a Scottish author in the time of Queen Mary and James VI. His personal history is meagre and obscure; all that we know being the testimony of Dempster (*Hist. Eccl.*), that he was a professor in the university, and an advocate in the parliament of Paris, and that he was employed in that city

in a diplomatic capacity by Queen Mary, and also by her son, who conferred on him the appointment of Master of Requests. His first work, entitled *Ciceronis Princeps*, &c., was published at Paris in 1608; his next, *Ciceronis Consul, Senator, Populusque Romanus*, in 1612. Both these works are compilations from the writings of Cicero. His next work, *De Statu Prisci Orbis*, appeared in 1615, and consists of a condensed sketch of the history and progress of religion, government, and philosophy in ancient times. These three works he republished in a collected form the year after, under the title *De Statu, Libri tres*. His crowning labor, *De Tribus Luminibus Romanorum*, was published after his death. The 'three luminaries' were Cicero, Seneca, and Pliny, out of whose works he intended to compile, on the same plan as his previous works, a comprehensive digest of the civil and religious history, and the moral and physical science of the Romans. The first of these only was completed, and forms a remarkable monument of B.'s industry and ability. 'B.,' says Mr. Hallam 'seems to have taken a more comprehensive view of history, and to have reflected more philosophically on it than perhaps any one had done before.' B.'s works furnished the materials for Dr. Middleton's *Life of Cicero*, though that learned divine abstains from any allusion to the forgotten Scott from whom he plundered wholesale. Warton first denounced the theft, which was afterwards made clear by Dr. Parr in his edition of the *De Statu, Libri tres*, published in 1787.

BELLE'ROPHON, a genus of univalve shells, known only as a fossil. Montfort, who established the genus, placed it among the chambered Cephalopoda. It was subsequently associated with the living Argonaut, but is now generally considered as a genus of De Blainville's Nucleobranchiata (q. v.), having as its nearest ally the genus *Atlanta;* from which, however, it differs in having a strong shell. The shell of the B. is symmetrically convolute, with few and occasionally sculptured whorls, globular or discoidal, and having a dorsal keel, which terminates in a deep notch in the sinuous aperture. It is a palæozoic organism, extending from the lower silurian to the carboniferous series. Seventy species have been described.

Bellerophon tangentialis.

BELLE'ROPHON (originally called HIPPONOUS) was the son of the Corinthian king Glaucus, and Eurymede, daughter of Sisyphus. Other accounts make Neptune his father. Having accidentally killed his brother, B. fled to his relative Prœtus, king of Argos, by whom he was hospitably received and protected; but Anteia, the spouse of Prœtus, having become enamored of him, and he, like Joseph, having declined her overtures, she revenged herself after the manner of Potiphar's wife. This induced Prœtus to send his guest away to Iobates, king of Lycia, to whom B. carried a sealed message. After being entertained nine days at the court of Lycia, B. delivered the letter, which contained a request that Iobates would cause the youth to be slain. This, however, Iobates was reluctant to do in a direct way, as B. was his guest. He consequently imposed upon B. the seemingly impossible task of slaying the formidable Chimæra (q. v.). B., mounted on the winged steed Pegasus (given to him by Pallas), ascended into the air, and succeeded in slaying the monster with his arrows. Afterwards, he was sent by King Iobates against the Amazons, whom he defeated. On his way home he destroyed an ambuscade of Lycians, which Iobates had set for his destruction. That monarch now thought it useless to attempt his death, and as a sort of recompense, gave the hero in marriage his daughter Philonoë, by whom he had three children—Isander, Hippolochus, and Laodameia; such at least is the story as told by Apollodorus, who here concludes. Homer relates that he at last drew on himself the hatred of the gods, and wandered about in a desolate condition through the Aleïan field. Pindar relates that B. on Pegasus endeavored to mount to Olympus, when the steed, maddened by Jove through the agency of a gadfly, threw his rider, who was stricken with blindness. B.'s adventures were a favorite subject of the ancient artists. Sculptures have recently been discovered in Lycia which represent him vanquishing the Chimæra.

BELLES-LETTRES, a term adopted from the French into the English and various other languages. It is generally used in a vague way to designate the more refined departments of literature, but has in fact no precise limits. In English usage it is synonymous with another vague expression, *polite literature*, including history, poetry, and the drama, fiction, essay, and criticism.

BELLEVILLE, a town of France, in the department of the Seine, forming a suburb of Paris, and enclosed by the new fortifications. It has manufactories of cashmeres, varnished leather, articles of polished steel, chemical stuffs, &c. There are springs at B. which have supplied Paris with water from a very early date, and it has tea-gardens and other places of amusement much resorted to by the Parisians. Pop. over 70,000.

BELLEVILLE, chief town of the county of Hastings, Ontario, Canada, situated on the Bay of Quinté, Lake Ontario, and on the Grand Trunk Railway of Canada, 48 m. W. from Kingston. It is a very thriving town. Here are several iron-foundries, manufactories, and saw-mills. Pop. (1871) 7305.

BELLEY, a town of France in the department of Ain, is a place of great antiquity, and was at one time strongly fortified. The finest lithographing stones in France are procured here. Pop. (1876) 4105.

BE'LL-FLOWER. See CAMPANULA.

BELLI'NI, the name of a Venetian family which produced several remarkable painters. The earliest was JACOPO B., who died in 1470. He was a pupil of the celebrated Gentile da Fabriano, and one of the first who painted in oil. His eldest son, GENTILE B., born 1421, died 1501, was distinguished as a portrait-painter, and also as a *medailleur*. Along with his brother, he was commissioned to decorate the council-chamber of the Venetian senate. Mohammed II., having by accident seen some of his works, invited Gentile to Constantinople, employed him to execute various historical works, and dismissed him laden with presents. The *Preaching of St. Mark* is his most famous achievement. His more celebrated brother, GIOVANNI B., born 1422, died 1512, was the founder of the older Venetian school of painting, and contributed greatly to its progress. His works are marked by naïveté, warmth, and intensity of coloring. His best works are altar-pieces. His picture of the *Infant Jesus* slumbering in the lap of the Madonna, and attended by angels, is full of beauty and lively expression. His *Holy Virgin, Baptism of the Lord*, and *Christ and the Woman of Samaria*, are also much admired. Among his numerous pupils the most distinguished were Giorgione and Titian.

BELLI'NI, VINCENZO, one of the most popular modern opera composers, was born at Catania, in Sicily, November 1, 1802, and died at Puteaux, near Paris, September 24, 1835. He received his early education at the Conservatory of Naples, and was subsequently instructed in composition by Tritto and Zingarelli. After making some attempts, without much success, in instrumental and sacred music, he brought forward, in 1825, the opera *Andelson e Salvina*, which was played in the small theater of the Royal College of Music (Naples). Another opera *Bianco e Gernando*, was given in the theater St. Carlo (1826) with such success that, in 1827, Bellini was commissioned to write a piece for *La Scala* at Milan. This opera, *Il Pirata*, was the first which carried the composer's name beyond Italy. It was followed with equal success by *La Straniera*, 1829, and by *I Capuletti ed i Montecchi*, written for the theater of Venice, 1830, which was the culmination of the fame of B., though it by no means exhausted his productive powers. *La Sonnambula* and *Norma* appeared in 1831, and *Beatrice di Tenda* in 1833. In the same year the composer went to Paris, where he became acquainted with other forms of music beside the Italian.

He was received with great applause in London, and after his return to Paris, wrote his opera *I Puritani*, which shows the influence of the French school of music, but without servile imitation. At an early age the career of B. was interrupted by death, before the composer had fully developed his powers. He was the most genial and original of all the followers of Rossini, and though inferior to his master in exuberance of fancy, is superior in carefulness and finish, especially in the due subordination of instrumental decorations to vocal melody. In private he was highly esteemed for the purity and affectionateness of his character.

BELLINZO'NA, or BE'LLENZ, a town of Switzerland, in the canton of Tessin or Ticino, on the left bank of the river of that name, and the seat of the provincial government, alternately with Lugano and Locarno. It is guarded by three old castles, and completely commands the passage of the valley in which it is situated. In former times, it was considered a place of great military importance, and was the scene of frequent conflicts between the Italians and Swiss; the latter of whom finally made themselves masters of it about the beginning of the 16th c. As an entrepôt for the merchandize of Germany and Italy, it is now a place of considerable commercial importance, though the population is but small—(1870) 2501.

BE'LLIS. See DAISY.

BELLO'NA, the goddess of war among the Romans, was described by the poets as the companion, sister, wife, or daughter of Mars; she was also represented as armed with a bloody scourge, and as inspiring her votaries with a resistless enthusiasm in battle. In the war with the Samnites, the Consul Appius Claudius vowed a temple to B., which was erected afterwards on the field of Mars. In this temple the senate gave audience to embassies from foreign powers, and also the consuls who had claims to a triumph which would have been nullified by entrance into the city. The priests of the goddess were styled *Bellonarii*, and practised sanguinary rites; such as cutting their own arms or feet, and offering (or even drinking) the blood in sacrifice. This was especially done on the *dies sanguinis* (day of blood), March 24.

BELLOT, Joseph René, a lieutenant in the French navy, who perished in the arctic regions, in search of Sir John Franklin, was born in Paris, 18th March 1826, and educated at Rochefort, in the Naval School. In the French expedition against Tamatave, in 1845, he gave proof of so much courage and presence of mind, that the Cross of the Legion of Honor was conferred on him before he had attained his twentieth year. In May 1851, he joined the expedition then preparing in England for the polar regions, in search of Sir John Franklin, and sailed in the *Prince Albert*, Kennedy commander, sent out by Lady Franklin. Distinguished by his noble daring and spirit of enterprise, he took part in several explorations. In one of these he made an important geographical discovery, to which his name was given—*Bellot Strait* (q. v.). On his return he was promoted to the rank of navy lieutenant. In the expedition fitted out by the British Admiralty, under Captain Inglefield, he sailed as a volunteer, in H.M.S. *Phœnix*; but never returned, having been carried by a violent gust of wind, 21st March 1853, into a deep crack in the ice on which he was traveling. A considerable sum was subscribed in England for a monument to his memory. His *Journal of a Voyage to the Polar Seas made in Search of Sir John Franklin* in 1851—1852, edited, with a notice of his life, by M. Julien Lemer, 2 vols., was published at Paris in 1854. English translation, London, 1855.

BELLOT STRAIT, the passage which separates North Somerset from Boothia Felix, and connects Prince Regent's Inlet with Peel Strait or Sound, or, in M'Clintock's new nomenclature, Franklin Channel. Its east entrance was discovered by Kennedy during the search for Franklin, and he assuming the continuity of the opening, classified it accordingly, naming it after his lamented companion Bellot. After four unsuccessful attempts, it was explored for the first and perhaps last time by M'Clintock on his crowning voyage. It is about 20 miles long, and, at its narrowest part, about 1 mile wide, running pretty nearly on the parallel of 72°, between granite shores which, everywhere high, rise here and there to 1500 or 1600 feet. Through this funnel both the winds and the waters have full play; the latter, permanent currents and flood-tides alike, coming from the west. To the most northerly point of the south shore, M'Clintock has given the name of Murchison Promontory, which, at least unless other straits like B. S. be found towards the isthmus of Boothia, must be also the most northerly point of the new continent. See Barrow, Point.

BELLOWS. See Blowing-machines.

BELLOY, Pierre Laurent Buirette, one of the first French dramatists who ventured to introduce on the stage native, instead of Greek, Roman, or other outlandish heroes. He was born at St. Flour, in Auvergne, 17th November 1727, and died 5th March 1775. His father having died while B. was young, his uncle took him under his protection, and educated him for the law; but the seductions of the drama proved irresistible, and the opposition which he encountered in the cultivation of his theatrical talent ultimately determined him to leave his adopted home. Under the name of Dormont de B., he performed on various northern boards, and was much esteemed for his private worth. For some years he resided at St. Petersburg, where the Empress Elizabeth interested herself in him. In 1758, he returned to France, to superintend the 'bringing out' of his tragedy *Titus*, trusting that its success would reconcile his family to him. In this, however, he was disappointed, for the piece proved a failure, being only a feeble imitation of *Metastasio*, and he returned to St. Petersburg. After the death of his uncle, he again visited France, and obtained a decided success by his tragedy of *Zelmire*. In 1765 appeared *Le Siége de Calais*, which was immensely popular, and is even yet held in estimation; and in 1771, *Gaston and Bayard*, which secured for him an entrance to the French Academy. But of all his productions, the one which has longest retained a place in the *répertoire* of the stage, though it was far from popular at first, is *Pierre le Cruel*. B.'s dramas are not by any means wanting in theatrical effectiveness, but are marred by great incorrectness. They have been collected and edited by Gaillard (6 vols., Par. 1779).

BELLS, on shipboard is a term having a peculiar meaning, not exactly equivalent to, but serving as a substitute for 'time' or 'o'clock' in ordinary land-life. The day, or rather the night, is divided into watches or periods, usually of four hours' duration each; and each half-hour is marked by striking on a bell. The number of strokes depends, not on the hour, according to ordinary reckoning, but on the number of half-hours which have elapsed in that particular watch. Thus, 'three bells' is a phrase denoting that three half hours have elapsed, but it does not in itself show to which particular watch it refers. Captain Basil Hall, in his *Fragments of Voyages and Travels*, while treating of Sunday usages on board ships of the Royal Navy, mentions one or two phrases illustrative of this mode of time-reckoning. While the sailors are at breakfast on Sunday morning, 'the word is passed to "clean for muster," and the dress is specified according to the season of the year and climate. Thus, at different seasons is heard: "Do you hear there, fore and aft! clean for muster at five bells! duck-frocks and white trousers! "—or, "Do you hear there, clean shirt and a shave for muster at five bells! "' A ship's bell is usually hung to the beam of the forecastle, but occasionally to a beam near the mizzen-mast. In foggy weather, both steamers and sailing-vessels *when at anchor* sound their bells at intervals not exceeding two minutes; but sailing-ships under weigh sound a fog-horn during fogs, and steamers in motion, their whistles. See Watch on Shipboard.

BELLU'NO (the ancient *Bellunum*), a city of Venetia, Northern Italy, on the right bank of the Piave, and 51 miles north of the city of Venice. It is walled, is the seat of a bishop, has a handsome cathedral, hospital, public library, fine aqueduct, &c. It has a trade in timber, and manufactories of silks, hats, leather, and earthenware. Pop. 7000.

BELLU'R, a large town in the territory of Mysore, India, 40 miles north from Seringapatam, with a fort, which has a strong mud rampart and ditch. The town itself was formerly protected by a similar rampart, which is now ruinous.—Another town of the same name, also in Mysore, is situated 60 miles west-north-west from this, a mile from the west bank of the river Yagachi, or Bhadri, one of the head-waters of the Cavery.

BELOIT, a city of Wisconsin, U. S., on Rock River, on the Southern State Railway, 75 miles south-west of Milwaukee, built on two plains, one 70 feet above the other, with broad shaded streets, groves, and handsome residences. It has a college, 9 fine churches, several flour and paper mills, foundries, and manufactories of agricultural implements, &c. Pop. (1870) 4396.

BE'LOMANCY (Gr. *belos*, an arrow; *manteia*, prophecy), a mode of divination by arrows, practised among the Arabs and other nations of the east. A number of arrows being shot off with sentences written on labels attached to them, an indication of futurity is sought from the inscription on the first arrow found. This is only one of many ways of divining by arrows. See Axinomancy. Divining-rod.

BELON, Pierre, a celebrated French naturalist, was born in 1517 at Soulletière, in the department of Sarthe. He studied medicine at Paris, and subsequently traveled through Germany. In 1546 he left France, and visited Greece, Asia-Minor, Egypt, and Arabia. He returned in 1549, and in 1553 published the results of his travels, in a work entitled *Observations on several Singular and Memorable Things discovered in Greece, Asia, Judœa, Egypt, Arabia, and other Foreign Countries*. Charles IX. gave him apartments in the Château of Madrid, a sumptuous edifice which Francis I. had constructed in the Bois de Boulogne. Here he resided till his tragic death in April 1564. He was murdered by robbers when gathering herbs at a late hour of the evening in the Bois de Boulogne.

Besides the valuable work already mentioned, B. published in 1551, *A Natural History of Strange Sea-fish, with a correct Representation and Account of the Dolphin, and several others of that Species*, which contains, among other things, an exact description of the dolphin, and the earliest picture of a hippopotamus in any European book; in 1555, *A Natural History of Birds*, which is often quoted by Buffon, and acknowledged to be the most important treatise on ornithology of the 16th c.; in 1558, an elaborate and interesting work on Arboriculture, in which he gave a list of the exotic trees which it would be useful to introduce into France. Besides these, B. wrote several other treatises of trees, herbs, birds, and fishes.

BE'LONE. See Garfish.

BELOOCHISTA'N, or BALUCHISTAN, a country of Southern Asia, bounded on the N. by Afghanistan, on the E. by Sinde, on the S. by the Arabian Sea, and on the W. by the Persian province of Kerman. B. corresponds in general with the ancient Gedrosia, excepting that the latter name appears to have extended to the Indus, while the former nowhere reaches that river. B. stretches in N. lat. between 24° 50′ and 30° 20′, and in E. long. between 61° and 68° 40′, having a coast-line of 500 miles. The area is about 106,000 square miles, and the population is variously estimated at from 400,000 to 1,000,000. Though it was anciently a part of Persia, yet its modern relations connect it rather with India, more particularly since Sinde and Moultan have fallen under the dominion of the English. In the bygone ages of the overland invasions of Hindustan, the Gedrosian or Beloochee Desert formed, as it were, a barrier for the lower Indus, constraining every assailant, from Alexander downwards, to prefer the less barren, though perhaps more rugged route through Afghanistan into the Punjab—a preference strengthened by Alexander's direful experience in returning from the Indus along the coast. The surface is generally mountainous, more especially towards the north, the peak of Takkatu being said to be 11,000 feet high. Even the bottoms of some of the valleys have an elevation of 5700 feet; and the capital, Kelat, situated on the side of one of them, is 6000 feet above the level of the sea. The rivers are in-

considerable, unless after heavy rains: even the largest of them, the Dusti, after a course of 1000 miles has been found to be only 20 inches deep, and 20 yards wide at its mouth. The pastures, as may be supposed, are poor, so that there are few cattle: sheep and goats, however, are numerous. The dromedary is the ordinary beast of burden; and it is only in the north-west, towards Kerman, that horses are bred. Wherever there is a sufficiency of water, the soil is productive—the lowlands yielding rice, sugar, cotton, indigo, and tobacco; and the higher grounds, wheat, barley, madder, pulse, and European fruits. In the sandy waste of Mekran, where Alexander's army suffered its severest hardships and privations, the only valuable product is the date. The minerals are copper, lead, antimony, iron, sulphur, alum, and sal-ammoniac; and the manufactures are skins, woollens, carpets, and tent-covers of goat's and camel's hair, and rude fire-arms. B. has but one seaport, Sonmeanee, near the frontier of Sinde. The trade is insignificant, being, such as it is, chiefly monopolized by Hindus. The chief peoples of B. are the distinct races of the Belooches and the Brahoes; all the inhabitants are Mohammedans of the Sunnite confession. Most of the east provinces, which alone come into contact with British India, are under the authority of the Khan of Kelat, who, with a revenue of about £30,000, maintains an army of 3000 men. This petty sovereign having acted treacherously towards the British during the Afghan campaign of 1839, his royal city was taken by storm. In 1841, it was again captured, for temporary occupation, by the British. In 1877, England obtained by treaty with the Khan the right of permanently occupying Quettah, and of having a political agent at Kelat.

BELPA'SSO, a town in Sicily, on the lower part of the southern slope of Mount Etna, in the province and 8 miles north-west from the town of Catania. Pop. about 7500. Below the town is an expanse of brown lava, but the surrounding country is generally rich and fruitful. A town called Mel Passo, from the abundance of honey in its neighborhood, stood not far from the site of the present town but was destroyed by an eruption in 1669; when the inhabitants removed to a locality a few miles off, in the plain, and built a town of which the desolate remains are still to be seen, bearing the name of *Belpasso Vecchio;* malaria compelled them to leave it, and to return to the mountain-slope, notwithstanding its occasional dangers.

BE'LPER, a market-town of Derbyshire, England, on the Derwent; a station on the North Midland Railway, seven miles north from Derby. It is well built, in great part of gritstone, which is obtained in the neighborhood. One of the most conspicuous public buildings is a church, of recent erection, on an eminence above the town; the union workhouse is also worthy of notice, being a splendid building in the Elizabethan style of architecture. B. is, to a considerable extent, a town of recent growth, and owes its prosperity to the establishment of cotton-works here by Messrs. Strutt, one of whom was elevated to the peerage as Lord Belper. In these works, a very great number of operatives are employed. The manufacture of silk and cotton hosiery is also largely carried on in B. Nail-making and the manufacture of brown earthenware also give employment to many of the inhabitants. The surrounding country is rich in coal, iron, lead, and limestone. B. was at one time the residence of John of Gaunt, part of whose mansion still remains. Pop. (1881) 9875.

BELSHAM, THOMAS, a Unitarian theologian, was born at Bedford in 1750. He was educated a Calvinist, and became pastor of a congregation and head of the theological academy at Daventry. These offices he resigned in 1789, on embracing Unitarian views, and shortly after received the charge of a new theological academy at Hackney, which in a few years collapsed for want of funds. Before its extinction, he succeeded Dr. Priestley in his pastoral charge, and in 1805 removed to London as the successor of Dr. Disney, where he continued till his death in 1829. Most of his works are controversial; his doctrine regarding the person of Christ represents the purely 'humanitarian' view, as distinguished from the more nearly Arian sentiments of men like Channing. He published also a work on mental and moral philosophy, following Hartley, and a memoir of his predecessor, Theophilus Lindsey. His brother, William (b. 1752; d. 1827), was an active and voluminous writer of history and political tracts on the side of the Whigs.

BELSHAZ'ZAR, or BELSA'ZAR, was the last king of the Chaldæan dynasty in Babylon. The name occurs only in the Old Testament, where it indicates either the person who is called by Herodotus Labynetos, or his son. For an account of the circumstances attending his overthrow, see the Book of Daniel, Herodotus, &c.

BELT (signifying Girdle), the name given to two straits, the GREAT and the LITTLE B., which, with the Sound, connect the Baltic with the Cattegat. The GREAT B., about 70 miles in length, and varying in breath from 4 to more than 20 miles, divides the Danish islands, Seeland and Laaland, from Fünen and Langeland. The LITTLE B. divides the island of Fünen from Jütland. It is equal in length to the Great B., but much narrower. Its greatest breadth is about 10 miles, but it gradually narrows towards the north, until at the fort of Frederica it is less than a mile wide; thus the passage from the Cattegat into the Baltic is here easily commanded. Both the Belts are dangerous to navigation, on account of numerous sandbanks and strong currents; and therefore, for large vessels, the passage by the Sound (q. v.) is preferred.

BE'LTEIN, BE'LTANE, BEI'LTINE, or BEA'LTAINN, the name of a heathen festival once common to all the Celtic nations, and traces of which have survived to the present day. The name is derived from *tin* or *teine*, fire, and Beal or Beil, the Celtic god of light or Sun-god, a deity mentioned by Ausonius 309—392 A.D.) and Tertullian (who flourished during the first half of the 3d c.), as well as on several ancient inscriptions, as Belenus or Belinus. B. thus means 'Beal's fire,' and belongs to that sun and fire worship which has always been one of the most prominent forms of polytheism. The great festival of this worship among the Celtic nations was held in the beginning of May, but there seems to have been a somewhat similar observance in the beginning of November (the beginning, and the end of summer). On such occasions, all the fires in the district were extinguished (while the system was in full force, even death was the penalty of neglect); the *needfire* (q. v.) was then kindled with great solemnity, and sacrifices were offered—latterly, perhaps, of animals, but originally, there can be little doubt, of human beings. From this sacrificial fire the domestic hearths were rekindled.

The earliest mention of B. is found by Cormac, Archbishop of Cashel in the beginning of the 10th c. A relic of this festival, as practised in some parts of the Highlands of Scotland about the beginning of the 19th c., is thus described: 'The young folks of a hamlet meet in the moors on the 1st of May. They cut a table in the green sod, of a round figure, by cutting a trench in the ground of such circumference, as to hold the whole company. They then kindle a fire, and dress a repast of eggs and milk in the consistence of a custard. They knead a cake of oatmeal, which is toasted at the embers against a stone. After the custard is eaten up, they divide the cake in so many portions, as similar as possible to one another in size and shape, as there are persons in the company. They daub one of these portions with charcoal until it is perfectly black. They then put all the bits of cake into a bonnet, and every one, blindfold, draws out a portion. The bonnet-holder is entitled to the last bit. Whoever draws the black bit is the devoted person, who is to be sacrificed to Baal, whose favor they mean to implore in rendering the year productive. The devoted person is compelled to leap three times over the flames.' The leaping three times through the fire is clearly a symbolical sacrifice, and there was doubtless a time when the victim was bound on the pile, and burned. See SACRIFICE.

It has been usual to identify the worship of the Celtic Beal with that of the Baal (q. v.) or Bel of the Phœnicians and other Semitic nations. It is unnecessary, however, to go beyond the family of nations to which the Celts belong (see ARYANS), in order to find analogies either for the name or the thing. J. Grimm (*Deutsche Mythologie*, i. 208, 581) identifies the Celtic Beal not only with the Slavonic *Belbog* or *Bjelbog* (in which name the syllable *bel* or *bjel* means white, and *bog*, god), but also with the Scandinavian and Teutonic Balder (q. v.) or Paltar, whose name appears under the form of Baldag (the white or bright day), and who appears to have been also extensively worshiped under the name of Phol or Pol. The universality all over Europe in heathen times of the worship of these personifications of the sun and of light through the kindling of fires and other rites, is testified by the yet surviving practice of periodically lighting *bonfires* (q. v.). The more marked turning-points of the seasons would naturally determine the times of these festivals. The two solstices at midwinter (see YULE) and midsummer, and the beginning and end of summer, would be among the chief seasons. The periods of observance, which varied, no doubt, originally, more or less in different places, were still further disturbed by the introduction of Christianity. Unable to extirpate these rites, the church sought to Christianize them by associating them with rites of her own, and for this purpose either appointed a church-festival at the time of the heathen one, or endeavored to shift the time of the heathen observance to that of an already fixed church-festival.

All over the south of Germany, the great bonfire celebration was held at midsummer (*Johannisfeuer*), [see JOHN'S, EVE OF ST.] —a relic, probably, of the sun-festival of the summer solstice: throughout the north of Germany, it was held at Easter. It is probable that this fire-festival (*Osterfeuer*) of Ostara—a principal deity among the Saxons and Angles—had been originally held on the 1st of May, and was shifted so as to coincide with the church-festival now known as Easter (q. v.; see also WALPURGA, ST.) The seriousness and enthusiasm with which these observances

continued to be celebrated in the 16th and 17th centuries, began afterwards to decline, and the kindling of bonfires has been mostly put down by the governments; the earlier interdicts alleging the unchristian nature of the rites; the later, the danger occasioned to the forests.

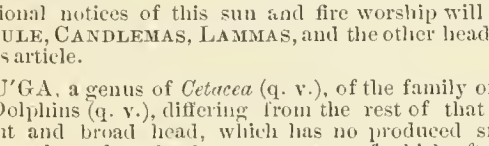
In Great Britain, St. John's Eve was celebrated with bonfires; and Easter had its fire-rites, which, although incorporated in the service of the Roman Catholic Church, were clearly of heathen origin. But the great day for bonfires in the British islands was the 1st of November. Fewer traces of this are found in other countries, and therefore we must look upon it as more peculiarly Celtic. While the May festival of B. was in honor of the sun-god, in his character of god of war—who had just put to flight the forces of cold and darkness—the November festival was to celebrate his beneficent influence in producing the fruits which had just been gathered in. Hence it was called *Samhthcine* (peace-fire). If we may judge from the traces that still remain or have been recorded, the November observances were more of a private nature, every house having its bonfire and its offerings, probably of fruits, concluding with a domestic feast. The B. festival, again, was public, and attended by bloody sacrifices. Although the November bonfires, like B., were probably of Celtic origin, they seem to have been adopted by the inhabitants of the British islands generally. About the end of last century they were still kindled in various parts of England, and to this day over whole districts of Aberdeenshire, every rural dwelling has its Hallowe'en bonfire lighted at nightfall in an adjoining stubble-field.

The Anglo-Saxon population of England had their own characteristic May-day rites; but there exist traces also of the observance among them on that day of rites similar to the Celtic Beltane. An 'Old Holne Curate,' writing to *Notes and Queries* in 1853, says: 'At the village of Holne, situated on one of the spurs of Dartmoor, is a field of about two acres, the property of the parish, and called the Ploy (play) Field. In the center of this stands a granite pillar (Menhir) 6 or 7 feet high. On May morning, before daybreak, the young men of the village assemble there, and then proceed to the moor, where they select a ram lamb (doubtless with the consent of the owner), and after running it down, bring it in triumph to the Ploy Field, fasten it to the pillar, cut its throat, and then roast it whole, skin, wool, &c. At midday, a struggle takes place, at the risk of cut hands, for a slice, it being supposed to confer luck for the ensuing year on the fortunate devourer. As an act of gallantry, in high esteem among the females, the young men sometimes fight their way through the crowd to get a slice for their chosen among the young women, all of whom, in their best dresses, attend the *Ram Feast*, as it is called. Dancing, wrestling, and other games, assisted by copious libations of cider during the afternoon, prolong the festivity till midnight.

'The time, the place (looking east), the mystic pillar, and the ram, surely bear some evidence in favor of the Ram Feast being a sacrifice to Baal.'

Additional notices of this sun and fire worship will be found under YULE, CANDLEMAS, LAMMAS, and the other heads referred to in this article.

BELU'GA, a genus of *Cetacea* (q. v.), of the family of *Delphinidæ* or Dolphins (q. v.), differing from the rest of that family in the blunt and broad head, which has no produced snout; the smaller number of teeth, the greater part of which often fall out before the animal is far advanced in age; and the want of a dorsal fin. The only species found in the northern parts of the world is *B. artica* (for which name there are unhappily many synonyms, as *B. leucas*, &c.), the White Whale and White Fish of whalers, often called by English writers the B., and the Round-headed Cachalot. The form of the B. is remarkably characterized by the



Beluga.

softness of all its curves, and adapts it for rapid and graceful movements; its skin is usually of a clear white color, and not very strong, so that it often fails to retain a harpoon. The B. attains a length of more than thirteen feet. The female brings forth two young ones at a birth, and displays the greatest solicitude for them. The food of the B. consists of fish, in pursuit of which it often ascends rivers to some distance. It is gregarious, and may be seen in herds of forty or fifty, which often gambol around boats; it abounds in most parts of the arctic seas, and sometimes, but not very frequently, visits the British shores. One was killed in the Firth of Forth in 1815, and one in the Medway in 1846. The Greenlanders take the B. with harpoons or with strong nets. Its flesh affords them a valuable supply of food, and is eaten by most of the inhabitants of arctic coasts; it affords also a considerable quantity of the very finest oil, and the skin is made into leather. Some of the internal membranes are also employed for various purposes.—Another species of B. is found in the southern hemisphere. It is called *B. Kingii*.

BE'LUS. See BAAL.

BELVEDE'RE (It.) was originally an erection on the top of a house, for the purpose of looking out on the surrounding country, and enjoying the air, in which sense it is still understood in Italy. A part of the Vatican (q. v.) in Rome is known as the B., and gives name to the famous statue of Apollo. In France, and with us, the word has come to signify any kind of summer-house or place of refreshment.

BELVEDE'RE (*Kochia scoparia*, *Chenopodium scoparium*, or *Salsola scoparia*), an annual plant of the natural order *Chenopodiaceæ* (q. v.), a native of the middle and south of Europe, and of great part of Asia, which has long been very familiar in British gardens as an ornamental annual, not upon account of its flowers, which have no beauty, but of its close, pyramidal, rigid form, and numerous narrow leaves, which make it appear like a miniature cypress-tree. It is sometimes called SUMMER CYPRESS.

BELVI'SIA (also called NAPOLEO'NA), a genus of exogenous plants, the type of the natural order *Belvisiaceæ*, of which order only a few species have yet been discovered, natives of the tropical parts of Africa. They are large shrubs, with smooth, simple, leathery leaves. The flowers grow in threes, sessile in the axils of the leaves, and are beautiful and extremely curious. The calyx is a thick, leathery cup, divided into five ovate segments. The corolla consists of three distinct rings, the outer one 5-lobed, and furnished with ribs, by means of which it is strongly plaited, turning back over and hiding the calyx when full blown; the second, a narrow membrane, divided into numerous regular segments like a fringe; the third, an erect cup-shaped membrane. The stamens are erect like another cup; the ovary 5-celled, with two ovules in each cell; the style short, thick, and 5-angled, with a broad, flat 5-angled stigma. The fruit is a soft berry, crowned with the calyx, with large kidney-shaped seeds. The wood is soft, and contains numerous dotted vessels.—The pulp of the fruit of the best known species is mucilaginous and eatable, the rind very full of tannin; the fruit is as large as a pomegranate, and the seeds 1¼ inch long. The position of this remarkable order in the botanical system is not yet well determined. Lindley regards it as most nearly allied to *Rhizophoraceæ* (Mangroves, q. v.). It is supposed by some that the two inner rings of the corolla should be regarded as sterile stamens, and the place of the order is thus fixed near *Barringtoniaceæ* (q. v.).

BELZO'NI, GIOVANNI BATTISTA, the son of a poor barber, was born at Padua in 1778, and was educated at Rome, for the priesthood, but soon displayed a preference for mechanical science, especially hydraulics; and when the French republican troops took possession of the pontifical city, he quitted his religious studies altogether. About the year 1800, he visited Holland, and in 1803 came to England. For a time he gained a living by exhibiting feats of strength in the theaters. At Astley's, he played the part of Hercules, but he also continued his mechanical studies, and even gave numerous hydraulic representations in the most populous towns of the kingdom. After a sojourn of nine years in England, he went to Spain and Portugal, in his capacity of theatrical athlete. From the peninsula, he passed to Malta, and thence to Egypt in 1815, on the invitation of Mehemet Ali, who wished him to construct a hydraulic machine. After succeeding in this undertaking, he was induced, by the travelers Burckhardt and Salt, to direct his attention to the exploration of Egyptian antiquities. He threw himself with ardor into his new vocation. He removed the colossal bust of the so-called 'Young Memnon' from the neighborhood of Thebes to Alexandria, and was the first who opened the temple of Ipsambul. In the valley of 'the royal graves'—Biban-el-Moluk—near Thebes, he discovered several important catacombs containing mummies, and among others, opened, in 1817, the celebrated tomb of Psammetichus, from which he removed the splendid sarcophagus, now along with the 'Young Memnon,' and other results of B.'s labors in the British Museum. But B.'s greatest undertaking was his opening of the pyramid of Cephren. An attempt made on his life caused his departure from Egypt, but previously he made a journey along the coast of the Red Sea, and another to the Oasis of Siwah, hoping there to find ruins of the temple of Jupiter-Ammon. In the course of his explorations, he discovered the emerald mines of Zubara and the ruins of Berenice, the ancient commercial entrepôt between Europe and India. In September 1819, he returned to Europe, visited his native town Padua, and enriched it with two Egyptian statues of granite. He also published in London his *Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs, and Excavations in Egypt and Nubia; and of a Journey to the Coast of the Red Sea in search of the ancient Berenice, and another to the Oasis of Jupiter-*

Ammon (1821, with an atlas of 44 colored engravings). In 1821, he opened in London an exhibition of his Egyptian antiquities, but soon afterwards undertook a journey to Timbuktu, in Central Africa. At Benin he was attacked by dysentery which compelled him to return to Gato, where he died, December 3, 1823. His original drawings of the royal tombs he had opened in Egypt were published by his widow (London, 1829).

BEM, JOSEPH, commander of the army in Transylvania during the Hungarian revolution, 1848—9, was born at Tarnov, in Galicia, 1795. After a course of military adventure in Poland, he went to France, where he resided for a considerable time, earning a livelihood by teaching mechanics and mnemonics. In 1848, after failing in an attempt to organize an insurrection in Vienna, he joined the Hungarians, and was intrusted with the command of the army of Transylvania, amounting to 8000—10,000 men. He at first experienced some checks from the Austrian army, but afterwards defeated them at Hermannstadt and the bridge of Piski; and finally succeeded, in March 1849, in driving both them and their allies, the Russians, back into Wallachia. Having thus made himself master of Transylvania, he proposed, by amnesties and general mild rule, to gain the adherence of the German and Slavonian population, especially in Wallachia; but his propositions were not entertained by Kossuth and the Hungarian commissariat. After expelling the troops under Puchner from the Banat, B. returned into Transylvania, where the Russians had defeated the Hungarians. Here he reorganized his forces, and did all that was possible in his circumstances to prevent the union of the Russians with the Austrians, but his efforts were unsuccessful. After failing in an attempt to excite an insurrection in Moldavia, he was defeated in a battle near Schäszburg, where he was opposed to three times the number of his own troops. At Kossuth's request, he now hastened into Hungary, where he took part in the unfortunate battle near Temesvar. Retreating into Transylvania, he here defended himself for some days against a vastly superior force, and then made his escape into Turkey, where he embraced, from political motives, the profession of Islam, was raised to the dignity of a pasha, and obtained a command in the Turkish army. In February 1850, he was sent to Aleppo, where, after suppressing the sanguinary insurrection of the Arabs against the Christian population, he died of fever, December 10, 1850. B. was in private life characterized by the benevolence of his disposition, and, as a military leader, was distinguished by courage, presence of mind when in extreme danger, and remarkable rapidity of movement.

BEMBATOO'KA, BAY OF, a safe and commodious bay on the north-west coast of Madagascar, in lat. 16° S., and long. 46° E. Prime bullocks are sold here for less than 10*s.* each, and are bought extensively by agents of the French government, who have them driven to Fort Dauphin, on Antongil Bay, on the opposite side of the island, where they are killed and cured for the use of the French navy, and for colonial consumption. Rice is also sold very cheap at Bembatooka. Majunga, on the north side of the bay, is an important town, Bembatooka being but a village.

BEMBE'CIDÆ, a family of Hymenopterous insects of the division in which the females are furnished with stings. Along with *Sphegidæ* (q. v.), and other nearly allied families, they receive the popular name of Sand-wasps. They very much resemble bees or wasps in general appearance. They are natives of the warmer parts of the world. Some of them are remarkable for the odor of roses which they emit. The females make burrows in sandy banks, in each of which they deposit an egg, and along with it the bodies of a few flies as food for the larva. The B. fly very rapidly, and with a loud buzzing noise. *Bembex rostrata* is common in the south of Europe.

BEMBO, PIETRO, one of the most celebrated Italian scholars of the 16th c., was born in Venice, May 20, 1470; having studied at Padua and Ferrara, he early devoted himself to polite literature. He edited the Italian poems of Petrarch, printed by Aldus, in 1501, and the *Terzerime* of Dante, 1502. In 1506, he proceeded to the court of Urbino, where he resided till 1512, when he went to Rome, where he was made secretary to Pope Leo X. On the death of that pope, B. returned to Padua, where he became a liberal patron of literature and the arts, as well as a fertile writer himself. In 1529, he accepted the office of historiographer to the republic of Venice, and was also appointed keeper of St. Mark's Library. In 1539, B., who had only taken the minor ecclesiastical orders, was unexpectedly presented with a cardinal's hat by Pope Paul III., who afterwards appointed him to the dioceses of Gubbio and Bergamo. He died January 18, 1547. B. united in his character all that is amiable. He was the restorer of good style in both Latin and Italian literature. His taste is said to have been so fastidious with regard to style, that he subjected each of his own writings to forty revisions previous to publication. Some of his writings are marred by the licentiousness of the time. Among his works may be mentioned the *Rerum Veneticarum Libri XII.* (Venice, 1551), of which he published an Italian edition (Venice, 1552); his *Prose*, dialogues in which are given the rules of the Tuscan dialect; *Gli Asolani*, a series of disputations on love, &c.; *Rime*, a collection of sonnets and canzonets; his Letters, Italian and Latin; and the work, *De Virgilii Culice et Terentii Fabulis*. His collected works were published at Venice, in 4 vols., 1729.

BE'MBRIDGE BEDS are a division of the Upper Eocene strata, resting on the St. Helen's, and capped by the Hempstead series. They are principally developed in the Isle of Wight. Ed. Forbes, who carefully examined them there, has arranged them in four subdivisions: 1. The upper marls and laminated gray clays, which form the basement bed of the 'black band,' the lowest member of the Hempstead series. They are distinguished by the abundance of *Melania turretissima*. 2. Unfossiliferous mottled clays, alternating with fossiliferous marls and clays, whose characteristic organisms are *Cerithium mutabile* and *Cyrena pulchra*. 3. The oyster-bed, consisting of greenish marl, and containing immense quantities of a species of oyster (*Ostrea Vectensis*), accompanied with *Cerithia*, *Mytili*, and other marine mollusca. 4. The Bembridge limestone, generally a compact, pale-yellow, or cream-colored limestone, but sometimes vesicular and concretionary, and containing occasionally siliceous or cherty bands. This is interstratified with shales and friable marls. All the beds are fossiliferous, containing numerous land and fresh-water shells. One bed is composed almost entirely of the remains of a little globular *Paludina*. Shells of *Lymnea* and *Planorbis* are abundant, and are accompanied with the spirally striated nucules of two species of *Chara*, water-plants which have been well preserved because of the large quantity of lime which enters into their composition. In this division have been found the mammalian remains of the species of *Palæotherium* (q. v.), and *Anoplotherium* (q. v.) which characterize the gypseous deposits of Montmartre; it is consequently considered the British equivalent of these Parisian beds.

No marked line of distinction separates this series from the St. Helen's beds on which it rests. The contained organisms indicate that both had the same fluvio-marine origin. The maximum thickness of the Bembridge series is 115 feet.

BEN, ABEN, AVEN, EBN, IBN, are all forms, in the different Semitic languages, of the same word, which means 'son,' and is used as a prefix to names. *Ben*, a Hebrew form, is familiar to us from its use in Bible names—e. g., Benhadad, the son or worshiper of Hadad, or Adod, the chief idol of the Syrians; Benoni, son of my pain; Benjamin, son of the right hand, &c. These examples show that not only literal but metaphorical sonship is expressed by this prefix. This form of constructing a name by composition was common in the Semitic languages, on account of their lack of patronymics. The plural, *Beni*, is found in the names of many Arab tribes—as Beni Omayyah, the sons of Omayyah, the family known in history as the Ommiades; and sometimes in the names of places—as Beni-Hassan.

BEN, BEIN, or BHEIN, a Gaelic word signifying 'mountain' or 'mountain head.' It is prefixed to the name of a great many mountains in Scotland—as Ben Nevis, Ben Macdhui, Ben Cruachan, &c. The corresponding term in various parts of Europe is *Pen*, which is found in many of the names in Cornwall and Wales, in the Pennine Alps, and probably also in the word Apennines and the Cevennes of France.

BEN, OIL OF, a fluid fixed oil, obtained from the seeds of a tree found in India and Arabia, and known as the HORSERADISH TREE (*Moringa pteryyosperma*). The seeds are called BEN NUTS, and are roundish, with three membranous wings. The oil is used by watchmakers, because it does not readily freeze; also by perfumers, as the basis of various scents; and other oils are often adulterated with it. See HORSERADISH TREE.

BENA'RES, a city on the left side of the Ganges, which here varies, according to the season, between 50 and 92 feet in depth, and in width between 600 yards and a little more than half a mile. It is in lat. 25° 17′ N., and long. 83° 4′ E., being 421 miles to the north-west of Calcutta, and 466 and 74 respectively to the south-east of Delhi and Allahabad. Without reckoning Secrole, which, at the distance of 2 or 3 miles to the westward, contains the official establishments, B. covers, as it were, an amphitheater of 3 miles in front, and 1 mile in depth, the immediate margin of the river, which is comparatively steep, being chiefly occupied by flights of steps, or ghats, as they are called, where crowds of all classes spend the day in business, amusement, or devotion. This lively scene, backed by the minarets of about 300 mosques, and the pinnacles of about 1000 pagodas, presents a truly picturesque appearance to spectators on the opposite shore of the Ganges. On closer inspection, however, the city, as a whole, disappoints a visitor. The streets, or rather alleys, altogether impracticable for wheeled-carriages, barely afford a passage to individual horsemen or single beasts of burden; and these thoroughfares, besides being shut out from sun and air by buildings of several stories, are said to be shared with the numerous passengers by sacred bulls that roam about at will. The population in 1872 was 175,188.

In the traditions of the country, B. is believed to have been co-

eval with creation; and tolerably authentic history does assign to it a really high antiquity. In its actual condition, however, B. is a modern city. Both in extent and embellishment, it owes much to the influence of Mahratta ascendency, which dates from the close of the 17th c.; and it possesses, perhaps, not a single structure that reaches back to the close of the 16th. As the central seat of Hinduism, B., on high occasions, attracts immense crowds of pilgrims—sometimes as many as 100,000; and some years ago, during an eclipse of the moon, forty persons were trampled to death in the streets. Naturally enough, the Brahmins of B. have always been remarkable for bigotry. Now, however, Brahminism appears to be on the decline; and a result, which Mohommedan persecution vainly tried to produce, would seem to be gradually achieved, chiefly through the introduction of European literature and science. On the Sanscrit College, instituted in 1792, there was at a later date ingrafted an English department, comprising poetry, history, mathematics, and political economy. It is attended by numerous Hindus, and a few Mussulmans and native Christians. B., as Heber has observed, is very industrious and wealthy, as well as very holy. Besides having extensive manufactures of its own in cotton, wool, and silk, its commanding position on the grand line of communication—road, river, and rail alike—renders it the principal emporium of the neighboring regions. It is the great mart for the shawls of the north, the diamonds of the south, and the muslins of the east; while it circulates the varied productions of Europe and America over Bundelcund, Goruckpore, Nepal, &c. For the general history of the city, see the following article on the district of the same name. The details of the mutiny of 1857 will be found under the head of SECROLE. At the same time, B. proper added its share to the fearful interest of the emergency through the proverbially fanatical character of its inhabitants, who during the second siege of Bhurtpore, had got 30,000 sabers sharpened in anticipation of a second repulse of the British.

BENA'RES, or BANA'RAS, the district mentioned in the preceding article. It is under the lieutenant-governorship of the North-west Provinces, being bounded on the W. and N. by Jounpur; on the E. by Ghazeepore and Shahabad; and on the S. and W. by Mirzapore. It extends in N. lat. between 25° 7′ and 25° 32′, and in E. long. between 82° 45′ and 83° 38′; and thus measuring about 30 miles by 55, it embraces an area of 996 square miles. In 1872, the census gave a population of 794,039, or almost 800 to a square mile: the number of inhabited houses was 116,507. The district is traversed by the Ganges in a north-east direction for about 45 miles. Besides other rivers, such as the Karamnasa, the Goomtee, and the Burna, and several inferior streams, lakes and tanks are numerous, but small, the largest not exceeding a mile in circuit. The annual rain-fall, though averaging less than in the lower parts of the Ganges, is still considerable, always exceeding 30 inches, and amounting in 1823 to 89. Considering that the tract is barely beyond the tropics, and but little elevated above the sea, the range of the thermometer is unusually great, being between 45° in January, and 111° in May. The mean temperature is stated at 77°, pretty nearly the middle point between the two extremes. The soil, though here and there sterile, is in general characterized by great fertility, more particularly to the left of the Ganges. In the growth of opium, indigo, and sugar—more especially the last—the district surpasses nearly every other portion of British India. In fact, the state of agriculture is such as may be expected from the density of the population. The rich fields, the thriving villages, and the luxuriant groves, render the aspect of the country very delightful; and perhaps the best proof of the presence of industry and civilization is the fact, that elephants, rhinoceroses, buffaloes, lions, and tigers, which were hunted in 1529, have entirely disappeared. After a Hindu domination, according to popular faith, of 2400 years, the district sank under the Mussulman yoke in 1193; and, in the first of the 16th c., it was annexed by Baber to the Mogul Empire. On the dismemberment of that dominion, it fell to the share of the Nawab of Oude, whose grandson, in 1775, ceded it to the East India Company, about ten years after that body had acquired the sovereignty of Bengal.

BENA'TEK, a small town of Bohemia, on the right bank of the Iser, a few miles distant from Prague. It is worthy of note as being for a long time the residence of the celebrated astronomer Tycho Brahé.

BENAVE'NTÉ, a town of Spain, in the province of Zamora. It is situated on the western or right bank of the Esla, opposite to the mouth of the Cea, 34 miles north from Zamora. It is overlooked by a huge half-ruined castle, and surrounded by a decayed mud-wall, in which are six gates. It has spacious streets and squares, six churches, a number of schools, three hospitals, a bishop's palace, &c. The castle was formerly the seat of the family of Pimentel, Counts of Benavente, to whose progenitor it was granted in 1394. The interior of the castle was desolated by Soult, on his retreat from Oporto, and fragments of sculpture still lie scattered about. It was at B. that Moore's retreat commenced, 28th December 1809; and it was the scene of other interesting events of the Peninsular War. B. is now a dull and poverty-stricken place, built chiefly of mud cottages. Pop. 4500. There is no bridge at Benavente. The Esla is crossed by a ferry-boat.

BENBECU'LA, one of the Hebrides or Western Isles of Scotland, between North and South Uist, 20 miles west of Skye, and belonging to Invernessshire. It is 8 miles long, and 8 broad, low and flat, and consists chiefly of bog, sand, and lake, resting on a substratum of gneiss rock, with a very broken coast-line. Pop. (1881) 1661, consisting of fishermen and small farmers, who fertilize the soil with the sea-weed which is cast ashore on the island.

BENBOW, JOHN, a brave English Admiral, was born in Shropshire in 1650. He first distinguished himself as captain of a merchantman, in a bloody action with Sallee pirates. He attracted the notice of James II., who gave him a commission in the navy. After the Revolution, he obtained the command of a large ship, and in the course of a few years he was made rear-admiral. The high confidence reposed in him by King William is borne in memory by a very bad pun on his name, said to have been perpetrated by the taciturn monarch. Objecting to several names proposed for the command of an expedition, he said: 'No; these are all fresh-water *beaus*, we need another kind of *beau;* we must send *Benbow*.' The most memorable of this gallant sailor's exploits was his last, where his stubborn valor contrasted nobly with the dastardly behavior of his captains. Off St. Martha, in the West Indies, on the 19th August 1702, he came up with a superior French force under Admiral Du Casse. For four days he kept up a running-fight with the enemy, almost deserted by the rest of his squadron. On the morning of the 24th, his right leg was mashed by a chain-shot. His officers condoled with him. 'I had rather had lost them both,' said the sturdy admiral, 'than have seen this dishonor brought upon the English nation. But, hark ye—if another shot should take me off, behave like men, and fight it out!' As soon as his wound was dressed, he was carried to the quarter-deck, and directed the fight while it lasted. The enemy sustained severe loss; but the infamous cowardice of the other captains, who actually refused to obey the admiral's signals, made the contest hopeless, and B. sailed away to Jamaica. He died of his wound on the 4th November. The recusant officers were tried by court-martial, and two captains were shot. B.'s employment of explosive vessels at St. Malo, seems to have been an anticipation of Lord Dundonald,s method at Basque Roads.

BENCH, a hall or court where justice is administered. In this sense, however, it has in modern times received a more limited acceptation, signifying the dais or elevated part of a court-room or chamber where the judges sit to administer the laws. In English courts of justice, this seat is in form literally a bench or couch running along one end of the court-room, the number of judges and their places on this bench being marked by separate desks, one for each judge; but in Scotland and Ireland, the arrangement is different, the judges in these countries sitting on chairs placed at a long and, as in Scotland, a semicircular, table, which is in a raised position. The term B. is also applied, by way of distinction, to the judges themselve as a class; thus we speak of the *B. and bar*. It has likewise, popularly and conventionally, an ecclesiastical application, the bishops of the Church of England being, as a body, sometimes designated by it; hence the expression, 'B. of Bishops.' See BANC.

BENCH, COMMON, COURT OF. This is a technical name sometimes given to the Court of Common Pleas. See COURTS OF COMMON LAW.

BENCH, KING'S, or QUEEN'S, the supreme court of common law in the kingdom. See COURTS OF COMMON LAW.

BENCH, UPPER, the name given to the Court of King's Bench in the time of Cromwell. See preceding notice, and COURTS OF COMMON LAW.

BE'NCHERS. The governing bodies of the four great Law Societies in England, or Inns of Court—Lincoln's Inn, Inner Temple, Middle Temple, and Gray's Inn—are so called. They are generally Queen's counsel or barristers of distinction; and they annually elect a president or *treasurer*, as he is called, who takes the chair at their corporate meetings, and speaks and acts in their name. See INNS OF COURT.

BENCH-WARRANT, is a warant signed by a superior judge or two justices of the peace, during the assizes or sessions, to apprehend a defendant, against whom a bill of indictment has been found. See WARRANT.

BENCOO'LEN, capital of a Dutch residency on the west coast of Sumatra, lies in 102° 20′ E. long., and 3° 48′ S. lat. Pop. 7000. The residency B. has an area of 9567 sq. miles. Rice, coffee, maize, sugar-cane, the cocoa-nut, and other fruits are grown.

About 400,000 lbs. of pepper are produced annually. B. was founded by the English (1686), but was given to the Dutch by the London Treaty, 11th March 1824. Population of district, 130,000.

BEND, one of the honorable ordinaries, or more important figures in Heraldry. It is formed by two parallel lines, which may be either straight, or indented, engrailed, &c. (q. v.), drawn from the dexter to the sinister base, and consequently passing athwart the shield. The B. occupies a fifth part of the shield in breadth, if plain; and a third part, if charged. The B. is supposed to rep-

Bend.

Bendlet.

Garter.

Cost.

Ribbon.

resent a shoulder-belt, or scarf worn over the shoulder. When heralds speak of the B. simply, the B. dexter is understood, the B. sinister being always expressly mentioned.

Bend Sinister is the bend dexter reversed, and passing from the left to the right side of the shield, as the dexter does from the right to the left. See BAR and BASTARD BAR.

There are four diminutives of the Bend—viz., the *bendlet*, the *garter*, the *cost*, and the *ribbon*.

The terms *in bend*, *per bend*, *bendy*, &c., are of frequent occurrence in heraldic works, and signify that the charge is placed, or the shield divided, diagonally in the direction of the bend.

BEND is the name for one among many kinds of knot by which ropes are fastened on shipboard. Seamen imply this meaning when they speak of 'bending the cable,' 'bending a sail,' the 'carrick-B.,' 'fisherman's-B.,' the 'sheet-B.,' &c.

BENDEMANN, EDUARD, one of the most distinguished painters of the Düsseldorf school, was born in Berlin in 1811. Although he had received a very careful scientific education, he devoted himself to art, became a pupil of Schadow's, and soon proved that he had not mistaken his vocation. As early as 1832, his great picture of the Captive Jews was exhibited at Berlin, and at once acknowledged to be a master-piece. His next important work, in 1833, represented Two Girls at a Fountain. It was followed, in 1837, by Jeremiah at the Ruins of Jerusalem, a very large picture, which excited universal enthusiasm in Paris, where it was exhibited, and for which he obtained a prize-medal. In 1838, B. was summoned to Dresden as member of the Academical Council, and professor of the Academy of Art; and the execution of the larger frescoes in the palace was intrusted to his skill. An affection of the eyes, from which he suffered for several years, interrupted the work, which is now, however, completed, and embraces a wide range of historical and mythological subjects. B.'s artistic bias is characteristic of the Düsseldorf school, his pictures being rather lyrical than dramatic. But he is distinguished by a peculiar grace and charm of his own, arising from a most perfect symmetry in drawing and composition, an exquisite *naïveté* in conception, and a tender harmonious, yet truthful coloring. His portrait of his wife, a daughter of Schadow, is one of his best works. From 1859 till 1867, he was Director of the Düsseldorf Academy.

BENDER, a fortified town, with a citadel, in the province of Bessarabia, Russia. The town is situated on the right bank of the Dniester 48 miles from its mouth, and has paper-mills, tanneries, forges, and saltpetre-works. Pop. (1880) 26,842, including many Armenians, Tatars, Moldavians, and Jews. In 1770, the Russians captured the place, and put the garrison and inhabitants, then amounting to about 30,000, to the sword. It was restored to the Turks in 1774, and again stormed by the Russians in 1809. The peace of Jassy gave it back to the Turks, from whom it was again taken by the Russians in 1811, who were confirmed in the possession of it by the treaty of Bucharest in the following year.—Charles XII. of Sweden lived for some time, 1709—1712, at Varnitza, a village near Bender.

BE'NDIGO, one of the most productive gold-fields in the colony of Victoria, having, in 1857, yielded, according to the official returns, 525,018 ounces. It is about 25 miles to the north of Mount Alexander, which, again, is about 75 miles inland from Melbourne.

BE'NÉ, a town of about 6000 inhabitants, in the province of Mondovi, Piedmont, 18 miles north-east of Coni. It occupies the site of the ancient *Augusta Bagiennorum*, destroyed by Alaric. Many interesting vestiges are found in the neighborhood; and the ruins of an aqueduct, baths, and amphitheater are still visible.

BENEDEK, LUDWIG VON, an Austrian general, born in 1804 at Odenburg, in Hungary, where his father was a physician of repute. He received his military education at the Neustädt Academy, and at its close entered the army as ensign in 1822. In 1843, he was promoted to the rank of senior lieutenant, and on the occasion of the insurrection in Galicia in 1846, had several opportunities of distinguishing himself. In August 1847, as commandant of Count Gyulai's infantry-regiment, he moved to Italy, where a still more brilliant career awaited him. On the occasion of the retreat from Milan, and especially after Curtalone, where he had led on the assault with great skill and gallantry, his name was mentioned in the army reports by Marshal Radetsky in the highest terms; and, consequently, he received the cross of the Order of Maria Theresa. He afterwards distinguished himself at the taking of Mortara, and in the battle of Novara. In April 1849 he was made major-general and brigadier of the first body of reserve of the army of the Danube. He commanded the *avant-garde* at Raab and Oszony, and received a slight wound in the affair at Uj-Szegedin; which did not, however, prevent him from taking a most active part in the subsequent engagements of Szörny and Ozs Ivany, where he was wounded in the foot. At the close of the Hungarian campaign, he was ordered again, high in command, to Italy. In the Italian campaign of 1859, B. commanded the eighth corps of the Austrians. At Solferino, B. drove back the Piedmontese with great slaughter, and was the last to leave the field. He was governor of Hungary in 1860, and soon afterwards got the command of the Austrian army in that country. He commanded the Austrians in the war with Prussia in 1866, but shortly after the defeat of Sadowa, he was superseded. He died 27th April 1881.

BENEDI'CITÉ, a hymn or song of the three children in the fiery furnace, sung in the Christian Church as early as the time of St. Chrysostom, and used in the Anglican Church in the morning-services when the Te Deum is not sung.

BENEDICT, SAINT, the founder of monachism in the west, was born of a rich and respected family at Nursia, in Umbria, Italy, 480 A.D. At an early age B. was sent to the schools of literature and jurisprudence at Rome, but soon grew dissatisfied with the sterile character of the instruction dispensed. The world was full of distractions, impurities, and ignorance; and it was difficult to resist by the ordinary safeguards of virtue, the colossal evils by which men were environed; only, therefore, in the devotions of religion, in the holy silence of solitary meditation, did B. see a safe refuge from the sins of the time, and the possibility of realizing a spiritual strength which would enable him to stem the tide of corruption that was setting in. He resolved to leave the city, and betake himself to some deep solitude in which the murmur of the world would be inaudible, and alone in the rocky wilderness wrestle with his own nature, until he had conquered it and laid it a sacrifice on the altar of God. In pursuance of this resolution, when he had only reached, according to some, the age of 14, he departed from Rome, accompanied for the first 24 miles by the nurse whom his parents had sent with him as an attendant to the city. B. then left her, and retired to a deserted country lying on a lake, hence called *Sublacum* (now Subiaco). Here, in a cavern (which afterwards received the name of the Holy Grotto), he dwelt for three years, until his fame spread over the country, and multitudes came to see him. He was now appointed abbot of a neighboring monastery; but soon left it, as the morals of the half-wild monks were not severe enough for his taste. This, however, only excited a livelier interest in his character, and as he lived in a period when the migration and interfusion of races and nations were being rapidly carried on, he could not fail to draw crowds of wanderers about him. Wealthy Romans also placed their sons under his care, anxious that they should be trained for a spiritual life. B. was thus enabled to found twelve cloisters, over each of which he placed a superior.

The savage *Goths* even were attracted to him, and employed in the useful and civilizing practice of agriculture, gardening, &c. He now sought another retreat, and, along with a few followers, founded a monastery on Monte Cassino, near Naples, afterwards one of the richest and most famous in Italy. Here he extirpated the lingering relics of paganism, and had his celebrated interview with Totila, king of the Goths, to whom he spoke frankly and sharply on his errors. In 515, he is said to have composed his *Regula Monachorum*, in which he aimed, among other things, at representing the irregular and licentious life of the wandering monks, by introducing stricter discipline and order. It eventually became the common rule of all western monachism. The monasteries which B. founded were simply religious colleges, intended to develop a high spiritual character, which might beneficially influ-

ence the world. To the abbot was given supreme power, and he was told to acquit himself in all his relations with the wisdom of God, and of his Master. The discipline recommended by St. B. is nevertheless, milder than that of oriental monachism with regard to food, clothing, &c.; but enjoins continual residence in the monastery, and, in addition to the usual religious exercises, directs that the monks shall employ themselves in manual labors, imparting instruction to youth, copying manuscripts for the library, &c. By this last injunction, St. B., though this was not directly intended, preserved many of the literary remains of antiquity; for the injunction, which he gave only with regard to religious books, was extended afterwards to many secular productions. It is remarkable that the founder of the most learned of all the monastic orders was himself so little of a scholor, that St. Gregory the Great described him as being '*scienter, nesciens, et sapienter indoctus*'—learnedly ignorant, and wisely unlearned. St. B. died March 21, 543.

BENEDICT is the name of fourteen popes. Of these only the following are historically important enough to deserve special mention.—BENEDICT VIII., son of Count Gregory of Tuscoli, was elected in 1012; but was driven from Rome by the anti-pope Gregory. In 1014, he was restored to the papal chair by the Emperor Henry II., and afterwards defeated the Saracens, and took from them, with the help of the Pisans and Genoese, the island of Sardinia; and also various places in Apulia from the Greeks, by the help of Henry. He distinguished himself as a reformer of the clergy, and interdicted, at the synod of Pavia, both clerical marriage and concubinage. He died in 1024.—BENEDICT IX., a nephew of the preceding, was elected pope at the age of 18, in 1033; but in 1038, the Romans rose in indignation, and banished him on account of his almost unexampled licentiousness. He was reinstalled by Conrad II.; again formally deposed by the Consul Ptolemæus, who set up Sylvester III. in his place; and after three months, was once more installed as pope by means of bribery. By a new simoniacal compact, John Gratianus was declared pope under the name of Gregory VI. The Emperor, Henry III., to remove such gross scandals from the church, deposed all the three popes—B., Sylvester, and Gregory, and caused Suidger, bishop of Bamberg, to be elected as Clement II.; but on his death, in 1047, the deposed B. IX. again corruptly regained the papal see, and held it eight months, until 1049, when he was displaced, first by Damasus II., and afterwards by Leo IX. He died in the convent of Grotta Ferrata in 1056.—BENEDICT XIII., 1724—1730, was a learned and well-disposed man, of simple habits and pure morals, though rather strict in his notions of the papal prerogative. He unfortunately yielded himself to the guidance of Cardinal Coscia, a greedy, unscrupulous personage, who greatly abused the confidence reposed in him. B. always exhibited great moderation in politics, and an honorable love of peace, and was instrumental in bringing about the Seville treaty of 1729. During this pontificate, a remarkably large number of saints, chiefly from the monastic orders, were added to the calendar.—BENEDICT XIV. (PROSPERO LAMBERTINI), the most worthy to be remembered of all the pontiffs so named, was born at Bologna in 1675. Before his elevation, he had distinguished himself by extensive learning, and by ability in the several offices of *Promotor Fidei*, bishop of Ancona (1727), cardinal (1728), and archbishop of Bologna (1732). Succeeding Clement XII., he began his pontificate, in 1740, with several wise and conciliatory measures; founded chairs of physic, chemistry, and mathematics in Rome; revived the academy of Bologna, and instituted others; dug out the obelisk in the Campus Martius, constructed fountains, rebuilt churches; caused the best English and French books to be translated into Italian; and in many other ways encouraged literature and science.

His piety was sincere, enlightened, and tolerant, and his doctrines were well exemplified in his practice. He was extremely anxious that the morals of the clergy should be untainted; and, to that effect, established a board of examiners for all candidates to vacant sees. In proof of his toleration, he showed the frankest kindness to all strangers visiting his capital, whatever the nature of their religious opinions. The only accusation brought against him by his Roman subjects was, 'that he wrote and studied too much, but ruled too little,' or left affairs of business too much in the hands of the Cardinal Valentine. After a painful illness, B. XIV. died May 3, 1758.—His most important works are that *On the Diocesan Synod; On the Sacrifice of the Mass;* and *On the Beatification and Canonization of Saints.* A complete edition of his writings was published under the care of the Jesuit de Azevedo (12 vols., 1747–51), and in 16 vols. (1777).

BENEDICT, SIR JULIUS, a musician and composer, German by birth, but, since 1836, resident in England. He was born at Stuttgart in 1805, and studied first under Hummel at Weimar, and afterwards under Weber at Dresden. On Weber's recommendation, he was, in 1824, made music director of the Kärnther Thor Theater, Vienna; and he afterwards filled the same post in Naples. While in Naples, he produced an opera buffa called *Gracinta ed Ernesto*, and an opera seria *I Portogesi a Goa*. In Paris, and afterwards (1835) in London, he appeared with great success as a pianist. In 1836, he took up his permanent residence in London, and was, during that year, director of the opera buffa at the Lyceum, where he produced an operetta of his own, composed in Naples, *Un Anno ed un Giorno*. Turning his attention afterwards to English opera, he composed *The Gipsy's Warning* (1838), *The Brides of Venice* (1844), and *The Crusaders* (1846), three works, which, translated into German, have been well received in the composer's native country. He conducted the opera in Covent Garden Theater in 1843 and 1844, and the Norwich Musical Festival in 1845, and has since conducted much at concerts and great musical gatherings in London and in the provinces, besides being a successful pianoforte teacher. In 1850, he conducted at Mademoiselle Jenny Lind's concerts in America. In 1860, he produced a cantata, *Undine*, at the Norwich Musical Festival, which was very well received. His *Lily of Killarney*, first given in 1862, at Covent Garden, was his greatest operatic success. He has since produced a cantata, *Richard Cœur de Lion;* an opera di camera, *The Bride of Song;* a romantic opera, *Esmeralda;* and a cantata, *St. Cecilia*. His operas have much dramatic and melodic beauty, and in style and feeling are singularly English, to be the composition of a foreigner. His oratorio, *St. Peter*, written for the Birmingham Musical Festival, 1870, met with extraordinary success. His first symphony was received with great favor in 1873. In 1878 he was for the twelfth time conductor of the Norwich festival. Knighthood was conferred on B. in 1871, and he holds many foreign orders.

BENEDICT BISCOP, an English ecclesiastic of the 7th c., who exercised a most important influence on Anglo-Saxon civilization and learning. He was born about the year 629, of a noble Northumbrian family (his patronymic, according to Eddius, being Baducing), and until about his 25th year, was a courtier of Oswin, king of Northumberland. About that time, he gave up his court-life, and accompanied Wilfred to Rome (654), where he spent about ten years in study, and from which he seems to have returned soon after the synod of Whitby in 664. In 665, he was in Rome a second time, being sent on a mission by Alchfrid, king of Northumbria. After a stay at Rome of a few months, he proceeded to Lerins, in Provence, where he became a monk, received the tonsure, and spent about two years, thus acquiring a knowledge of monastic discipline. He retuned to Rome in 668, came to England with Theodore and Adrian, and was made abbot of the monastery of St. Peter (afterwards that of St. Augustine) in Canterbury. This he resigned two years after, and went to Rome for a third time, for the purpose of bringing home the literary treasures which he had already collected. He returned about 673, bringing with him a large collection of valuable books, and repaired to Northumbria, where King Ecgfrid gave him land near the mouth of the Wear, on which he founded the famous monastery of Wearmouth. Workmen were brought from France to build and glaze the church and monastery, this being one of the earliest instances of the use of glass for windows in England. He also introduced from Gaul and Rome (which he visited again in 678) church utensils and vestments, relics, pictures, images, and again a vast number of books. He also brought with him John, archanter of St. Peter's, who introduced the Roman choral service. On his return from this visit to Rome, King Ecgfrid presented him with more land on the other side of the Wear, and a place called Girwi, on which he built a second monastery, dependent on Wearmouth. B. made his fifth and last journey to Rome in 685, and, as on former occasions, came home loaded with books and pictures, bringing with him also, according to Bede, two silk palls 'of incomparable workmanship.' Shortly after his return from Rome, about 687, he was seized with palsy, under which he languished three years, dying on the 12th January 690. During his long illness, he often anxiously exhorted his monks to look carefully after his books, and preserve them from loss or injury.

The benefits conferred by B. on Anglo-Saxon civilization, which was then only in its dawn, and the impulse given by his labors to Anglo-Saxon learning, were greater than can now be estimated. It is not certain that he wrote any books, and those ascribed to him are of little value; but by his personal teaching, and especially by his founding at Wearmouth such a valuable and, for the time, extensive library, he implanted in the nation a taste for literature and learning, which soon was fruitful in results, and continued to be so for many centuries. Bede, who was his pupil, has written a life of B., and the numerous works of this 'venerable' author are the best proof of the extent and variety of information to which he had access in the monastery of Wearmouth.—See Wright's *Biographia Britannica Literaria*.

BENEDICTINES, the general name of all the monks following the rule of St. Benedict. The first Benedictine monastery was that founded at Monte Cassino, in the kingdom of Naples, about 529, by St. Benedict himself. The order increased so rapidly, after the 6th c., that the B. must be regarded as the main agents

in the spread of Christianity, civilization, and learning in the west. They are said at one time to have had as many as 37,000 monasteries, and counted among their branches the great order of Clugny, founded about 910; the still greater order of the Cistercians, founded in the following century; the congregations of Monte Cassino in 1408, of St. Vanne in 1600, and of St. Maur on the Loire, in 1627. To this last congregation all the Benedictine houses in France were affiliated. It had afterwards its chief seat at St. Maur, near Vincennes, and more lately at St.-Germain-des-Prés, near Paris. Its fine conventual buildings at St. Maur on the Loire, were destroyed during the revolutionary troubles. Numbering among its monks such scholars as Mabillon, Montfaucon, Sainte-Marthe, D'Achery, Martene, Durand, Rivet, Clemencet, Carpentier, Toustain, Constant, and Tassin, it has rendered services to literature which it would be difficult to overestimate. Besides admirable editions of many of the fathers, the world of letters owes to the B. of St. Maur, the *Art de Vérifier les Dates* (1783—1787, in 3 vols. fol.); a much enlarged edition of Ducange's *Glossarium Mediæ et Infimæ Latinitatis* (1733—1736, in 6 vols. fol.), with a Supplement (1766, in 4 vols. fol.); the *De Re Diplomatica* (1681 and 1709, fol.); the *Nouveau Traité de Diplomatique* (1750—1765, in 6 vols. 4to); *L'Antiquité Expliquée* (1719—1724, in 15 vols. fol.); the *Monuments de la Monarchie Française* (1729—1733, in 5 vols. fol.); the *Acta Sanctorum S. Benedicti* (1688—1702, in 9 vols. fol.); the *Annales Ordinis S. Benedicti* (1713—1739, in 6 vols. fol.); a new and much improved edition of the *Gallia Christiana* (1715—1856, in 14 vols. fol.); the *Veterum Scriptorum Spicilegium* (1653—1677, in 13 vols. 4to); the *De Antiquis Monachorum Ritibus* (1690, in 2 vols. 4to); the *De Antiquis Ecclesiæ Ritibus* (1700—1702, in 3 vols. 4to); the *Thesaurus Novus Anecdotorum* (1717, in 5 vols. fol.); the *Veterum Scriptorum et Monumentorum Amplissima Collectio* (1724—1733, in 9 vols. fol.); the *Histoire Litteraire de la France* (1733—1749, in 9 vols. 4to). The B. were suppressed in France, along with the other monastic orders, at the Revolution in 1792; and their splendid conventual buildings at St. Maur on the Loire were destroyed. They have lately been revived; and the B. of Solesmes, established in 1837, have resumed, under the direction of Dom Gueranger, Dom (now Cardinal) Pitra, and others, some of the works which the B. of St. Maur left unfinished, and entered on literary enterprises of their own, such as the *Spicilegium Solesmense*, in 10 vols. 4to of which four have already appeared. The chief B. houses in Germany were those of Prüm, Ratisbon, Fulda, Ellwang, and Saltzburg; in Spain, they had Valladolid, Burgos, and Montserrat; in Italy, Monte Cassino, Rome, Padua, and Capua. In England, most of the richest abbeys and all the cathedral priories (excepting Carlisle) belonged to this order.

In Scotland the B. had the monasteries of Dunfermline, Coldingham, Kelso, Arbroath, Paisley, Melrose, Newbottle, Dundrennan, and others. In Germany, several Benedictine monks distinguished themselves as promoters of education in the 10th c.; while in the latter half of the 11th c., the B. Lanfranc and Anselm, archbishops of Canterbury, laid the foundation of medieval scholasticism. In Italy, also, the B. gained distinction as literati, jurists, and physicians; but almost everywhere corruption of manners appears to have accompanied increasing wealth, until gradually it became the practice to receive, almost exclusively, the sons of noble and wealthy persons as novices among the 'Black Monks.' Several of the popes attempted a reformation of the order, and at the general Council of Constance, 1416, a plan of reform was laid down, but failed in being carried into practice. In the 15th c., the B. had 15,107 monasteries, of which only 5000 were left after the Reformation, and now not more than about 800 can be counted. As early as 1354, this order could boast of having numbered among its followers 24 popes, 200 cardinals, 7000 archbishops, 15,000 bishops, 1560 canonized saints, and 5000 holy persons judged worthy of canonization, and 37,000 monasteries, besides 20 emperors, 10 empresses, 47 kings, above 50 queens, 20 sons of emperors, 48 sons of kings, 100 princesses, and an immense number of the nobility. Tanner (*Notit. Monast.*) enumerates 113 abbeys and other institutions of B. in England, and 73 houses of Benedictine nuns. From their dress—a long black gown, with a cowl or hood of the same, and a scapulary—the B. were commonly styled 'Black Monks.' The institution of convents for nuns of this order cannot be traced back beyond the 7th c.

The rule of St. Benedict was less severe than that which the eastern ascetics followed. Besides implicit obedience to their superiors, the B. were to shun laughter, to hold no private property, to live sparely, to exercise hospitality, and, above all, to be industrious. Compared with the ascetic orders, the B., both in dress and manners, may be styled the gentlemanly order of monks; and whatever may be said of their religion, they deserve a high tribute of respect for their artistic diligence and literary undertakings. Speaking of the great productions of the B. above noticed, Sir Walter Scott characterizes them as 'works of general and permanent advantage to the world at large; showing that the revenues of the B. were not always spent in self-indulgence, and that the members of that order did not uniformly slumber in sloth and indolence.' Among the chief works on the history of the B., are the *Annales Ordinis S. Benedicti*, and the *Acta Sanctorum S. Benedicti*, already referred to; Reyner's *Apostolatus Benedictinorum in Anglia* (Douai, 1626, fol.); the *Bullarium Cassinense* (Venice, 1650, 2 vols. fol.); Tassin's *Histoire de la Congrégation de Saint Maur* (Paris 1770); *Chronica de la Order de San Benito* (Salamanca, 1609—1615, 7 vols. fol.); *Regula S. Benedicti et Constitutiones Congregationis S. Mauri* (Paris, 1770, 8vo); Montalembert's *Moines de l'Occident*.

BENEDI'CTION (from the Lat. *benedicere*, to speak well), signifies a solemn invocation of the Divine blessing upon men or things. The ceremony in its simplest form may be considered almost coeval with the earliest expressions of religious feeling. We know from Holy Writ that the Jewish patriarchs before they died invoked the blessing of God upon their children, and at a later period the priests were commanded to implore the Divine blessing upon the people. Christ sanctioned the custom, which was consequently carried forward into the primitive church, where it gradually developed itself in different forms. In the eastern as well as the western church, it is considered an essential preliminary to almost all important acts. One of the most superb spectacles that a stranger at Rome can witness, occurs on Easter Sunday, when the pope, attended by his cardinals, pronounces after mass a solemn B. *urbi et orbi* (on the city and the world). The B., however, is not confined to a form of prayer, but is accompanied with sprinkling of holy-water, use of incense, making the sign of the cross, &c. The chief cases in which a B. is bestowed are—the coronation of kings and queens, the confirmation of all church dignitaries, and the consecration of church vessels, bells, and sacred robes; the nuptial ceremony, the absolution, and the last sacrament. The most solemn form of B. in the Roman Church is that 'with the Most Holy Sacrament,' which is administered by the bishop or priest with the monstrance or ostensory containing the consecrated elements. Besides these, lands, houses, cattle, &c., often receive a B. from the priest. In the English church-service, there are two bendictions; in the Scotch, only one. In the Greek Church, when the B. is being pronounced, the priest disposes his fingers in such a manner as to convey symbolically to the faithful who are close enough to observe the arrangement, the doctrine of the Trinity and the twofold nature of Christ.

BENEDI'CTUS, a portion of the service of the mass of the Roman Church—also the so-called 'canticle of Zachary' (Luke i. 68—79), used in the Roman service of matin-lauds, and thence adopted into the Anglican morning service.

BE'NEFICE, or BENEFI'CIUM (Lat. 'a good deed,' also 'a favor,' and hence 'a grant,' or 'a provision' generally, and now more especially, a provision made for an ecclesiastical person), was a term formerly applied to feudal estates, but is now used to denote certain kinds of church preferment, such as rectories, vicarages, and other parochial cures, as distinguished from bishoprics, deaneries, and other ecclesiastical dignities or offices. In this sense a distinction is accordingly taken by the 1 and 2 Vict. c. 106, s. 124, between *benefices* and *cathedral preferments;* by the former being meant all parochial or district churches, and endowed chapel and chapelries; by the latter, all deaneries, archdeaconries, and canonries, and generally all dignities and offices in any cathedral or collegiate church, below the rank of a bishop. See note in 3 Stephen's *Com.*, p. 27. By the 5 and 6 Vict. c. 27, s. 15, which is an act to enable incumbents to devise lands on farming leases, it is enacted that the word B. shall be construed to comprehend all such parochial preferment as we have above described, 'the incumbent of which, in right thereof, shall be a *corporation sole*' (q. v.); and by an act passed in the same session, chapter 108, being an act for enabling ecclesiastical corporations to grant leases, it is, by section 31, declared that B. shall mean every rectory, *with or without cure of souls*, vicarage, &c., the incumbent or holder of which shall be a corporation sole. But by a later act, the 13 and 14 Vict. c. 98, which is an act to extend a former act, the 1 and 2 Vict. c. 106, against pluralities, the term B. is, by section 3, explained to mean B. *with the cure of souls and no other*, anything in any other act to the contrary notwithstanding. Benefices are also *exempt or peculiar*, by which is meant that they are not to be under the ordinary control and administration of the bishop; but, by section 108 of the 1 and 2 Vict. c. 106, above mentioned, it is provided that such exempt or peculiar benefices shall nevertheless, and so far as relates to pluralities and residence, be subject to the archbishop or bishop within whose province or diocese they are locally situated.

There are, in general, four requisites to the enjoyment of a benefice. 1st, Holy orders, or ordination at the hands of a bishop of the established church or other canonical bishop (a Roman Catholic priest may hold a benefice in the Church of England on abjuring the tenets of his church, but he is not ordained again); 2d, Presentation, or the formal gift or grant of the B. by the lay or ecclesiastical patron; 3d, Institution at the hands of

the bishop, by which the cure of souls is committed to the clergyman; and 4th, Induction, which is performed by a mandate from the bishop to the archdeacon to give the clergymen possession of the temporalities. Where the bishop is himself also patron, the presentation and institution are one and the same act, and called the *collation* to the benefice. In Scotland, the law on this subject is regulated by the 6 and 7 Vict. c. 61. passed in 1843, and commonly called Lord Aberdeen's Act. See ESTATE, LIVING, PARISH, PLURALISM.

BENEFI'CIARY is a legal term sometimes applied to the holder of a benefice. It may also denote a person who is in the enjoyment of any interest or estate held in trust by others, in which latter sense it is strictly and technically used in the law of Scotland, all having right or interest in trust-funds and estate being in that system called beneficiaries. The technical term in the law of England corresponding to this latter meaning of the word is *cestui que trust* (q. v.). Patent rights and copyrights are denominated B. privileges. See TRUST.

BE'NEFIT SOCI'ETIES, associations for mutual benefit chiefly among the laboring classes, and of which there are now great numbers; being better known under the name of FRIENDLY SOCIETIES, we refer for an account of them to that head. Meanwhile, we confine attention to that peculiar species of associations called BENEFIT BUILDING SOCIETIES, which are much better described as Building Societies only. There are societies established for the purpose of raising, by periodical subscriptions, a fund to assist members in obtaining heritable property, freehold or otherwise. They were formerly regulated by an act passed in 1836, the 6 and 7 William IV. A new act came into force in 1874, and was amended in 1876. (Regulations are issued from time to time by the Home Secretary, as in 1876 and 1882.) All societies established thereafter *must* be governed by this later act, and those which were in existence at the time of its enactment *may* adopt it, but it is not compulsory upon them to do so. The act of 1836 declares that it shall be lawful to establish such societies, for the purpose of enabling the members to erect and purchase dwelling-houses, or acquire other real or leasehold estate, but which shall be mortgaged to the society until the amount or value of the shares drawn on shall be fully repaid with interest and all other appropriate payments. A share is not to exceed in value £150, and the corresponding monthly subscription is not to be more than twenty shillings. A majority of the members may make rules and regulations for the government and guidance of the society, such rules not being repugnant to the provisions of the act, nor to the general laws of the realm; and for offences against these rules and regulations, fines, penalties, and forfeitures may be inflicted. No member shall be allowed to receive any interest or dividend on his share until the same has been realized, except on the withdrawal of such member according to the rules of the society.

The new act considerably enlarges the scope and powers of B. S. Section 13 declares that any number of persons may establish a society, either terminating or permanent, for the purpose of raising, by the subscriptions of the members, a stock or fund for making advances to members out of the funds of the society, upon security of freehold, copyhold, or leasehold estate, by way of mortgage; and any society under the act shall, so far as is necessary for the said purpose, have power to hold land, with the right of foreclosure, and may from time to time raise funds by the issue of shares of one or more denominations, either paid up in full or to be paid by periodical or other subscriptions, and with or without accumulating interest, and may repay such funds when no longer required for the purposes of the society. It will be seen that the restrictions of £150 and twenty shillings have disappeared, the contributions and ultimate value of a member's interest being at his own discretion. The liability of members, in respect of shares upon which an advance has been made, is limited to the amount actually paid or in arrear thereon; and in respect of shares upon which advances have been made, is limited to the amount payable under any mortgage or other security, or under the rules. Societies are empowered to receive deposits or loans, from members or other persons, corporate bodies, joint-stock companies, or terminating building societies, provided, in the case of permanent societies, that the total amount owing at one time shall not exceed two-thirds of the amount for the time being secured to a society by mortgages from its members; and in the case of terminating societies, shall not exceed two-thirds as aforesaid, or a sum not exceeding twelve months' subscriptions on the shares for the time being in force. Societies established under or adopting the act of 1874 are bodies corporate, having perpetual succession and a common seal, thus dispensing with the cumbrous and inconvenient system of trusteeship. Their rules must specify the society's name and place of meeting; mode of raising funds, with their purposes and mode of investment; terms of withdrawal and repayment; manner of alteration of rules; the appointment, remuneration, and removal of officers; provisions as to general and special meetings, and the settlement of disputes, custody of seal, mortgage deeds, and securities, powers of directors and other officers, fines, and mode of dissolution. Societies may unite with others, or one society may transfer its engagements to another. They may purchase, build, hire, or take on lease any building for conducting their business. Minors may be members, but cannot vote or hold office during nonage. Accounts are to be furnished to members and loan depositors annually. The societies are exempt from stamp-duties of every kind, except those upon mortgages; while those which continue under the act of 1836 retain their present exemption from stamp-duty upon mortgages also up to £500. It is not probable that this difference will be permitted to continue long; and even now the slight gain is more than counterbalanced by the privileges of incorporation, &c. conceded by the act of 1874. Receipts endorsed upon mortgages are sufficient discharges without reconveyance.

Two great divisions of building societies exist, the terminating and the permanent, but the latter are rapidly superseding the former. In the best-conducted societies, subscriptions are received at any time and to any amount, at the option of the member. The majority of the members pay from ten to twenty shillings per month, and others pay smaller or much larger sums as convenient. Very large sums are received in some societies. Two societies in Bradford, Yorkshire, alone receive £900,000 per annum, and have 20,000 contributing members. Other large towns in the provinces are not far behind, and in London the societies are numerous, and in the main prosperous. The Royal Commissioners, in 1872, assumed that building societies had a subscribed capital of over £9,000,000, a loan or deposit capital of over £6,000,000, over £17,000,000 total assets, over £16,000,000 advanced on mortgage, and an income of over £11,000,000. In 1882, the number of societies in England and Wales was about 1500, holding on mortgage property to the value of about £40,000,000.

The theory of these institutions is very simple. Money is collected in comparatively small sums from large numbers of people, and lent to others who borrow upon real security, either to build or trade, or for any other purpose. There was a time when members were only permitted to subscribe fixed sums at stated times, and every departure from rule was visited by heavy fines. Now, in the best-conducted societies at least, every facility is given for varying powers of investment to find a place for capital, little or much; and entrance and withdrawal are equally easy. In most cases, the repayments are upon a scale calculated to pay off both principal and interest in a certain number of years, usually about fourteen, but advances on private mortgage or repayable at the borrower's convenience are becoming more frequent every year. In fact, the almost limitless adaptability of the building society system has only been appreciated of late years, and every decade sees changes and improvements in it. Under the new legislation the societies may look forward to a still more prosperous future.

BE'NEFIT OF CLE'RGY. This expression relates to happily a former state of the law of England, which at once shows the power of the clergy and the ignorance of the people. It was otherwas called *privilegium clericale*, and in the days of its real meaning and force, the benefit or privilege meant little short of the total exemption of the clerical order, in respect of crimes and offences, from the jurisdiction and authority of the secular magistrate—an exemption pretended to be founded upon the text of Scripture, 'Touch not mine anointed, and do my prophets no harm.' The only exception to this was the priest being held in custody by the king himself; but even in that case, he could only remain in such regal custody with the pleasure and consent of the bishop, who had entire control over his person, and over the inquiry into his offence. If a priest or 'clerk' happened to be imprisoned by the secular arm, on a criminal charge or capital felony, he was, on the bishop's demand, to be instantly delivered up without any further inquisition; not, indeed, to be let loose upon the country, but to be detained by the ordinary till he had either purged himself from the offence, or, having failed to do so, had been degraded; and this state of things continued till the reign of Henry VI., when it was settled that the prisoner should first be arraigned, and might either then claim his B. of C. by plea declining the jurisdiction, or, as was most usually practised, after conviction, by way of arresting judgment. The test of admission to this singular privilege was the clerical dress and tonsure; and a story is told of one William de Bussy, a serjeant-at-law, 1259 A.D. (the practising lawyers then were all priests), who, being called to account for his great knavery and malpractices, claimed the benefit of his orders or clergy, which till then remained an entire secret, and to this end wished to untie his coif, that he might show that he had the clerical tonsure; but this was not permitted, and the bystanders seizing him, not by the coif, but by the throat, dragged him to prison. See 1, Stephen, p. 17. But in course of time a much wider and more comprehensive criterion was established, all who could *read*, whether of the clergy or laity—a mark of great learning in those days—and therefore capable of becoming

clerks, being allowed the privilege. But laymen could only claim it *once*, and upon so doing, were burned on the hand, and discharged; to be again tried, however, by the bishop, whose investigation usually resulted in an acquittal, which, although the offender had been previously convicted by his country, or perhaps by his own confession, had the effect of restoring him to his liberty, his credit, and his property—in fact, the episcopal acquittal so entirely whitewashed him, that in the eye of the law he became a new and innocent person.

The mode in which the test of reading was applied was as follows: On conviction, the felon demanded his clergy, whereupon a book (commonly a psalter) was put into his hand, which he was required to read, when the judge demanded of the bishop's commissary, who was present, *Legit ut clericus?* and upon the answer to this question depended the convict's fate: if it were simply *legit*, the prisoner was burned on the hand, and discharged; but if *non legit*, he suffered the punishment due to his offence. But by 5 Anne, c. 6, the B. of C. was extended to all persons convicted of clergyable offences, whether they could read or not; and by the same statute and several subsequent ones, instead of burning on the hand, a discretionary power was given to the judge to inflict a pecuniary fine or imprisonment. But all further attempts to modify and improve the law on this subject proving impracticable, the B. of C. was at last totally abolished, by the 7 and 8 Geo. IV. c. 28; and now by the 4 and 5 Vict. c. 22, the same is the law with regard to the peers.

This privilege had never any existence or legal meaning in Scotland; and a learned writer on the law of that country complains of its introduction into a statute applicable to Scotland (Hutchison's *Justice of the Peace in Scotland*, vol. ii., p. 191). See on the subject of this article generally, Kerr's *Blackstone*, vol. iv. p. 452; Hale's *Pleas of the Crown*, part 2, c. 45; and Reeves's *History of the English Law*.

BE'NEFIT OF I'NVENTORY, in the Scotch law, was a legal privilege whereby an heir secured himself against unlimited liability for his ancestor, by giving up, within the *annus deliberandi* (q. v.) an inventory of his heritage or real estate, to the extent of which, and no further, was the heir liable. But the *annus deliberandi* is now abolished, and the privilege in question is of the less consequence, seeing that by the 10 and 11 Vict. c. 47 ss. 23 and 25, decrees of service infer only a limited representation of a deceased party, and the heir is only liable to the extent of the inheritance descending to him. See ANNUS DELIBERANDI, HEIR, INHERITANCE, DEBT, and MORTGAGE.

BE'NEKÉ, FRIEDRICH EDUARD, professor of philosophy in Berlin, was born in that city in 1798, and studied theology and philosophy, first at Halle, and then at Berlin. In 1820, he commenced lecturing in the latter university, but his lectures were soon interdicted by the minister Altenstein, as his philosophical views were quite opposed to those of Hegel. After a few years his lectures were again allowed, and on Hegel's death in 1832, he was appointed extraordinary professor of philosophy. In March, 1854, B. disappeared suddenly from his residence, and nothing more was heard of him until June, 1856, when his body was found in the canal at Charlottenburg in the same place in which he had sought his death. B. has more affinity with British thinkers than any other German philosopher. He holds that the only possible foundation for philosophy lies in strict adherence to the facts of our consciousness. His system of psychology is therefore what the Germans call 'empirical,' and his method is the Baconian as pursued in natural science. Of his numerous writings may be mentioned *Psychologische Skizzen* (2 vols. 1825—1827); *Lehrbuch der Psychologie als Naturwissenschaft* (Text-book of Psychology as a Natural Science, 2d ed. 1845); *System der Logik* (2 vols. 1842); *Erziehungs-und-Unterrichtslehre* (A Treatise on Education, 1842). The best German educationists recommend B.'s psychology as more capable of practical application than the prevailing systems of Germany.

BENEVE'NTO (ancient *Beneventum*), a city of Southern Italy, capital of the province of the same name. It occupies the site of the ancient city, out of the materials of which it is entirely built, on the declivity of a hill, near the confluence of the Calore and Sabato, about 32 miles north-east of the city of Naples. B. is about two miles in circumference, is surrounded by walls, has a citadel, a fine old cathedral, some noteworthy churches, and a magnificent arch, erected to the honor of the Emperor Trajan, by the senate, 114 A.D., which, with the single exception of that of Ancona, is the best preserved specimen of Roman architecture in Italy. It is an archiepiscopal see, and has a population of (1881) 17,406. B. is a place of very great antiquity. Some writers attribute its origin to Diomed, and in the cathedral is a bas-relief representing the Calydonian boar adorned for sacrifice, said to be the gift of the Greek hero himself. Others give the credit of its origin to Auson, a son of Ulysses and Circe. It was, however, in the possession of the Samnites, when history first takes notice of it, and it appears to have been captured from them by the Romans, some time during the third Samnite war. It was certainly in the hands of the Romans 274 B.C., who changed its name from Maleventum to Beneventum, six years later, and made it a Roman colony. The Carthaginians under Hanno were twice decisively defeated in the immediate neighborhood, during the second Punic war. It rapidly rose to a place of importance under the Roman empire, and was visited at various times by several of the emperors.

Under the Lombards, who conquered it in the 6th c., B. continued to flourish, and became the capital of a duchy which included nearly the half of the late kingdom of Naples. In the 9th c. the duchy was separated into three states—B., Salerno and Capua. In 1077, the whole was taken possession of by the Normans, excepting the town and its present delegation, which had previously (1053) been presented to the pope, by the Emperor Henry III. During the 11th and 12th centuries, four councils were held at B. Thenceforward, until 1860, when it was united with the kingdom of Italy, B. remained, with slight intervals, governed through a resident cardinal with the title of Legate. In 1806, it was made a principality by Napoleon, with Talleyrand as Prince of B.; but it was restored to the pope in 1815. In 1848—1849, B. was faithful to the pope. The province of B. has an area of 675 sq. m.; pop. (1881) 238,626.

BENE'VOLENCE, in the history of the law of England, was a species of forced loan, arbitrarily levied by the kings in violation of Magna Charta, and in consequence of which it was made an article in the Petition of Rights, 3 Car. I., that no man shall be compelled to yield any gift, loan, or B., tax, or such like charge, without common consent by act of parliament; and by the statute 1 Will. and Mary, st. 2, c. 2, it is declared, that levying money for or to the use of the crown, by pretence of prerogative, without grant of parliament, or for longer time, or in other manner than the same is or shall be so granted, is illegal. See Hallam's *Constitutional History of England*, and 1 Stephen's *Com.*, p. 167.

BENGA'L, a term formerly used of a 'presidency' of British India, now ordinarily understood of the administrative province so called. In 1765, the soubah or viceroyalty of this name was, along with Bahar and part of Orissa, ceded by the Great Mogul, virtually in full sovereignty, to the English East India Company. As a natural consequence of this acquisition of territory, the presidency of Calcutta, which had been separated from that of Madras in 1707, came to be styled the presidency of Bengal. Moreover, in 1773, this, the youngest of the three distinct governments of British India, was elevated above both its older rivals by an act of parliament, which declared its immediate ruler to be *ex officio* the governor-general of the whole of the Company's dominions. With its commanding position on and around the delta of the Ganges and the Brahmaputra, B., as a presidency, grew almost as uninterruptedly as a tree, alike to the north-west and to the south-east—far beyond the basins of its own mighty rivers. Within less than 90 years it had overleaped, without a break in its continuity, at once the Irrawaddy and the Indus. Benares in the one direction, was the first considerable increment, having been absorbed in 1775; while the last addition of importance—unless one should except Oude, which, however, had really become British in 1801—was Pegu, in the other direction, the Burmese war of 1852 filling up the gap on the coast which that of 1826 had still left between Assam and Aracan on the north, and Tenasserim on the south. From Tenasserim to the Punjab inclusive, B., as a presidency, embraced about 29° of long., and about 21° of lat. Further, it comprised, to the south-east, the detached settlements of Penang, Malacca, and Singapore; while to the north-west it might, for a time at least, have claimed Afghanistan. The whole of this vast tract was, either directly or indirectly, under the immediate rule of the governor-general, advised, and in some cases, controlled, by a council of 5 members, of whom one was the commander-in-chief, and at least one other was not to be a Company's servant.

Some time ago, the presidency of B., having proved to be too extensive for a consolidated administration, was divided into three portions—one portion remaining under the governor-general, and two being assigned to subordinate functionaries, the lieutenant-governors respectively of 'The North-western provinces,' and of 'Bengal.' The first portion, under the direct sway of the governor-general, consisted of the Punjab (q. v.); the Cis-Sutlej states, 4 in number—Oude, Nagpoor, Pegu, Tenasserim: and the 3 detached settlements already mentioned in and near the Straits of Malacca. The two other portions, occupying, between them, the entire space from Pegu to the Cis-Sutlej states, met near the confluence of the Gogra and the Ganges. Patna being situated in 'Bengal,' and Benares in 'The North-western Provinces.' The 'presidency' of B. is no longer an administrative division; The territory over which the lieutenant-governor of B. now rules is very nearly what used to be known as Lower B., and comprises B. Proper, Bahar, Orissa, including the tributary Mehals, Chota Nagpore, and the native states of Hill Tipperah and Kooch Bahar. The North-west Provinces are no longer included

in the government of B; the Punjab has likewise an independent lieutenant-governor; Oude is under a chief commissioner; Pegu and Tenasserim are embraced in British Burmah; and since 1874 Assam too has its own chief commissioner.

According to the census of 1872, the areas and populations of the four great provinces that constitute B. in the wider sense, and are under the lieutenant-governor of B., are as follows:

	Square Miles.	Inhabitants.
Bengal Proper	78,982	34,277,342
Bahar	42,417	19,736,101
Chota Nagpore	28,482	3,419,591
Orissa	8,714	3,162,490
	158,595	60,595,524
Tributary states	38,324	2,218,296
Total	196,919	62,813 820

The census of 1881 showed a total of 68,829,920 for the same area, without the tributary states. Thus the local government of B. (between 82° and 92° E., and 19°40′ and 28° 10′ N.) has a population nearly twice as numerous as that of the United Kingdom. It consists mainly of the lower plains of the Ganges, and the whole of the great delta, and comprises a portion of the valley of the Brahmapootra, and the sea-board district of Chittagong. Chota Nagpore and Orissa are beyond the western bounds of the plains of the Ganges.

In military matters, India is regarded as composed of the three presidencies of Bengal, Madras, and Bombay. When the army of B. is spoken of, by B. a much larger area is meant than the lieutenant-governorship or local government of B. Of the latter, the three provinces of Bahar, Chota Nagpore, and Orisso are discussed in separate articles. B. Proper alone, the ancient soubah, or the modern province, now claims more special notice.

B. Proper, then, is bounded on the N. by Nepaul, Sikim, and Bhotan; on the E. by Assam; on the S. by the Bay of Bengal; on the S.-W. by Orissa and Gundwana; and on the W. by Bahar. Taking its widest range, it measures about 350 miles from west to east, by an average of about 300 from south to north, and covers an area of 89,836 sq. m., embracing about 30 administrative districts. In 1871, the population was 36,769,735. Thus Bengal Proper is somewhat smaller in extent and denser in population than Great Britain. Next to Calcutta, the cities of note are Moorshedabad, Dacca, Burdwan, Purneah, Hoogly, Midnapore, Rajmahal, Bancorah, Berhampore, &c. In B. Proper, within the district of Hoogly, there stands also the French settlement of Chandernagore, containing somewhat less than 4 sq. m., with a population of about 33,000. The Hoogly district, moreover, contained, at one time, two other dependencies of foreign countries, the Dutch Chinsura, and the Danish Serampore, respectively ceded to England in 1824 and 1845. B. Proper, as a whole, may be regarded as almost a dead level. It is only on the south-west frontier that it shows any hill-country, for towards the north it is said nowhere to reach even a single spur of the Himalaya. The principal rivers are the Ganges and the Brahmaputra, the former intersecting the country diagonally from north-west to south-east, and the latter crossing its more easterly portion in a direction to the west of south. During their lower courses, these main channels are so interlaced together as to form perhaps the most singular net-work of waters in the world; and their first point of confluence is said to be Jaffergunge—the head also of tide-water—in lat. 23° 52′ N., and long. 89° 45′ E., at a distance of 160 miles from the sea. But the thousand-isled delta commences 120 miles further up the Ganges, where the highest offset, the Bhagirathi, breaks off to the right, afterwards to join a similar offset, the Jellinghee, in forming the Hoogly of Calcutta. Besides these two grand arteries, the province is watered by many less considerable rivers, chiefly northerly tributaries of the Ganges; so that even in the driest season there is scarcely any spot 20 miles distant from a navigable stream. During the rainy months, almost every water-course in the more level regions inundates the adjacent plains; while down in the delta, the separate floods sometimes mingle themselves into a breadth of 100 miles. To say nothing of temporary inconvenience and loss, these visitations often inflict permanent damage such as is wholly irreparable.

The soil, in most part of the province, is so decidedly alluvial, that hardly a rock or stone meets the ascending voyager within a distance of 400 miles from the sea—a soil offering but a feeble barrier to the torrents which, besides gathering, as they rise, velocity and momentum, are liable to change their direction with each increase of depth and width. A twofold evil is the result. Ganges and the Brahmaputra, resuming, as it were, their gifts of a former age, cut for themselves new passages, to the injury of private individuals, while their old ones become so many seething swamps, to the prejudice of the public health. To a partial extent, such calamities have been averted by embankments. In these circumstances, the intercourse is ordinarily carried on by water: the Bengalee, in fact, may be viewed as almost amphibious; and on the Lower Ganges alone, there are said to be—unless in so far as steam may have reduced the number—about 30,000 professional boat-men. Speaking generally, the communications by land are merely beaten paths. The only exceptions of note—and that certainly a noble one—is the Grand Trunk Road, which traverses the province from Calcutta upwards on its way to Delhi, Lahore, and the Indus. Much of the country is covered by thick woods and impenetrable jungles, which abound in wild animals, such as the jackal, the leopard, the tiger and the elephant. The last is often tamed for domestic use, the more common beasts of burden being the camel and the horse, the latter of an altogether inferior variety. Lying, as B. Proper does, between the 21st parallel and the 27th, its climate and productions, so far as the latitude alone is concerned, may be expected to be tolerably uniform over the entire province. But other causes intervene to affect the result. Thus, the nearer any place is to the sea, the heavier are the rains, and broader is the overflow; the difference of moisture, however, being, in the remoter localities, often made by irrigation. Moreover, in an inverse proportion to the latitude, the alternate monsoons of the Bay of Bengal (see next article), with their respective influences on the thermometer and barometer, are more sensibly felt in the maritime tracts. Lastly, to these special causes must be added a cause of more general character—the difference of elevation. Hence, wheat and barley, for instance, grow only on the higher grounds, while rice cannot thrive unless within the range of the inundations, yielding, too, an endless diversity of varieties, according to the infinitely fluctuating conditions under which it may be cultivated. Besides grains and vegetables in great variety and abundance, B. Proper gives to commerce opium, indigo silk, sugar, tobacco, coffee, and cotton. See CALCUTTA. Cotton manufactures, once extensively carried on, particularly in the district of Dacca, have latterly given way to British competition. The article of salt, to come up under another head in connection with revenue, claims separate notice.

Most of what is consumed in B. Proper is made in deserts on the coast, alternately covered and abandoned by every tide, where the singularly powerful evaporation—said to be sometimes an inch a day on the depth of the adjacent bay—impairs the health of the laborer in proportion as it facilitates his labor. Of all these commodities, indigo (q. v.) is, in one important view, the most valuable, as being more likely to attract English agriculturists to India. From the earliest times the dye appears to have been cultivated on the Lower Ganges, which for ages enjoyed, in this respect, the monopoly of the European trade. But when once the cultivation of the plant was introduced into America, it gradually engrossed the market—the greater care in the preparation making up for a natural inferiority in the article itself; and it was only when British capital and skill undertook the manufacture, that B. began to resume her original supremacy in this branch of agriculture. The annual rainfall at Calcutta varies from 50 inches to 85, diminishing gradually towards the interior. At Calcutta also, in the year 1871, the mean temperature for May was 84° 12′; for July it was 83° 12′; and for December, 69° 48′. The prevailing winds were, from January to May of the same year, north-west to south; from June to September, southerly; from October to December, north-west. Iron and coal are understood to abound, though by no means continuously, in a tract as large as England, running to the west from Rajmahal—a tract, however, not wholly situated in Bengal Proper. In 1757, a single battle, gained against odds of twenty to one, transferred B. from the Mogul's viceroy to the English East India Company—the Mogul's own grant of 1765 ratifying the decision of Plassy. The province of B. had in 1881 five colleges affiliated to the university of Calcutta; but there were in all 29 'institutions' catalogued as giving university education; 223 high schools, 1689 middle schools, and 2019 lower schools of secondary education; and 42,131 primary schools. With engineering, normal, industrial, and other schools, there were in all 47,507 educational institutions, with 928,489 pupils. In 1879–80, 3512 students were sent up to the examinations of the university of Calcutta, of whom 1291 passed. For the M.A. degree, 29 candidates (of a total of 48) passed.

BENGA'L, BAY OF, a portion of the Indian Ocean, of the figure of a triangle. Its southern side, drawn from Coromandel to Malacca, so as merely to leave on the right both Ceylon and Sumatra, may be stated at 1200 miles. The Bay of B. receives many large rivers—the Ganges and the Brahmaputra on the north, the Irrawaddy on the east, and on the west the Mahanuddy, the Godavery, the Kistna or Krishna, and the Cauvery. On the west coast, there is hardly anything worthy of the name of harbor; while on the east there are many good ports—such as Aracan, Cheduba, Negrais, Syriam, Martaban, Tavay River, King's Island, besides several more in the islands between Pegu and Sumatra. The evaporation, as stated in the previous article, sometimes amounts, in the hottest season, to about an inch a day. The monsoons prevail over the whole of the north part of the In-

dian Ocean, of which the Bay of B. is a part, and also over the maritime tracts of B. itself. The north-east monsoon is clearly the ordinary trade-wind of the northern hemisphere; while that from the south-west is shown by Maury, in his *Physical Geography of the Sea*, to be a deflection of the ordinary trade-wind of the southern hemisphere. Generally speaking, the north-east and south-west monsoons prevail respectively in summer and winter. Maury, however, shows that, on different parallels, there are different seasons for the alternate changes.

BENGA'L ARMY. A succinct account of the military forces in India, European and native, will be found under EAST INDIA ARMY; including a notice of the changes made consequent on the transfer of the Company's powers to the crown, in 1858.

BENGA'L LIGHT, BLUE LIGHT, or BENGAL FIRE, is a brilliant signal-light used at sea during shipwreck, and in ordinary pyrotechny for illuminating a district of country. It is prepared from nitre, sulphur, and the tersulphuret of antimony. The materials are reduced to fine powder, thoroughly dried and intimately mixed in the following proportions by weight: nitre, 6; sulphur, 2; tersulphuret of antimony, 1. The mixture constitutes the B. L., and when kindled by a red-hot coal, red-hot iron, or flame, immediately bursts into rapid and vivid combustion, evolving a brilliant, penetrating, but mellow light, which, during the darkness of night, readily overcomes the gloom for a considerable space. As the fumes evolved during the combustion of the B. L. contain an oxide of antimony, and are poisonous, the light cannot be used with safety in rooms or enclosed spaces.

BENGALI' LANGUAGE. See HINDUSTAN.

BENGA'ZI, a seaport town of Barca, North Africa, finely situated on the east coast of the Gulf of Sidra, in lat. 32° 6′ N., and long. 20° 2′ E. It has a population of about 7000, who carry on a trade with Malta and Barbary in oxen, sheep, wool, and corn. The value of exports in 1874 was £279,000. It has a castle, the residence of a bey, who governs it for the pasha of Tripoli. Its harbor is rapidly filling up with sand. There are here English, French, and Italian consuls. B. is chiefly interesting to the traveller, as having been the site of the ancient city of Hesperis, near which were several singularly luxuriant dells of large extent, enclosed within steep rocks rising to the height of 60 or 70 feet. These were supposed to answer well the description of the fabled Gardens of the Hesperides. It first rose to importance under Ptolemy III., who called it Berenice, after his wife. It had then a large population, chiefly of Jews. Justinian afterwards fortified it.

BENGEL, JOHANN ALBRECHT, a distinguished German theologian and commentator, whose writings have exercised considerable influence in England, was born at Winnenden, in Würtemberg, June 24, 1687. His early life was chequered by many vicissitudes. After completing his theological curriculum in 1707, he became curate of Metzingen; a year after, he was appointed theological tutor at Tübingen. Later in life, he held several high offices; among others, that of Consistorial councillor and prelate of Alpirsbach, in Würtemberg, where he died 2d December 1752. He was the first Protestant author who treated the exegesis of the New Testament in a thoroughly critical and judicious style. He did good service also in the rectification of the text of the Bible, and in paving the way for classifying the sacred manuscripts into families. The short notes in his *Gnomon Novi Testamenti* (Tübingen, 1742) have been generally regarded as valuable, and translated into various languages. They were especially made use of by John Wesley, in his *Notes on the New Testament*, which forms one of the standards of Wesleyan Methodism. Indeed Wesley's work may be regarded as little more than an abridged translation from Bengel. *An Exposition of the Revelation of St. John* (Stuttgard, 1740), and a chronological work—the *Ordo Temporum a Principio per Periodos Œconomiæ Divinæ Historicus atque Prophetici* (Tübingen, 1741), gained for B., in his time, a great reputation; some regarding him as an inspired prophet, but the majority as a visionary. In these works he calculated, on the basis he supposed to be laid down in the Apocalypse, that the world would endure for the space of 77777⅔ years; and that the 'breaking loose and the binding of Satan' would take place in the summer of 1836.

BENGUE'LA, a country of Western Africa, the limits of which are not very definitely fixed. It is usually represented as lying between lat. 9° and 16° S., and long. 12° and 17° E. The river Coanza separates it from Angola on the N., the mountains behind Cape Negro bound it on the S., and the Atlantic Ocean on the W. Its surface is generally mountainous, rising from the coast-line inland, in a series of terraces; several important rivers flow through it in a north-west direction to the Atlantic. These rivers have numerous affluents, and water is everywhere so plentiful, that it may be found by digging two feet beneath the surface. Vegetation of the most luxuriant and varied description is the consequence of this humidity. The fruit-trees, both of tropical and subtropical climates, succeed extremely well. The inhabitants, however, are too ignorant or indolent to take advantage of the productiveness of the soil. Animals of all kinds common to Western Africa abound in B., both on land and in water. Peacocks are said to be accounted sacred in B., and kept tame about the graves of the great chiefs. Sulphur, copper, and petroleum are found in the mountains, and also gold and silver in small quantities. The coast is unusually unhealthy, but the interior is more salubrious. B. is inhabited by a variety of petty tribes, some of which are cannibals, and barbarous beyond even the barbarism of Africa. As might be anticipated, religion exists only in the form of Fetichism. The Portuguese claim B., but they exercise no real power in the interior.

BENGUE'LA, ST. PHILIP DE, the Portuguese capital of the above region, on the Atlantic, near the mouth of the river Catumbella. Lat. 12° 33′ S., long. 13° 25′ E. It is very unhealthy; so inimical to European life, indeed, that the Portuguese affirm their countrywomen could not live three months in it. It has a miserable appearance, being built of half-baked bricks, and made ruinous-like by a practice that prevails of never repairing the houses, which, whenever they exhibit symptoms of decay, are abandoned for new ones erected in the vicinity. Pop. 3500, chiefly free blacks or slaves. It was a great slave-station at one time, exporting annually 20,000 slaves. The trade has fallen off greatly of late years. The town was, some time ago, invaded by a herd of thirsty elephants in quest of water and almost entirely destroyed.

BENI', a river of South America, in the state of Bolivia, formed by the junction of all the streams that rush down from the Eastern Andes between 14° and 18° S. lat. Flowing through the department of its own name, it joins the Mamore to form the Madeira, one of the largest affluents of the Amazon.

BENICA'RLO, a poor, dirty, walled town of Spain, in the province of Valencia. Pop. 6000, who manufacture 'full-bodied' wines for export to Bordeaux, where they are used in cooking clarets for the English market. Bad brandy is also manufactured here; and the town being situated on the Mediterranean, a little fishing is carried on.

BE'NI-HA'SSAN, a village of Upper Egypt, on the east bank of the Nile, in lat. 27° 53′ N., and long. 30° 55′ E. The place is remarkable for the numerous grottos in its vicinity, which are among the most interesting in Egypt. These catacombs are excavated in the calcareous bank—apparently, at one time, washed by the Nile, now flowing furthest west—in which the low hills that rise in this part of the valley terminate. The catacombs are about thirty in number, and are supposed to have been used as sepulchres by the principal inhabitants of Hermopolis, a city that stood on the opposite side of the river. Some of the grottos consist of three apartments, the largest of which is 60 by 40 feet; and pillars are cut out of the rock in imitation of the columns that support the roofs of buildings. These shafts are polygons of sixteen sides, fluted except on the inner side, which is left smooth for a line of hieroglyphics. They are usually about 16 feet high, and from 3 to 5 feet in diameter at the base. The sides of the caverns are covered with paintings representing the industrial pursuits, sports, pastimes, &c., of the ancient Egyptians. The paintings, though not so artistic as those in the Theban catacombs, are of earlier date, and throw much light on the manners and customs of the people.

BE'NI-ISGUE'N, a large town in the interior of Algeria, surrounded by a rampart, flanked with towers, and said to be nearly as populous as Algiers. It has some trade in grain.

BE'NI-I'SRAEL (Sons of Israel), a remarkable race in the west of India, who preserve a tradition of Jewish descent, and have from time immemorial acknowledged the law of Moses, although in many respects conforming to the idolatry of the Hindus by whom they are surrounded. Dr. Wilson estimates their whole number at not much more than 5000. Their original settlement was at Navagaum, about 30 miles from Bombay, where they were protected by the native princes; they have spread through the maritime parts of the Konkan, and some of them are now to be found in Bombay itself. Their features exhibit a resemblance to those of the Arabian Jews. Until recently, they were ignorant even of the names of many of the books of the Old Testament; and it was not without hesitation that they consented to receive those of the later prophets. Dr. Wilson supposes them to be a remnant of the ten tribes, and to have settled in India long before the Jews of Cochin. See COCHIN (HINDUSTAN). They reject the name of Jews, and deem its application to them a reproach. They have no MS. of the law in their synagogues. Their communities are governed by a *mukadam*, or head-man of their own number; and their religious assemblies are presided over by a *kazi*, who also performs circumcision and other rites.

BENI'N, a state in Guinea, Africa, above the mouth of the river Niger, situated in 4°—9° N. lat., and 4°—8° E. long. It takes its name from the western arm of the Niger—formerly supposed be a main river, and styled *Benin* or *Formosa*—which leaves the

Niger at Kirii, and, after a course of about 115 miles, forms an embouchure two miles wide. The country of B. is bounded on the N.E. and the E. by the Niger; on the S. by the Bay of Benin, into which Cape Formosa is projected; on the W. by Dahomey; and on the N.W. by Yariba. The coast is indented by numerous estuaries, and is generally level; but the land gradually rises towards the north, until it reaches an elevation of 2500 feet in the Kong Mountains. The soil is very fertile, producing rice, yams, palms, sugar, &c. The animals are the same as those in other states of Guinea, but the hippopotamus is more common. The population is so dense that the king—who is worshiped as a great *fetish*—could, in its most flourishing days, bring into the field an army of 100,000 men. The government, customs, and superstitions of B. are like those of Ashantee. The kingdom has long been declining, and is now much broken up into independent states. The capital, Benin, situated in lat. 6° 20′ N., long. 5° 50′ E., with about 15,000 inhabitants, has a considerable trade. Messrs. Smith and Moffat, who visited it in 1838, describe its market-place as very offensive, from the effluvia rising from a heap of human skulls; while in the outskirts of the town they were still more revolted by the sight of turkey-buzzards feeding on bodies of men recently decapitated. At Gato, a harbor lower down the river, where the traveler Belzoni died, European merchants formerly had factories. Warree is another principal place. The export trade of B. consists of palm-oil, salt, blue coral, jasper, wild-beast skins, slaves, &c. B. was discovered by the Portuguese Alfonso de Aveiro, 1486. In 1786, the French founded settlements at the mouth of the river, which were destroyed by the British in 1792.

BENI'N, Bight of, that portion of the Gulf of Guinea (q. v.) extending from Cape Formosa on the east to Cape St. Paul's on the west, a distance of about 390 miles, with a coast-line of 460 miles. Several rivers empty themselves into the B. of B., the three principal of which, Benin, Escardos, and Forcados, are accessible to shipping. The coast along the Bight was blockaded in 1851 by the British fleet engaged in the suppression of the slave-trade. Palm-oil and ivory are the principal articles of trade at the towns on the coast.

BENI-SOUE'F, a town of Central Egypt, on the right bank of the Nile, about 70 m. S.S.W. of Cairo, one of the stations where travelers making the tour of Egypt usually stay. It is the entrepôt of all the produce of the fertile valley of Fayoum, and has cotton-mills and alabaster quarries. Pop. 5000.

BENITIER or BENATURA, the name of the vase or vessel in which consecrated or 'holy water' is held in Roman Catholic churches. In England, the B. was known by the names of the 'holy-water font,' the 'holy-water vat,' the 'holy-water pot,' the 'holy-water stone,' the 'holy-water stock,' and the 'holy-water stoup.' Benitiers were either movable or fixed. Portable ones, commonly of silver, were used in processions. Fixed benitiers were placed near the doors of churches, so that the people might dip their fingers in the water, and cross themselves with it as they entered or left the church. The learned French ecclesiologist, M. Viollet-le-Duc, is disposed to think that, before the 12th c., there were no fixed benitiers, their place being served by vases of metal set down near the entrance of the church when the doors were opened. The fixed B. is usually placed either against a pillar, or upon a pedestal. It is of all shapes, and is of the most different materials, but oftenest of stone. The benitiers belonging to the church of St. Sulpice, in Paris, are remarkable for their beauty. They are formed of magnificent shells, and bordered with gilt copper. In Great Britain, benitiers are found of every style, from Romanesque to late Third Pointed. On the continent, they range from Romanesque to Renaissance, those of the latter style being generally of marble, richly sculptured, and supported by figures.

BE'NJAMIN (a Hebrew proper name, signifying 'Son of my Right Hand,' or 'Son of Good Fortune'), the youngest and most beloved of the sons of Jacob. His mother, Rachael, who died soon after he was born, called him *Benoni* (Son of my Pain), but his father changed it to Benjamin. He was the head of one of the twelve tribes of Israel. The tribe in the desert reckoned 35,400 warriors above twenty years of age; and on the entrance into Canaan, 45,600. Its territory, which was small but fertile, lay on the west side of the Jordan, between the tribes of Ephraim and Judah. The chief places were Jericho, Bethel, Gibeon, Gilgal, and Jerusalem, the last of which was on the confines of Judah. In the time of 'the Judges,' the tribe of B. became involved in war with the eleven other tribes of Israel, on account of refusing to deliver up to justice the Gibeonitish ruffians who had brutally abused the concubine of an Ephraimite. The result was dreadful. All the male descendants of B. were put to the sword (Judges xx. and xxi.), excepting 600, towards whom the hearts of their brethren finally relented. Saul, the first king of Israel, was of the tribe of B., which remained loyal to his son, Ishbosheth. After the death of Solomon, B., along with Judah, formed the kingdom of Judah; and on the return from the Captivity, these two coustituted the principal element of the new Jewish nation.

BE'NJAMIN OF TUDE'LA, a Jewish rabbi, was born in Navarre, Spain. He was the first European traveler who gave information respecting the distant East. Partly with commercial views, and partly to trace the remnants of the 'lost tribes,' he made a journey, in the years 1159—1173, from Saragossa, through Italy and Greece, to Palestine, Persia, and the borders of China, returning by way of Egypt and Sicily. He died in 1173, the last year of his travels. His notes of foreign lands—originally written in Hebrew, and frequently republished in Latin, English, Dutch, and French—are occasionally concise and valuable; but on the whole must be accepted with qualifications. Like all the early travelers, B. had a greedy ear for the marvellous. His errors are also numerous. The latest edition by Asher (London, 1841) contains the original text, with an English translation and learned annotations.

BE'NJAMIN TREE. See Benzoin.

BEN LAW'ERS, a mountain in Perthshire, Scotland, about 32 miles west-north-west of Perth, on the west side of Loch Tay. This mountain, which is easy of ascent, is rich in Alpine plants, and there is a magnificent view from its summit, which is 3984 feet high, or with the cairn at the top, 4000 feet. Ore of titanium is found in B. L.

BEN LE'DI, a mountain also of Perthshire, 4 miles west-north-west of Callander, with an elevation of 2875 feet. It received its name from the Druids, who are supposed to have had a place of worship on its summit—the Gaelic words *Beinn-le-Dia*, signifying 'Hill of God.' This mountain is celebrated in Scott's *Lady of the Lake*.

BEN-LO'MOND, a celebrated Scottish mountain in the north-west of Stirlingshire, on the east side of Loch Lomond, and about 27 miles west-north-west of Stirling. This mountain, forming the south extremity of the Grampians or Central Scottish Highlands, is 3192 feet high, and consists of mica slate, with veins of quartz, greenstone, and felspar porphyry. The summit is precipitous on the north side, with a gentle declivity on the south-east; it is covered with vegetation to the top. Though considerably surpassed in height by several other Scottish mountains, none are more imposing. Seen from Loch Lomond, it appears a truncated cone, and from between Stirling and Aberfoyle, a regular pyramid. It has perhaps been ascended by a greater number of tourists than any other of the Highland mountains. The magnificent view from the top, in clear weather, includes the whole length (30 miles) of Loch Lomond, with its diversified isles, and wooded and cultivated shores, the rich plains of Stirlingshire and the Lothians, the windings of the Forth, the castles of Stirling and Edinburgh, the heights of Lanarkshire, the vales of Renfrewshire, Ayrshire, Firth of Clyde, Isles of Arran and Bute, the Irish coast, Kintyre, and the Atlantic. The north semicircle of the horizon is bounded by Bens Lawers, Voirlich, Ledi, Cruachan, and Nevis; while some of the beautiful Perthshire lochs are seen.

BEN MACDHU'I, a lofty mountain of Aberdeenshire, belonging to the Grampian range, at one time thought the highest in Britain, but now known to be second—its elevation being 4296 feet.

BEN NE'VIS, the highest mountain in Great Britain, in Inverness. It has a height of 4406 feet, is difficult of ascent, with a tremendous precipice of 1500 feet on the north-east side. Here snow remains throughout the year. Careful daily meteorological observations at the summit, meant to be carried on every summer, were begun in 1881. Granite and gneiss form the base of the mountain, which above is composed of porphyry.

BENNETT, Sir William Sterndale, Mus. D., D.C.L., English pianist and composer, was born at Sheffield, April 13, 1816. After studying under Crotch, Holmes, and Potter, in the Royal Academy, London, he attracted the notice of Mendelssohn at the Düsseldorf Musical Festival, appeared with success at Leipsic in the winter of 1837—1838, and was received with great applause when he returned to London. In 1838, he was elected member of the Royal Society of Music. In 1856, he succeeded Mr. Walmsley as Professor of Music at Cambridge. At the opening of the International Exhibition, 1862, Tennyson's ode, *Uplift a Thousand Voices*, set to music by B., was fervidly sung. In 1868, he was appointed principal of the Royal Academy of Music; and was knighted in 1871. He died in 1875.

BENNIGSEN, Levin Aug. Theophilus, Count, one of the most famous Russian generals, was born at Brunswick, February 10, 1745. His father was an officer in the Brunswick Guards; and B. himself entered the Hanoverian service for a time; but having squandered the property left him, he joined the Russian army in 1773, and in the Turkish war soon attracted the notice of the empress, Catherine, who employed him to carry out her designs against Poland. He was one of the leaders of the conspiracy

against the Emperor Paul (1801); though he is said not to have been present at the catastrophe, but to have prevented the Empress Maria from rushing to her husband when she heard his cries. He fought with considerable success in the battle of Pultusk (1806), and held the chief command in the obstinate and murderous struggle at Eylau (1807). When Napoleon invaded Russia in 1812, B. commanded the Russian center on the bloody field of Borodino, and gave his voice for fighting a second battle before the walls of Moscow. Before the French began their retreat, he gained a brilliant victory over Murat at Woronowa (18th October). Differences with Kutusov, who would not adopt B.'s plan to prevent the French from crossing the Beresina, made him retire from the army; but after Kutusov's death, he took the command of the Russian army of reserve, which entered Saxony in July 1813, fought victoriously at the battle of Leipsic, and was created Count by the Emperor Alexander on the field. When Leipsic was taken, it was he that was commissioned by the allies to announce to the king of Saxony that he was a prisoner. Failing health made him retire from the Russian service in 1818 to his paternal estate in Hanover, where he died October 3, 1826.—His son, ALEX. LEVIN B., became a leading Hanoverian statesman.

BEN-RHY'DDING, a celebrated hydropathic establishment in the West Riding of Yorkshire, in a beautiful situation on the right bank of the river Wharf, 16 miles north-west of Leeds. The building, erected in 1846 at the cost of nearly £30,000 is a very imposing pile, on an eminence midway up the side of the valley. There is accommodation for a large number of patients and visitors, and extensive pleasure-grounds around. In addition to the usual appliances of the water-cure, and a variety of gymnastic exercises, Dr. M'Leod (who died in 1875) introduced the Compressed-air Bath (q. v.); and some time ago, a sumptuous Turkish bath was added to the other attractions of the establishment.

BE'NSHIE, or BA'NSHEE, an imaginary being in the superstitions of the Irish. The B. is a female, who is called the wife of the fairies, and she makes herself known by wailings and shrieks, premonitory of a death in the family over which she is presumed to exercise a kind of guardianship. The name of this tutelary demon is supposed to be from the Irish Celtic *ben* or *bean*, a woman; and *sighe*, a fairy. A similar superstition prevailed, and is perhaps not yet extinct, in the Highlands of Scotland.

Bent Grass (*Agrostis vulgaris*).

BENT GRASS (*Agrostis*), a genus of grasses, distinguished by a loose panicle of small, one-flowered, laterally compressed spikelets; the glumes unequal, awnless, and longer than the paleæ, which are also unequal, and of which the inner one is sometimes wanting, and the outer sometimes has and sometimes has not an awn; the seed free. (For explanation of these terms, see GRASSES.) The species are numerous, and are found in almost all countries and climates; several are natives of Britain. All of them are grasses of a slender and delicate appearance. Some are very useful as pasture-grasses and for hay, upon account of their adaptation to certain kinds of soil, although none of them is regarded as very nutritious.—The COMMON B. G. (*A. vulgaris*) forms a principal part of the pasture in almost all the elevated districts of Britain, and is equally abundant in many parts of the continent of Europe.

It resists drought better than almost any other grass, but is only sown by agriculturists on soils unsuitable for the more luxuriant grasses. It is also regarded as very suitable for lawns; but in light, dry, cultivated grounds, it is often a troublesome weed, known as Black Squitch, or Quick-grass, and frequent harrowing is resorted to for the removal of its creeping perennial roots. It is as frequent on wet as on dry soils, and varies much in size and appearance.—The MARSH B. G. (*A. alba*), also very common in Britain, forming a large part of the natural pasture in many moist situations, is very similar to the species just described, but generally taller and stouter. Of this also there are many varieties, but, in all of them, the *ligule* (the little membranous tongue at the junction of the blade of the leaf with its sheathing base) is elongated and acute, whilst in *A. vulgaris* it is very short, and appears as if cut off. A variety so little different as scarcely to deserve the name, but with somewhat broader leaves and more luxuriant habit of growth, was at one time much celebrated among agriculturists, under the name of FIORIN GRASS, or *Agrostis stolonifera*. It was unduly lauded, and the consequent disappointment led to its being unduly disparaged. It is a useful grass in moist grounds, newly reclaimed bogs, or land liable to inundation. The first three or four joints of the culms lie flat on the damp soil, emitting roots in abundance, and it was formerly propagated by chopping these into pieces, and scattering them, but now generally by seed.—HERD GRASS (*A. dispar*) is a native of the United States, with broader leaves than either of the preceding species, very creeping roots, and large panicles almost level at top. It was at one time strongly recommended for cultivation, but has gone out of repute in Britain. It is, however, more highly esteemed in France, particularly upon account of the great crop which it yields on deep sand and on moist calcareous soils.—BROWN B. G. (*A. canina*), a common perennial British grass, abundant in moist heaths and moorish grounds, is valuable for mixing with other grasses to form permanent pasture on poor wet peaty soils.—SILKY B. G. (*A. Spica venti*) is a beautiful grass, with very slender branches to its ample panicle, which, as it waves in the wind, has a glossy and silky appearance. It is a rare native of sandy grounds in England, common in Southern and Central Europe; an annual grass, occasionally sown in spring to fill up blanks in grass-fields.

BENTHAM, JEREMY, an eccentric but eminent writer on ethics and jurisprudence, was the son of a wealthy solicitor in London, where he was born (in Red Lion Street, Houndsditch) on the 15th February 1748. He received his early education at Westminster School; and when yet a boy, being little more than twelve years of age, he went to Queen's College, Oxford, where he took his master's degree in 1766. But though his years were so tender, he appears not to have been so unprepared as might be supposed to benefit by the university; for before entering it, he had already, by his precocious tendencies to speculation, acquired the title of 'philosopher.' On graduating, his father, who expected his son to become Lord Chancellor, set him to the study of the law at Lincoln's Inn, where he was called to the bar in 1772. He never practised in his profession, however, for which he had a strong distaste, which is paraded in many of his writings. Turning from the practice of law to its theory, he became the greatest critic of legislation and government in his day. His first publication, *A Fragment on Government*, 1776, was an acutely hypercritical examination of a passage in Blackstone's *Commentaries*, prompted, as he has himself explained, by 'a passion for improvement in those shapes in which the lot of mankind is meliorated by it.' The *Fragment* abounds in fine, original, and just observation; it contains the germs of most of his after-writings, and must be highly esteemed, if we look away from its disproportion to its subject and the writer's disregard of method. The *Fragment* procured him the acquaintance of Lord Lansdowne, in whose society at Bowood he afterwards passed perhaps the most agreeable hours of his life. It was in the Bowood society that he conceived an attachment to Miss Caroline Fox (Lord Holland's sister), who was still a young lady, when B. in the 54th year of his age, offered her his heart and hand, and was rejected 'with all respect.' In 1778, he published a pamphlet on *The Hard Labor Bill*, recommending an improvement in the mode of criminal punishment; which he followed in 1811 by *A Theory of Punishments and Rewards*. In these two works, B. did more than any other writer of his time to rationalize the theory of punishments by consideration of their various kinds and effects, their true objects, and the conditions of their efficiency. He published in 1787 *Letters on Usury;* in 1789, *Introduction to the Principles of Morals and Legislation;* in 1802, *Discourses on Civil and Penal Legislation;* in 1813, *a Treatise on Judicial Evidence;* in 1817, *Paper Relative to Codification and Public Instruction;* in 1824, *The Book of Fallacies*.

These were followed by other works of less consequence. His whole productions have been collected and edited by Dr. Bowring and Mr. John Hill Burton, and published in eleven volumes. It is well, however, for B.'s reputation, that it does not rest wholly on his collected works; and that he found in M. Dumont, Mr. James Mill, and Sir Samuel Romilly, generous disciples to diffuse his principles and promote his fame. In his early works, his style was clear, free, spirited, and often eloquent; but in his later works, it became repulsive, through being overloaded and darkened with technical terms. It is in regard to these more especially that M. Dumont has most materially served his master by arranging and translating them into French, through the medium of which language B.'s doctrines were propagated throughout Europe, till they became more popular abroad than at home. Mr. James Mill, himself an independent thinker, did much in his writings to extend the application in new directions of B.'s principles, a work in which, apart from his original efforts, he has achieved a lasting monument of his own subtilty and vigor of mind. Criticisms on B.'s writings will be found in the *Edinburgh Review*, by Sir Samuel Romilly; and in the *Ethical Dissertation*, (*Encyclopædia Britannica*, 7th and 8th eds.), by Sir James Mackintosh. But the most valuable contribution in English to his reputation is unquestionably *Benthamiana*, by Mr. John Hill Burton, advocate, containing a memoir, selections of all the leading and important

passages from his various writings, and an appendix embracing an essay on his system, and a brief clear view of all his leading doctrines.

In all B.'s ethical and political writings, the doctrine of utility is the leading and pervading principle; and his favorite vehicle for its expression is the phrase, 'the greatest happiness of the greatest number,' which was first coined by Priestly, though its prominence in politics has been owing to Bentham. 'In this phrase,' he says, 'I saw delineated for the first time a plain as well as a true standard for whatever is right or wrong, useful, useless, or mischievous, in human conduct, whether in the field of morals or politics.' It need scarcely be remarked, that the phrase affords no guidance as to how the benevolent end pointed at is to be attained; and is no more than a quasi-concrete expression of the objects of true benevolence. In considering how to compass these objects, B. arrived at various conclusions, which he advocated irrespective of the conditions of society in his day, and of the laws of social growth which, indeed, neither he nor his contemporaries understood. He demanded nothing less than the immediate remodelling of the government, and the codification and reconstruction of the laws; and insisted, among other changes, on those which came at a later day to be popularly demanded as the points of the 'Charter'—viz., universal suffrage, annual parliaments, vote by ballot, and paid representatives. However impossible some of these schemes were, it cannot be denied that B. did more to rouse the spirit of modern reform and improvement in laws and politics, than any other writer of his day. Many of his schemes have been, and many more are, in the course of being slowly realized; the end and object of them all was the general welfare, and his chief error—apart from his over-estimate of the value of some changes which he proposed—lay in conceiving that organic changes are possible through any other process than that of growth and modification of the popular wants and sentiments. It was this error that led the philosopher, in his closet in London, to devise codes of laws for Russia (through which country he made a tour in 1785) and America, the adoption of which would have been equivalent to revolutions in these countries, and then bitterly to bewail the folly of mankind when his schemes were rejected.

In ethics, as in politics, he pressed his doctrines to extremes. It has been said that his doctrine of utility was so extended that it would have been practically dangerous, but for the incapacity of the bulk of mankind for acting on a speculative theory.

By the death of his father in 1792, B. succeeded to property in London, and to farms in Essex, yielding from £500 to £600 a year. He lived frugally, but with elegance, in one of his London houses (Queen Square, Westminster); and, employing young men as secretaries, corresponded and wrote daily. By a life of temperance and industry, with great self-complacency, in the society of a few devoted friends (who, says Sir James Mackintosh, more resembled the hearers of an Athenian philosopher than the proselytes of a modern writer). B. attained to the age of eighty-four. He died in June 1832.

BENTHA'MIA, a genus of plants of the natural order *Cornaceæ* (q. v.), consisting of Asiatic trees or shrubs, of which the fruit is formed of many small drupes grown together. *B. fragifera*, a native of Nepaul, is a small tree, with lanceolate leaves, and a reddish fruit, not unlike a mulberry, but larger; not unpleasant to the taste. It has ripened fruit in the south of England, and will probably be found to succeed in the open air, wherever the winters are so mild that fuchsias are not cut down by frost. The flowers are fragrant.

BENTINCK, Lord William George Frederick Cavendish, commonly called Lord George B., at one time the leader of the agricultural Protection party, third son of the fourth Duke of Portland, was born 27th February 1802, and entering the army when young, eventually attained the rank of major. He subsequently became private secretary to his uncle, the Right Hon. George Canning. Elected in 1826 M.P. for Lynn-Regis, he sat for that borough till his death. At first, attached to no party, he voted for Catholic Emancipation and for the principle of the Reform Bill, but against several of its most important details, and in favor of the celebrated Chandos Clause (q. v.). On the formation of Sir Robert Peel's ministry in December 1834, he and his friend Lord Stanley, afterwards Earl of Derby, with some adherents, formed a separate section in the House of Commons. On the resignation of Sir Robert Peel in April following, Lord George openly joined the great Conservative party, which acknowledged that statesman as its head, and adhered to it for nearly eleven years. On Peel's return to power in 1841, Lord George received an offer of office, which he declined, being at that time deeply interested in the sports of the field and the race-course. When Peel introduced his free-trade measures in 1845, a large portion of his supporters joined the Protection party then formed, of which Lord George became the head, and a leading speaker in the debates. His speeches in the session of 1845—1846 were most damaging to the government of Sir Robert Peel, and contributed in no small degree to hasten its downfall in July of the latter year. Lord George supported the bill for the removal of the Jewish disabilities, and recommended the payment of the Roman Catholic clergy by the landowners of Ireland. In the sporting world he is understood to have realized very considerable gains, and he showed the utmost zeal at all times to suppress the dishonest practices of the turf. He died suddenly of a spasm of the heart, 21st September, 1848, while crossing his father's park at Welbeck Abbey, Nottinghamshire.

BENTINCK, Lord William Henry Cavendish, a general officer and statesman, uncle of the preceding, and second son of the third Duke of Portland, was born 14th September 1774, and became an ensign in the Coldstream Guards in 1791. Having served with distinction in Flanders, Italy, and Egypt, he was in 1803 appointed governor of Madras, where he advocated several useful reforms; but his proscription of beards and the wearing of turbans and earrings by the sepoys when on duty, led to the mutiny and massacre of Vellore, and his own immediate recall. In August 1808, he was placed on the staff of the army in Portugal under Sir Harry Burrard. Subsequently selected to proceed on an important mission to the supreme Junta of Spain, he accompanied the army under Sir John Moore in its retreat, and at Corunna commanded a brigade. He next commanded a division of Lord Wellington's army, and shortly after was sent as British minister to the court of Sicily, and commander-in-chief of the British forces in that island. At the head of an expedition, he landed in Catalonia in July 1813, penetrated to Valencia, and afterwards laid siege to Tarragona, but was repulsed at Villa Franca. Early in 1814, quitting Sicily, he repaired to Tuscany, published at Florence a proclamation inviting the Italians to shake off the French yoke, and afterwards made himself master of Genoa. Between 1796 and 1826 he held a seat in parliament as member for Camelford, Nottinghamshire, and Ashburton. In 1827, he was appointed governor-general of India, and sworn a privy-councillor. His policy in India was pacific and popular, and his viceroyship was marked by the abolition of Sutti (q. v.), and by the opening up of the internal communication, as well as the establishment of the overland route. After his return in 1835, he was elected M.P. for Glasgow. He died at Paris, June 17, 1839.

BENTLEY, Richard, a distinguished classical scholar, was born at Oulton, in Yorkshire, January 27, 1662. In 1676, he entered St. John's College, Cambridge, in the humble capacity of subsizar. Little is known of his university career, except that he showed early a strong taste for the cultivation of ancient learning At the usual time, he took the degree of Bachelor of Arts; and on leaving the university, he was appointed head-master of the grammar-school of Spalding, Lincolnshire. About a year afterwards, he resigned this situation to become tutor to the son of Dr. Stillingfleet, then Dean of St. Paul's and subsequently Bishop of Worcester. B. accompanied his pupil to Oxford, where he had full scope for the cultivation of classical studies; and that he succeeded in acquiring there some local reputation, is evinced by his having twice been appointed to deliver the Boyle Lectures on the Evidences of Natural and Revealed Religion. Hs entered the church, and owed to the patronage of the Bishop of Worcester various good ecclesiastical appointments, and through the same influence became librarian of the King's Library at St. James's. In 1690, he published his *Dissertation upon the Epistles of Phalaris*, which established his reputation throughout Europe, and may be said to have commenced a new era in scholarship. The principles of historical criticism were then unknown, and their first application to establish that the so-called Epistles of Phalaris, which professed to have been written in the 6th c. B.C., were the forgery of a period some eight centuries later, filled the learned world with astonishment.

In 1700, B. was appointed Master of Trinity College, Cambridge; and in the following year, he married Mrs. Joanna Bernard, the daughter of a Huntingdonshire knight. The history of B.'s Mastership of Trinity is the narrative of an unbroken series of quarrels and litigations, provoked by his arrogance and rapacity, for which, it must be confessed, he was fully as well known during his lifetime as for his learning. He contrived, nevertheless, to get himself appointed Regius Professor of Divinity, and, by his boldness and perseverance, managed to pass scathless through all his controversies. Notwithstanding that at one time the Bishop of Ely, the visitor of Trinity, pronounced sentence depriving him of his mastership, and that at another the senate of the university pronounced a similar sentence of his academic honors, he remained in full possession of both the former and the latter till the day of his death. This stormy life did not impair his literary activity. He edited various classics—among other, the works of Horace—upon which he bestowed vast labor. He is, however, more celebrated for what he proposed than for what he actually performed. The proposal to print an edition of the Greek New Testiment, in which the received text should be corrected by a careful comparison with all the existing MSS., was then singularly bold, and

evoked opposition. He failed in carrying out his proposal: but the principles of criticism which he maintained have since been triumphantly established, and have led to important results in other hands. He is to be regarded as the founder of that school of classical criticism of which Porson afterwards exhibited the chief excellences, as well as the chief defects; and which, though it was itself prevented by too strict attention to minute verbal detail from ever achieving much, yet diligently collected many of the facts which men of wider views are now grouping together, to form the modern science of comparative philology. B. died in 1742, leaving behind him one son, Richard, who merited much of his father's taste with none of his energy, and several daughters, one of whom, Joanna, married, and was the mother of Richard Cumberland the dramatist.—Monk's *Life of B.* (1830); Jebb's *Bentley* (1882).

BÉ'NUÉ, or BI'NUÉ, or, as Dr. Barth prefers to spell it, BE'NUWÉ, called also Chadda and Tchadda, from the erroneous supposition that it was connected with Lake Tchad; an important river of Central Africa, forming the eastern branch of the Quorra or Niger, which it joins about 230 miles above the mouth of that river in the Gulf of Guinea. At its junction with the Faro, in lat. about 9° 33′ N., long. 12° 40′ E., the point where Dr. Barth crossed, he describes the B. as being 800 yards across, with a general depth in its channel of 11 feet, and 'a liability to rise under ordinary circumstances at least 30 feet, or even at times 50 feet higher.' In 1854, an expedition under the command of Dr. Baikie explored the B. as far as Dulti, a place about 350 miles above its confluence with the Niger, and some 80 or 100 miles from where Dr. Barth crossed. Dr. Barth regards this river as offering the best channel for the introduction of civilization into the heart of central Africa, seeing that the tract of land which separates the basins of the B. and the Shari, which flows into Lake Tchad, 'cannot exceed 20 miles, consisting of an entirely level flat, and probably of alluvial soil. . . . The level of the Tsad, and that of the river B. near Gewe, where it is joined by the Mayo Kebbi, seem to be almost the same.' In a second expedition, undertaken in 1862, Dr. Baikie explored as far north as Kano in Haussa. The expedition of the Church Missionary Society in 1879 explored several unvisited portions of the river.

BENYOWSKY, Maurice Augustus, Count de, a man of remarkable character and extraordinary fortunes, was born at Verbowa, in Hungary, 1741. He served in the Seven Years' War, studied navigation, and then fought for the Polish Confederation, until he was taken prisoner in 1769. In the same year he was banished to Siberia, and from thence to Kamtchatka. During the voyage, his exertions and skill saved the vessel that carried him. This recommended the prisoner to the governer, who made him tutor in his family. In this capacity he gained the affections of Aphanasia, daughter of the governor, by whom he was assisted in his plans for escape; which, however, was not effected without a struggle, in which the governor was killed. B., with ninety-six companions, in a ship well armed and provisioned, and with a considerable amount of treasure, set sail from Kamtchatka in 1771, visited Japan and Macao, and then sailed for France. He had not been here long when the French government proposed that he should found a colony at Madagascar, and he at once acquiesced. B. arrived on the island in February 1774, and was made king in 1776 by the chiefs in conclave, he adopting the native costume. Returning to Europe with a view to establish commercial relations between France and Madagascar, B. met with a very cold reception from the French government. He made unsuccessful overtures to the Austrian and British governments, but at length receiving assistance from private persons in England and America, departed again for Madagascar, where he arrived in 1785; and, involving himself in contention with the French government of the Isle of France, was killed in battle, May 23, 1786.—See *Memoirs and Travels of B., written by Himself* (1790).

BENZE'RTA, Lakes of, the ancient *Hipponitis Palus* and *Sisaræ Palus*, two lakes within the dominions of Tunis, near the town of Bizerta (q. v.) or Benzerta, and 30 miles north-west of the city of Tunis. They are each about 9½ miles long, and the larger one, which is clear and salt, is about 5½ miles broad; the smaller, which is turbid and fresh, 3½. They are about two miles apart, but united by a channel with a general depth of 6 feet and breadth of 75. Tunis is supplied with fish mainly from these lakes. So valuable is the fishing, that a wealthy Arab rents it from the Bey of Tunis for £4000 per annum.

BENZINE, BENZENE, or BENZOL, a compound of carbon and hydrogen ($C_{12}H_6$) discovered by Faraday. It is found amongst the products of the destructive distillation of a great many organic bodies. The most abundant source of B. is coal-tar (see Gas; Coal). On distilling coal-tar, the more volatile liquid hydrocarbons pass over first mixed with acid and basic compounds, and constitute what is known as light oil or coal naphtha. When the crude naphtha is purified by redistillation and subsequent agitation, first with sulphuric acid, and then with caustic soda, an oil is obtained which consists mainly of B. and its homologues. By submitting this oil to a process of fractional distillation, a portion is obtained, boiling at 176°—212°, from which B. crystallizes out on cooling the liquid to 32°. The B. is freed by pressure from the substances remaining liquid at this temperature. Commercial B. is, however, always impure. Pure B. is most readily obtained by cautiously distilling a mixture of one part benzoic acid with three parts of slaked lime. The mixture of B. and water which passes over it shaken up with a little potash, the B. decanted, treated with calcium chloride to take up the water, and the dried B. thus obtained is rectified on the water-bath. At ordinary temperatures, B. is a thin, limpid, colorless, liquid, evolving a characteristic and pleasant odor. At 32° F., it crystallizes in beautiful fern-like forms, which liquefy at 40°; and at 177°, it boils, evolving a gas which is very inflammable, burning with a smoky flame. It readily dissolves in alcohol, ether, turpentine, and wood-spirit, but is insoluble in water. It is valuable to the chemist from the great power it possesses of dissolving caoutchouc, gutta-percha, wax, camphor, and fatty substances. Impure B. is thus much used in removing grease-stains from woollen or silken articles of clothing. When heated, B. also dissolves sulphur, phosphorus, and iodine. B., when acted upon by chlorine, nitric acid, &c., gives rise to a very numerous class of compounds, belonging to what is known as the aromatic series The so-called coal-tar colors are all derivatives of B. and the homologous hydrocarbons (see Dye-stuffs).

BENZO'IC ACID, or *the Flowers of Benzoin*, has been known since the beginning of the 17th c., and occurs naturally in many balsamiferous plants, and especially in Benzoin Gum (q. v.), from which it may be readily obtained by several processes. The simplest is as follows. The coarsely-powdered resin is gently heated in a shallow iron-pot, the mouth of which is closed by a diaphragm of coarse filter-paper. Over this is tied a covering of thick paper somewhat like a hat. The porous filter-paper allows the vapors of B. A. to pass through it, but keeps back the empyreumatic products. At the end of the operation, the hat-like cover is found lined with a crystalline sublimate of B. A. which is nearly pure, being mixed only with traces of a volatile oil, which gives it a pleasant smell, like vanilla. The B. A. thus prepared is the best for pharmaceutical purposes. B. A. is also prepared from the urine of graminivorous animals. The urine is allowed to putrefy, then mixed with milk of lime and filtered. The filtrate, concentrated by evaporation, gives with hydrochloric acid a precipitate of B. A. B. A. thus prepared is cheaper, but always smells of urine. By subliming it with a small quantity of benzoin gum, the pleasant vanilla-like smell, may, however, be imparted to it also. B. A. is always in the form of snow-white, glistening, feathery crystals, with a fairy aspect of lightness, having a hot bitter taste. It is readily dissolved by alcohol and ether, but sparingly soluble in water. B. A. is one of the materials present in *Tinctura Camphoræ Composita*, and has been administered in chronic bronchial affections; but the benefit derivable from its use in such cases is questionable. B. A. taken into the stomach, increases within 3 or 4 hours the quantity of hippuric acid in the urine. It forms a numerous class of compounds with the oxides of the metals, lime, &c., called benzoates. The chemical formula for crystallized B. A. is $HO,C_{14}H_5O_3$. Oil of bitter almonds (hydride of benzoyl) is the aldehyde of B. A. (see Aldehydes), and the corresponding alcohol benzoic or benzylic alcohol, is, also known.

BE'NZOIN, BE'NJAMIN, or BENZO'IC GUM, a fragrant resinous substance, formed by the drying of the milky juice of the Benzoin or Benjamin Tree (*Styrax*, or *Lithocarpus Benzoin*), a tree of the natural order *Styracaceæ*, and a congener of that which produces Storax (q. v.), a native of Siam, and of Sumatra and other islands of the Indian Archipelago. The tree grows to nearly two feet in diameter; the smaller branches are covered with a whitish rusty down; the leaves are oblong, acuminate, and entire, downy and white beneath; the flowers are in compound racemes. B. comes to us in reddish-yellow transparent pieces. Different varieties, said to depend upon the age of the trees, are of very different price; the whitest, said to be the produce of the youngest trees, being the best. There is a variety known in commerce as *Amygdaloidal Benzoin*, which contains whitish almond-like tears diffused through its substance, and is said to be the produce of the younger trees. B. is obtained by making longitudinal or oblique incisions in the stem of the tree: the liquid which exudes soon hardens by exposure to the sun and air. B. contains about 10—14 per cent. of Benzoic Acid (q. v.); the remainder of it is resin. B. is used in perfumery, in pastilles, &c., being very fragrant and aromatic, and yielding a pleasant odor when burned. It is therefore much used as incense in the Greek and Roman Catholic Churches. Its tincture is prepared by macerating B. in rectified spirit for seven to fourteen days, and subsequent straining, when the *Compound Tincture of Benjamin, Wound Balsam, Friar's Balsam, Balsam for Cuts, the Commander's Balsam*, or *Jesuit's Drops*, is obtained. It is frequently applied

to wounds directly; or still better, when the edges of the wound are brought together, and bound with lint or plaster, the tincture of B. may be used as an exterior varnish. In the preparation of *Court-plaster*, sarcenet (generally colored black) is brushed over with a solution of isinglass, then a coating of the alcoholic solution of benzoin. The tincture is likewise employed in making up a cosmetic styled *Virgin's Milk*, in the proportion of two drachms of the tincture to one pint of rose-water; and otherwise it is used in the preparation of soaps and washes, to the latter of which it imparts a milk-white color, and a smell resembling that of vanilla. B. possesses stimulant properties, and is sometimes used in medicine, particularly in chronic pulmonary affections. It may be partaken of most pleasantly when beaten up with mucilage and sugar or yolk of egg. The name *Asa dulcis* (q. v.) has sometimes been given to it, although it is not the substance to which that name seems properly to have belonged.—The milky juice of *Terminalia Benzoin*, a tree of the natural order *Combretaceæ*, becomes, on drying, a fragrant resinous substance resembling B., which is used as incense in the churches of the Mauritius. It was at one time erroneously supposed that B. was the produce of *Benzoin odoriferum*, formerly *Laurus Benzoin*, a deciduous shrub of the order *Lauraceæ*, a native of Virginia, about 10—12 feet high, with large, somewhat wedge-shaped, entire leaves, which still bears in America the name of *Benzoin*, or *Benjamin Tree*, and is also called *Spice-wood* or *Fever-bush*. It has a highly aromatic bark, which is stimulant and tonic, and is much used in North America in intermittent fevers. The berries are also aromatic and stimulant, and are said to have been used in the United States during the war with Britain as a substitute for pimento or allspice. An infusion of the twigs acts as a vermifuge.

BE'NZOYL, the hypothetical radicle, $C_{14}H_5O_2$, supposed to exist in benzoic acid and many allied bodies. Thus, benzoic acid is regarded as the hydrate of benzoyl, and the oil of bitter almonds as the hydride of benzoyl, $C_{14}H_5O_2H$. As further examples of this group of bodies, we may mention benzoyl chloride, $C_{14}H_5O_2Cl$, and benzoyl cyanide, $C_{14}H_5O_2C_2N$.

Hydride of Benzoyl is the volatile or essential oil belonging to the benzoic series. It is represented by the formula $C_{14}H_6O_2$, and has been already considered under Almonds, Volatile Oil or Essential Oil of (q. v.).

BEOWULF, an Anglo-Saxon epic poem, which is one of the greatest literary and philological curiosities, and one of the most remarkable historical monuments in existence. The date of the events described is probably about the middle of the 5th c.; and as the legends refer to the Teutonic races which afterwards peopled England, it is believed that the poem, in its original shape, was brought by the Anglo-Saxons from their original seats on the continent. Only one MS. of the poem is known to exist; that, namely, in the Cottonian Library, which was seriously injured by the fire of 1731. This MS. consists of two portions, written at different times and by different hands, and is manifestly a copy, executed perhaps about the beginning of the 8th c., from an older and far completer version of the poem. But, even in the form in which it came from the hands of its last recaster, B. is the oldest monument of considerable size of German national poetry, and notwithstanding the Christian allusions which fix the existing text at a period subsequent to 597 A.D., a general heathen character pervades it, which leaves little doubt as to the authentic nature of the pictures which it presents of Teutonic life in anti-Christian times. (It should be mentioned that some scholars hold that B. is a translation from a Danish original.) Much learned labor has been bestowed on this strange relic by Sharon Turner; Conybeare; Thorkelin of Copenhagen, who published the entire work in 1815; and by Mr. Kemble, whose edition, published by Pickering in 1833, was followed in 1837 by a translation, with glossary, preface, and philological notes.

At first Mr. Kemble was disposed to regard B. as an historical epic, but his view of it latterly came to be, that though to some extent historical, it must be regarded, in so far as the legends are concerned, as mainly mythological; and this remark he conceived to apply to the hero not less than to the incidents related. But Beowulf, the god, if such he was, occupies only a small space in the poem, and seems to be introduced chiefly for the purpose of connecting Hrothgar, king of Denmark, whom Beowulf, the hero, comes to deliver from the attacks of the monster Grendel, with Scef or Sceaf, one of the ancestors of Woden, and the common father of the whole mythical gods and heroes of the north. Sceaf is traditionally reported to have been set afloat as a child on the waters, in a small boat or ark, having a *sheaf* (Ang.-Sax. sceaf) of corn under his head; whence his name. The child was carried to the shores of Slesvig, and being regarded as a prodigy, was educated and brought up as king. Between Sceaf and Beowulf, Scyld intervened, according to the opening canto of the poem; but when compared with kindred traditions, the whole genealogy becomes involved in extreme obscurity, and Scyld seems sometimes to be identified with Sceaf, and sometimes with Woden. But the view of the connection between Beowulf and Sceaf is strengthened by the following considerations. The old Saxons, and most likely the other conterminal tribes, called their harvest month (probably part of August and September) by the name Beo or Beowod, in all probability their god of agriculture or fertility. Whether, or to what extent, this divinity is identical with the mythical hero of the poem, Mr. Kemble does not venture to determine, though he indicates a strong leaning to the affirmative.

But in so far as the main points of historical interest are concerned—viz., the date of the legends, and the race and regions to which they belong—the results of the historical and of the mythological view seem to be pretty nearly the same. The poem falls entirely out of the circle of the Northern Sagas, and probably belong to Slesvig. All the proper names are Anglo-Saxon in form, but not the slightest mention is made of Britain, the Ongle mentioned being manifestly Angeln (see Angles), and not Anglia. From these and many other considerations, the learned editor infers that B. records the mythical beliefs of our forefathers; and in so far as it is historical, commemorates their exploits of a period not far removed in point of time from the coming of Hengest and Horsa, and that in all probability the poem was brought over by some of the Anglo-Saxons who accompanied Cerdic and Cyneric, 495 A.D.

The poem opens with an incident which reminds us of one of the most beautiful of Mr. Tennyson's earlier poems, the *Mort d' Arthur*, and seems to show a similarity between British and Germanic traditions. We give it in the simple words of Mr. Kemble's prose translation.

'At *his* appointed time then Scyld departed, very decrepit, to go into the peace of the Lord; they then, his dear comrades, bore him out to the shore of the sea, as he himself requested, the while that *he*, the friend of the Scyldings, the beloved chieftain, had power with *his* words; long he owned it! There upon the beach stood the ringed-prowed *ship*, the vehicle of the noble, shining like ice, and ready to set out. They then laid down the dear prince, the distributor of rings, in the bosom of the ship, the mighty one beside the mast; there was much of treasures, of ornaments, brought from afar. Never heard I of a comelier ship having been adorned with battle-weapons and with war-weeds, with bills and mailed coats. Upon his bosom lay a multitude of treasures which were to depart afar with him, into the possession of the flood. They furnished him not less with offerings, with mighty wealth, than those had done who in the beginning sent him forth in his wretchedness, alone over the waves. Moreover they set up for him a golden ensign, high over head; they let the deep sea bear *him;* they gave *him* to the ocean. Sad was their spirit, mournful *their* mood. Men know not in sooth to say (men wise of counsel, *or any* men under the heavens) who received the freight.'

The following is a brief outline of the story: B. is introduced to us, preparing for a piratical adventure. After a vivid description of the embarkation of the hero and his 'friendly Scyldingi,' the scene changes, and the palace of Hrothgar rises before us. Here the Danish king has assembled his warriors, and holds a feast, unconscious of the deadly peril in which he is placed. The 'scop' ('shaper,' from *scapan*, 'to shape' or 'create') sings a poem on the origin of things, and how evil came into the world. This is deftly used to bring upon the stage the 'grim stranger Grendel, a mighty haunter of the marshes, one that held the moors, fen, and fastness, the dwellings of the monster-race.' Malignant and cruel, he hears with envious hate the sounds of joy echoing from the hall, and stealing into the palace after dark, when the revel is over, he seizes and destroys thirty of the sleeping thegns. In the morning, when the havoc wrought by Grendel becomes known, there is a fierce outcry, and Hrothgar is loudly blamed. Yet twelve winters pass by before the outrage is avenged. The king is continually 'seethed in the sorrow of the time;' but help is at hand. B. has heard of the crimes of the monster, and comes with his Geats (Jutes) to inflict punishment. The voyage over the waves, and the landing of the brave adventurers on the shores of Hrothgar's dominions, is finely told. After some parley with the coast-guards, an interview takes place between the monarch and the hero, who almost pleads to be allowed to deliver the land from the ravages of Grendel. Most tender and pathetic is the passage in which he asks—if fortune should be adverse to him ('if Hilda'—*i. e.* 'the goddess of slaughter'—'should take him away'), that they would not mourn over the 'solitary rover,' but plant a 'simple flower' on his cairn, and send back his 'garments of battle' to his lord and kinsman, Higelac. The inevitable feast follows, in the course of which the 'scop' sings of the peace that is to be, and B. enlarges upon his past exploits.

Then we have an exquisite picture of the Danish Queen: 'There was laughter of heroes, the noise was modulated, words were winsome; Wealtheow, Hrothgar's queen, went forth; mindful of their races, she, hung round with gold, greeted the men in the hall; and the freeborn lady gave the cup first to the prince of the East Danes; she bade him be blithe at the service of beer, dear to his people. He, the king, proud of victory, joyfully received the

feast and hall-cup. The lady of the Helmings then went round about every part of young and old; she gave treasure-vessels, until the opportunity occurred, that she, a queen hung round with rings, venerable of mood, bore forth the mead-cup to Beowulf. Wise of words, she greeted the Geat, she thanked God because her will was accomplished, that she believed in any earl, *as* a consolation against the crimes.' That night, when the shadows of darkness have fallen, Grendel comes swiftly to the palace from the misty moors, and assails Beowulf. A fierce struggle ensues, but the monster is baffled, and obliged to flee. Next day a second feast is held in honor of the hero's success, magnificent gifts are showered upon him by the grateful Hrothgar, the services of the 'scop' are again called into request, music and sports follow, and the queen once more moves through the crowd of warriors with courtesy and grace. The night, however, is not to pass without its tragedy. The mother of the monster secretly enters, and destroys one of the king's dearest thegns. B., in a magnanimous speech, undertakes to avenge him. Having sought the wild haunts of the 'hateful one,' he first slays the mother after a furious combat, in which he would have been vanquished but for the apparition of a magic sword 'over the waves,' which came into his grasp. Grendel is then destroyed, and his head carried off as a present to Hrothgar. B. then returns home, and after a variety of other but less interesting adventures, succeeds to the throne on the death of his kinsman Higelac. More recent editions than those above noted are that by Heyne (1863, 3d ed. 1873); and the admirable English one of Thomas Arnold, published with translation, notes, and appendix in 1876. Wackerbarth (1849), Thorpe (1855), and Lumsden (1881, the latter in ballad metre, have given English metrical translations. There are several German versions.

BĒPU'R, or BEYPORE, a seaport of Western India, 6 miles S. of Calicut. Its situation is very beautful. It has a considerable trade in timber, particularly teak, which is floated down the river for exportation. Iron ore is found in the neighborhood, and iron-works have recently been established here. B. is the terminus of a railway across the peninsula of India from Madras by way of Coimbatore, and will probably soon become a place of great importance. Pop. in 1871, 5858.

BEQUEA'TH, to leave personal property by will or testament to another. In the case of *real* estate, the proper term to employ is *devise*. But although it is usual and safe so to use these words, neither of them is essential to the validity of an English will, but other words, showing clearly the intention of the testator, will sullice. In the Scotch law, the term *B.* can only apply to *personal* estate. Real estate, indeed, according to the existing regulations of that system, cannot be left or conveyed by will or testament; a testamentary disposition or settlement, expressed in certain technical terms of present conveyance, being necessary for the purpose. See WILL; LEGACY; DISPOSITION (*Mortis Causâ*); SETTLEMENT; REAL; PERSONALITY.

BEQUE'ST, a legacy of personal property left by will. See BEQUEATH and its references.

BÉRANGER, JEAN PIERRE DE, a celebrated French poet, was born in Paris, 19th August 1780, in the house of his grandfather, a tailor in the Rue Montorgueil, to whose care he was left entirely by his father, a scheming and not over-scrupulous financier. After living for some time with an aunt at Péronne, to whom he appears to have been indebted for those republican principles which afterwards made him so obnoxious to successive French governments, B., at the age of fourteen, was apprenticed to a printer in that place, where he remained three years, devoting all his leisure hours to the acquirement of knowledge. He now returned to Paris, where his father, a zealous loyalist, was engaged in some questionable schemes of money-getting, which were mixed up with conspiracy. B. assisted him in his money affairs, so far as he honorably could, and kep this political secrets; but he did not disguise his contempt for the royalist cause, nor fail to express his opposite sympathies. The business, however, was not one to the taste of B., who was throughout the whole of his life a man of the most sensitive honor, and he soon left it. He had ere this begun to write, but his poems were not successful; and reduced almost to destitution, he, in 1804, enclosed some of his verses to M. Lucien Bonaparte, with a letter explaining his circumstances, and with a request for assistance—the one solitary instance of solicitation during a long life of independence, marked by the refusal of numerous offers of lucrative patronage. The appeal was not made to a deaf ear. Mr. Bonaparte obtained employment for the poet, first as editor of the *Annales du Musée*, and afterwards as a subordinate secretary in the University; a post which he held for twelve years, when the government, provoked at his satire, and alarmed at his popularity, dismissed him. Duringthe 'Hundred Days,' Napoleon offered B. the remunerative post of censor—a singular office for such a man. He refused it. But though he scorned to accept favor from, or to flatter Napoleon, at a time when it was alike fashionable and profitable to do so, he was of much too noble a nature to join in the sneers and reproaches which greeted the hero on his fall. Above the fear of power, he was incapable of taking advantage of misfortune. In 1815, B. published his first collection of songs, which soon attained a very wide popularity. In 1821, he published another collection, which was followed shortly after by some fugitive pieces, which subjected him to a government prosecution, a sentence of three months' imprisonment, and a fine of 500 francs. In 1825, a third collection, and in 1828, a fourth appeared, still more withering in its sarcasm on those in power; and the penalty of B.'s outspokenness was a fine of 10,000 francs and nine months' confinement in La Force. This fine was soon paid by the poet's friends, and his prison became the resort of the most eminent men in the kingdom, and a very armory in which he forged those keen-piercing bolts which galled so terribly, and contributed so much to the overthrow of the Bourbons. But B. refused to profit by the new state of things he had been instrumental in bringing about. Rejecting the emoluments and honor which his friends, now in power, were anxious to bestow, he retired to live in privacy at Passy.

In 1833, he published a fifth collection of songs, when he took a formal leave of the public; and from that time until the day of his death, twenty-four years after, he remained silent. In 1848 B. was elected a member of the Assemblée Constituante by more than 200,000 votes; but after taking his seat, to show his appreciation of the honor conferred on him, he almost immediately resigned. He consistently rejected all the offered favors of the late Emperor, as well as a graceful overture on the part of the Empress, which he owned it cost him much to refuse. B. died at Paris, July 17, 1857. The cost of his funeral was defrayed by the French government, and his remains were attended to the grave by the most distinguished men in all departments of literature. B. was as emphatically the poet of the French people as Burns was the bard of the Scottish peasantry. The same stanch and fearless independence, genuine manliness, sound common sense, and contempt for everything mean and hypocritical, characterized both men; and as poets, they differ in excellence only as the sentiments of the French and Scottish people differ in their capacity to be turned into song. 'Neither friend nor enemy has as yet disclosed to us any speck on the heart, the honor, the genius, or the good sense of Béranger.' Since his death, his *Last Songs*, written between 1834 and 1851, have been published, and also *My Biography* (Paris, M. Perrotin; London, Jeffs). See *My Biography; Memoirs of Béranger*, by M. Lapointe; and *Béranger et son Temps*, by Jules Janin (1866).

BERA'R, a valley situated locally in the Nizam's territories, but annexed politically to British India, for the maintenance of what is called the Nizam's Contingent. It is bounded on the N. by a detached portion of Scindia's dominions and the Nerbudda provinces; on the E., by Nagpoor; on the W., by Candeish, and on the S. by two of the Nizam's ramaining districts—Maiker Bassim and Mahur. It lies between 20° 15′ and 21° 40′ N. lat., and between 76° and 78° 2′ E. long., having an area of 16,960 sq. m. Pop. (1868) 2,231,565. It is traversed in its length by the Poornah—itself a tributary of the Taptee—which, with its numerous affluents, affords an ample supply of water to the valley, and on other grounds, is peculiarly suitable to the cultivation of cotton. The transfer in 1853 from the Nizam to the British has proved favorable to this production: about 25 per cent. of the area is devoted to cotton. In the east part there is a coal-field of 40 square miles, and at Akolah, in Purana, there are salt wells fed by a subterranean lake. Though Ellichpore is the chief town, yet it is inferior to Oomrawutti (q. v.).

BERA'T, a town of Albania, European Turkey, in the vilayet of Janina, situated on the banks of the Usumi, about 30 m. N.E. of the seaport of Avlona. Population, 8000 to 10,000 two-thirds of whom are Greeks; the remainder Turks. The valley in which B. stands is very fertile, producing large quantities of grain, oil, and wine. B. has a citadel, and traces of ancient Greek buildings, and gives title to a Greek archbishop.

BE'RBERA, a seaport station of Somali, Eastern Africa, with a good harbor, on a bay of the Gulf of Aden. Lat. 10° 26′ N., long. 45° 8′ E. It is celebrated as the scene of a large annual fair, which brings nearly 20,000 people together from all quarters in the East. Coffee, grains, ghee, gold-dust, ivory, gums, cattle, ostrich-feathers, slaves, &c., are brought down to this place from the interior on strings of camels, sometimes numbering as many as 2000, and exchanged for cotton, rice, iron, Indian piece-goods, &c. As soon as the fair—which usually extends from November to April—is over, the huts are carefully taken down, and packed up, and nothing remains to mark the site of the town but the bones of animals slaughtered for food during the continuance of the fair.

BERBERI'DEÆ, or BERBERIDA'CEÆ, a natural order of exogenous plants, of which the different species of Barberry (q. v.) afford the best known examples. Many of the plants of this order are spiny shrubs; some are perennial herbaceous plants.

Their leaves are alternate, their flowers sometimes solitary, sometimes in racemes or panicles. The calyx consists of 3, 4, or 6 deciduous sepals; the corolla, which arises from beneath the germen, consists of petals equal in number to the sepals, and opposite to them, or twice as many; the stamens are equal in number to the petals, and opposite to them; the anthers are 2-celled, each cell opening curiously by a valve which curves back from bottom to top; the carpel is solitary and 1-celled; the fruit is either a berry or a capsule. This order, which is nearly allied to *Vitaceæ* (q. v.), (Vines, &c.), contains more than 100 known species, chiefly belonging to the temperate parts of the northern hemisphere, and of South America.

BE'RBERS, the general name usually given to the tribes inhabiting the mountainous regions of Barbary and the northern portions of the Great Desert. It is derived, according to Barth, either from the name of their supposed ancestor, *Ber*, which we recognize in the Lat. *A-fer*, an African (see letter B); or from the Greek and Roman term *Barbari*. The name by which they call themselves, and which was known to the Greeks and Romans, is Amázigh, or Mazigh, Mazys, Amoshagh, Imoshagh, &c., according to locality, and whether singular or plural. These tribes have a common origin, and are the descendants of the aboriginal inhabitants of Northern Africa. They appear to have been originally a branch of the Semitic stock; and although they have been conquered in succession by the Phœnicians, Romans, Vandals, and Arabs, and have become, in consequence, to some extent, a mixed race, they still retain, in great part, their distinctive peculiarities. Till the eleventh century, the B. seem to have formed the larger portion of the population inhabiting the southern coast of the Mediterranean, from Egypt to the Atlantic Ocean; but, on the great Arab immigrations which then took place, they were driven to the Atlas Mountains, and to the desert regions where they now live.

In Tripoli, the allegiance they pay to the Turks is little more than nominal; in Algeria, where they usually are termed Kabyles, they are yet unconquered by the French; and in Morocco, where they are called 'Shellooh,' they are only in form subject to the emperor. The B. occupying the desert, who are called Tuaric, or Tawarek, by the Arabs, have become much mixed with the negro race. The number of the B. is estimated at between three and four millions. They are of middle stature, sparely but strongly built. The complexion varies from a red to a yellow brown, and the shape of the head and of the features has more of the European than the oriental type. The hair is, in general, dark, and the beard small. The eyes are dark and piercing. Their manners are austere, and in disposition they are cruel, suspicious, and implacable. They are usually at war either with their neighbors or among themselves; are impatient of restraint; and possessed of a rude, wild spirit of independence, which makes it impossible for them to unite for any common purpose, or to make the advances in civilization which one might otherwise expect from their high physical organization. They live in clay-huts and tents; but in their larger villages, they have stone-houses. They have herds of sheep and cattle, and practise agriculture, and are especially fond of the cultivation of fruit-trees. They possess water-mills and oil-presses. The mines of iron and lead in the Atlas are wrought by them, and they manufacture rude agricultural implements, as well as swords, guns, and gunpowder. They formerly professed the Christian religion; but since the Arabs drove them from the fertile plains between the mountains and the sea, they appear to have retrograded in every way, and they are now among the most bigoted adherents of the religion of Mohammed; although their former creed has left a few traces, as in the names *Mesi* for God, and *angelus* for angel, and many curious customs still observed among them. See Barth's *Africa*, vol. i.

BERBI'CE, the eastern division of British Guiana, is bounded W. by Demerara; N. by the Atlantic; E. by Dutch Guiana or Surinam; and S. by the basin of the Amazon, or rather, perhaps, the upper waters of the Surinam and Corentyn. In 1796, Berbice, Demerara, and Essequibo were surrendered to the British under Major-General Whyte, but were soon after restored to the Dutch at the peace of Amiens, and recaptured in 1803. B. stretches in long. between 55° 40′—57° 20′ W., and in lat. southward from 6° 30′ N. It is subdivided into six parishes, four of which belong ecclesiastically to the Scotch National Church, and two to the Episcopalian. Pop. about 32,000, of whom nearly 4000 are white and of mixed race. The principal products are sugar, coffee, cocoa, and tropic fruits. Cotton has all but ceased to be grown. The forests abound with splendid timber trees, including the mora, bullet-tree, and cedar. The Berbice River, though not the largest in British Guiana, is navigable to the greatest distance from the sea. The Essequibo discharges a greater volume of water, but is interrupted by rapids within 50 miles of the coast, while the Berbice admits a draught of 12 feet for 100 miles, and one of 7 feet for 60 more, the influence of the tide reaching nearly the whole way. Even as far as lat. 3° 55′ N., 175 miles in a straight line from its outlet, it has been found to have a width of 100 feet, with a depth of from 8 to 10. An important affluent is the Canje, on the banks of which a number of the most important plantations are situated. New Amsterdam, on the right bank of the Berbice river (pop. 7000), is the chief town and port of the district.

BERCE'TO, a town of Italy, in the province and 25 miles southwest from the city of Parma, beautifully situated amongst the Apennines. It is a clean, well-built town. The church is an old Gothic building. The mountains rise rapidly to the west of B., and some of the scenery which they present is very wild and desolate.

BE'RCHTA (in Old German, Peracta, and the original form of the name Bertha, being from the same root as the English name *bright*, and meaning 'shining,' 'white') is, in German mythology, the name given in the south of Germany and in Switzerland to a spiritual being, who was apparently the same as the Hulda (gracious, benign) of Northern Germany. This being represented origionally one of the kindly and benign aspects of the unseen powers; and so the traditions of Hulda (q. v.) in the north continued to represent her. But the B. of the south, in the course of time, became rather an object of terror, and a bugbear to frighten children; the difference probably arising from the circumstance, that the influence of Christianity in converting the pagan deities into demons was sooner felt in the south than in the north. Lady B. has the oversight of spinners. The last day of the year is sacred to her, and if she find any flax left on the distaff that day, she spoils it. Her festival is kept with a prescribed kind of meagre fare—oatmeal-gruel, or pottage, and fish. If she catches any persons eating other food on that day, she cuts them up, fills their paunch with chopped straw and other such agreeable stuffing, and then sews up the wound with a ploughshare for a needle, and an iron chain for a thread. In some places, she is the queen of the crickets. She is represented as having a long iron nose and an immensely large foot. That she was once an object of worship, is testified by the numerous springs, &c., that bear her name in Salzburg and elsewhere. It is likely that many of the Sagas of B. were transferred to the famous Berthas (q. v.) of history and fable. The numerous stories of the 'White Lady' who appears in noble houses at night, rocks and nurses the children while the nurses are asleep, and acts as the guardian angel of the race, have doubtless their root in the ancient heathen goddess Berchta.

BE'RCHTESGADEN, a village of Bavaria, charmingly situated on a mountain slope, about 15 m. S. of Salzburg. Pop. (1880) 1780. It has a royal hunting-lodge, but the place is most remarkable for its government salt-mines, from which 150,000 cwt. of rock-salt is annually obtained. During the residence of the court, the mine is sometimes illuminated, and its chambers are then seen to great advantage.

BERCY, a town of France, in the department of the Seine, situated on the right bank of the river of the same name. B. forms a suburb of Paris, and its population is reckoned as a portion of that of the capital. It has a large business in wines and other liquors.

BERDIA'NSK, a well-built seaport town of Southern Russia, government of Taurida, on the northern coast of the Sea of Azov. B. has the finest roads in the Sea of Azov, and is a place of commercial activity, being the entrepot for the products of surrounding governments. It trades in fish, wood, hides, tallow, grain, coal, and salt; there are extensive coal-mines and salt-lakes in its vicinity. Pop. (1880) 20,850. In 1855, during the Crimean campaign, Captain Lyons destroyed government property to a large amount, but the town was spared.

BERDITCHE'V, a town of Russia, in the government of Kiev, famous for its five annual fairs. At these, cattle, corn, wine, honey, leather, &c., are disposed of. The average annual value of the sales is £600,000. Pop. (1880) 52,500, chiefly Jews.

BERE'ANS, an almost extinct sect of Christians, who originated in Scotland in the 18th c. Their name is derived from the circumstance that the inhabitants of Berea 'received the word with all readiness of mind, and searched the Scriptures daily.'—Acts xvii. 11. The founder of the B. was the Rev. John Barclay, a native of Perthshire, b. 1734, d. 1798. From him they also received the name of Barclayans. They believe that the knowledge of God's existence and character is derived from the Bible alone, and not from reason or nature; that the Psalms of David do not relate to David at all, but exclusively to Christ; that assurance is of the essence of faith; and that unbelief is the unpardonable sin. In the ordinary points of doctrine, they are Calvinistic.

BE'RENGAR I., king of Italy, was the son of Eberhard, Duke of Friuli, and of Gisela, the daughter of the Emperor Louis the Pious. He and Guido, Duke of Spoleto, were the two most powerful and ambitious nobles in Italy at the close of the 9th c. After the deposition of Charles the Fat in 887, B., Guido, and Adalbert, Count of Tuscany, became candidates for the Carlovingian throne. B. was crowned king of Italy at Pavia in 888, while

Guido attempted to secure the realm of France. The former soon irritated the nobles against him by condescending to hold his territory in fief from Arnulf, king of Germany, against whom he found it vain to maintain his independence; and when Guido returned from his unsuccessful expedition to France, he was pursuaded to put himself in opposition to B., and was chosen king of Italy. With the help of Arnulf, however, B. ultimately prevailed. After the death of Guido in 894, his son Lambert compelled B. to share with him the sovereignty of North Italy; but, on the assassination of Lambert in 898, B. contrived to obtain possession of the whole of Lombardy. His influence quickly sank. He could check neither the plundering incursions of the Hungarians across the Alps in the north, nor those of the Arabs, who laid waste the shores of the south. The nobles now called in Louis, king of Lower Burgundy, who was crowned at Rome in 901; but he proved no better, and was finally overpowered by Berengar. In 915, B. was crowned emperor by Pope John X.; but the nobles, who appear to have kept themselves during his reign in a state of chronic disaffection, again revolted, and, in 919, placed themselves under the banner of Rodolf of Burgundy, who completely overthrew B. on the 29th July 923. The latter, in his extremity, called in the Hungarians to his aid, which unpatriotic act alienated the minds of all Italians from him, and cost him his life, for he was assassinated in the following year, 924.

BE'RENGAR, II., the son of Adalbert, Count of Ivrea, and grandson of Berengar I., succeeded to his father's possessions in 925, and married Willa, niece of Hugo, king of Italy, in 934. Incited by his ambitious and unscrupulous wife, he conspired against Hugo, and in consequence was compelled to flee to Germany, where he was received in a friendly manner by the Emperor Otto I. In 945, he recrossed the Alps at the head of an army. The nobles and the towns-people both welcomed him; but, instead of assuming the crown himself, he handed it over to the weak Lothaire, the son of Hugo. On the death of Lothaire, who was probably poisoned by Willa, B. allowed himself to be crowned along with his son Adalbert, in 950. To establish himself firmly in his new position, he wanted Adelheid, the youthful widow of Lothaire, to marry his son. She refused, and was subjected to a most cruel imprisonment, but ultimately found a helper and husband in the Emperor Otto himself, who, at the imperial diet at Augsburg in 952, compelled B. to acknowledge Italy to be a fief of the German empire. B. soon after engaged in war with the emperor, who sent his son Ludolf against him. Ludolf was successful, but died in 957, of poison administered, as was believed, by Willa. B. again mounted the throne, but behaved with such intolerable tyranny that his subjects and Pope John XII. called in the aid of the emperor, who marched into Italy in 961, and took possession of the country. B. took refuge in a mountain-fortress, where he held out till 964, when hunger compelled him to capitulate. He was sent as a prisoner to Bamberg, in Bavaria, where he died in 966. His wife, Willa, retired into a convent, and his three sons died in exile.

BERENGA'RIUS OF TOURS, a distinguished scholastic theologian, was born at Tours, in France, 998 A.D. His master, Fulbert de Chartres, is reported to have prophesied on his death-bed that B. would prove a dangerous man. In 1030, he was appointed preceptor of the school of St. Martin, in Tours, and in 1040, made Archdeacon of Angers. Here he continued to deliver his metaphysico-theological prelections, and drew upon himself the charge of heresy, in reference to the doctrine of transubstantiation. He held the doctrine of Scotus Erigena, that the bread and wine in the sacrament of the eucharist remained bread and wine, and that the faith of the believer who recognized their symbolic meaning only transformed them subjectively into the body and blood of Christ. This interpretration was condemned by Pope Leo IX., 1049—1050 and also by King Henry I. of France. In 1054, he retracted his opinion before the Council of Tours, but what B. meant by 'retraction' is not easy to see, for he immediately returned to his conviction, and recommenced the advocacy of it. For this he was cited to appear at Rome, where he repeatedly abjured his 'error,' but never seems to have really abandoned it. Hildebrand, who was then the pope, treated him with great moderation; and at last, when he discovered how hopeless it was to bind down B. by abjurations or declarations, he conceived it best to let him alone. Harassed and weakened by the attacks of the orthodox party, headed by Lanfranc of Canterbury, he finally retired to the isle of St. Cosmas, near Tours, in 1080, where he spent the last years of his life in devotional exercises. He died in 1088. The greater number of his works are lost; such as are extant have been collected and published by the Vischers (Berlin, 1834).

BERENI'CÉ, the name of several celebrated women of ancient times.—1. B., daughter of Lagus and Antigone, and the second wife of the Egyptian king, Ptolemy I. (Soter), (323—284 B.C.). She is described by Plutarch as the first in virtue and wisdom of the wives of Ptolemy. Theocritus celebrates her beauty, virtue, and deification in his *Idyls* 15 and 17.—2. B., daughter of Ptolemy II. (Philadelphus) and Arsinoë, was married to Antiochus II. of Syria, after he had divorced his wife Laodice, whom, however, he again took back, putting B. away. Laodice having no faith in her husband, poisoned him, and caused B. and her son to be murdered.—3. B., daughter of Magas, king of Cyrene, granddaughter of B. No. 1, was to have been married to Demetrius the Fair, but he having slighted her for her mother, she caused him to be murdered, and then went to Egypt and married Ptolemy III. (Euergetes), in accordance with the terms of a treaty between her father and Ptolemy II. During the king's wars in Asia, the queen B. made a vow to offer her beautiful hair to the gods when her husband returned safely—a vow which she fulfilled. The hair was suspended in the temple of Venus, whence, it is said, it was taken away to form a constellation, *Coma Berenicæ*. B. was put to death by her son Ptolemy IV. (Philopator), when he succeeded to the throne.—4. B., also called Cleopatra, daughter of Ptolemy IX. (Lathyrus), was, on her succession to the throne, married to Alexander II., by whom she was murdered 19 days after marriage.—5. B., daughter of Ptolemy XI. (Auletes), eldest sister of the renowned Cleopatra, was raised to the throne after her father's deposition, 58 B.C., but was put to death when her father was restored, 55 B.C. She was first married to Seleucus, whom she caused to be put to death, and afterwards to Archelaus, who was put to death with her.—There were, besides, two Jewish Berenices—the one, daughter of Salome, sister of Herod the Great and Costobarus, and mother of Agrippa I.; the other, and more famous, was daughter of this monarch. She was three times married: first, at a very early age, to Marcus, son of Alexander the Alabarch; afterwards to her uncle, Herod, king of Chalcis, who dying, left her for a second time a widow, at the age of 20; and again to Polemon, king of Cilicia, whom she soon deserted to return to her brother, King Agrippa II., the same before whom Paul defended himself at Cæsarea. After the capture of Jerusalem, she went to Rome, and Titus, who was much in love with her, would have married her but for the opposition of the people. The intimacy of B. and Titus forms the subject of a tragedy by Racine.

BERENI'CÉ (modern name, Sakáyt - el - Kublee, 'Southern Sakáyt'), a town of Egypt, on a bay in the Red Sea, 20 miles south-west of Ras Bernass. It was founded by Ptolemy Philadelphus, and was in ancient times the emporium of the trade with India, but it is now ruined, and interesting only for its antiquities, which include hieroglyphics, sculptures, and a temple dedicated to Serapis. There are emerald mines in its vicinity that have been worked since the time of the ancient Egyptians.

BERESFORD, WILLIAM CARR, VISCOUNT, a distinguished military commander, natural son of the first Marquis of Waterford, was born 2d October 1768, and entered the army 1785. After serving in various parts of the world, he bore a conspicuous part in the reconquest of the Cape of Good Hope in 1806, and subsequently, with the rank of brigadier-general, was with the British force that took possession of Buenos Ayres. In August 1808, he joined the British army in Portugal, and proceeded into Spain with Sir John Moore's force; was present at the battle of Corunna; and, after covering the embarkation of the troops, returned with them to England. In February 1809, Major-general B. was ordered a second time to Portugal, to take the command of the Portuguese army, with the local rank of lieutenant-general; and he succeeded in improving its discipline so greatly, as soon to render it highly efficient for active service. Appointed Marshal of Portugal in March, at the head of 12,000 men, he attacked the French in the north of that kingdom, crossed the river Douro, drove Loison's division back to Amarante, and uniting with the force under Sir Arthur Wellesley, pursued it in its retreat till it was utterly disorganized. For his services at the battle of Busaco, 27th August 1810, B. was nominated a Knight of the Bath. He commanded at the bloody battle of Albuera, May 16, 1811; and for the victory there gained over Soult, he received the thanks of parliament. He was present at Badajoz; at Salamanca, where he was severely wounded; at the various battles on the Pyrenees; at Nivelle, where he led the right of the center; at Nive; and at Orthez. He was in command of the British troops which took possession of Bordeaux, and subsequently distinguished himself at he battle of Toulouse. In May 1814, he was created Baron, and in 1823 Viscount of Beresford. By the Portuguese government, he was sent, in 1814, to Rio Janeiro, to suppress a formidable revolt there. In the Wellington administration, January 1828 to November 1830, he was Master-general of the Ordnance. He bore the title of Marquis of Campo Mayor and Duke of Elvas in Spain, Conde de Francoso in Portugal, and was knight of several foreign orders. He died, without issue, 8th January 1854, when the title became extinct.

BERESI'NA, or BEREZI'NA, a river of Russia, having its rise in the north of the government of Minsk. It flows in a southward direction for about 240 miles to the Dnieper, which it joins above Redchitzka. It is connected with the Düna, or Dwina, by a canal,

a communication between the Black and Baltic Seas being thus established. The B. is memorable on account of the disastrous passage of the French army, November 1812, during the retreat from Moscow. Two bridges over the B.—one for troops, the other for baggage and artillery—were hastily constructed. Many of the *pontoniers* died from the hardships endured in making these bridges. On the 27th, the passage of the French commenced, and was continued during the whole of the day. Victor's rear-guard of 7000 men, under Partonneaux, were, however, intercepted by the Russians, and had to capitulate. On the 28th, a vigorous attack was made by the Russians on the French on both sides of the river, but too late to prevent the latter securing the road to Zembin. The Russians, however, established a battery of twelve pieces to command the bridge; and the panic and confusion of their enemies now became dreadful. The artillery bridge broke, and all rushing to the other, it was soon choked; multitudes were forced into the stream, while the Russian cannon played on the struggling mass. On the 29th, a considerable number of sick and wounded soldiers, women, children, and sutlers, still remained behind, despite the warnings of Marshal Victor and General Eblé, until preparations were made for burning the bridges. Then a fearful rush took place; and as the fire seized the timbers, men, women, and children threw themselves in desperation into the flames or the river. 12,000 dead bodies found on the shores of the river, when the ice thawed, attested the magnitude of the French disaster. The Russians took 16,000 prisoners and 25 pieces of cannon.

BERE'TTYO-UJFALU', a market-town of Hungary, county Bihar, with a pop. (1880) of 6122.

BERE'ZNA, a town of Russia, in the government of Tchernigov, on the Desna. Pop. (1880) 9790.

BEREZO'V, or BERESO'FF ('the town of birch-trees'), a town of Siberia in the government of Tobolsk, on the left bank of the Sosva, a branch of the Obi, in lat. 63° 30' N. It is a small place, but important as the sole fur and skin trading station in a vast extent of country. Its annual fair is largely attended. It is the favorite residence of the Ostiaks and Voguls. Prince Menschikoff, the favorite of Peter the Great, who was banished to B , died and was buried here in 1731. His grave was opened 90 years afterwards, when his body, clothed in the uniform of the time, was found as free from decay as on the day it was buried, the frost, which at B. penetrates the soil to the depth of several feet, having preserved it. Pop. (1880) 1659.

BERG, BURG, BURGH, roots entering into the composition of many names of places. *Berg* (Ger.), *Beorg* (Ang.-Sax.), means 'hill,' 'mountain;' and *Burg*, or *Burgh*, means 'fort,' 'castle,' 'citadel,' probably from being situated on a hill or eminence. See BOROUGH, BURGH.

BERG, formerly a duchy of Germany, now incorporated with the Prussian dominions, and divided into the circles of Düsseldorf, Solingen, Elberfeld, Lennep, and Duisburg. After various vicissitudes, B. had merged in the electorate of Bavaria. In 1806, Bavaria ceded it to France; and Napoleon the same year adding to it large adjoining territories, made its area about 6700 square miles, and erected it into a grand duchy, constituting his brother-in-law, Murat, sovereign. Two years afterwards, Murat, being transferred to the throne of Naples, Napoleon's nephew, then Crown Prince of Holland, was made grand duke. The peace of 1815 gave B. to Prussia.

BE'RGA, a town of Catalonia, Spain, situated near the river Lobregat, 52 miles north-north-west from Barcelona. Its streets are paved, but mostly narrow and crooked. It has five squares, three churches, several convents, a hospital, schools, &c. It is overlooked and defended by a castle with a strong battery. Pop. 5000, mostly employed in husbandry and as muleteers; the produce of the fields, vineyards, and olive-yards of the neighborhood giving rise to a considerable trade. Cotton fabrics are also manufactured in B., and this branch of industry is on the increase.

BERGAMA (ancient *Pergamos*), a city of Asiatic Turkey, vilayet of Khodavendikhiar, situated in a beautiful and fertile valley, on the right bank of the Caicus, about 40 miles N.N.E. of Smyrna. Lat. 39° 4' N., and long. 27° 12' E. In early times, the city was the capital of the kingdom of Pergamus (q. v.). Many ruins still exist to attest the former magnificence of Bergama. The present population of B. is about 15,000, four-fifths of whom are Turks.

BE'RGAMO (the ancient *Bergomum*), a fortified town of Lombardy, situated on some low hills between the Serio and the Brembo, about 29 miles north-east of Milan, in lat. 45° 42' N., and 9° 37' E. B. consists of two parts—the upper city, wherein the nobility, an exclusive class, reside; and the Borgo, a suburb where business is transacted. Pop. (1881) 39,704. B. is well built, has a castle occupying the most elevated part of the town, and a cathedral. Silk, cotton, linen, woollen fabrics, and iron goods are manufactured. It has also an extensive trade in grindstones, quarried in the vicinity. Annually, in the month of August, the largest fair in Northern Italy is held here, at which money to the estimated amount of £1,200,000 is turned over. Under the Roman empire, B. became a municipal town of importance. It was destroyed by Attila, 452 A. D.; and after the fall of the Roman empire, it became one of the chief towns of the Lombard kings in this part of Italy, and capital of a duchy. After numerous changes, its inhabitants placed themselves under the protection of the Venetian Republic in 1427, and formed an integral portion thereof (with one exception of 9 years) until the subversion of the republic by Napoleon in 1797. Bernardo Tasso, the father of Torquato, and Tiraboschi, author of *The History of Italian Literature*, were natives of Bergamo. B. is the capital of the province of the same name, which has an area of 1015 square miles, a pop. (1881) of 391,580, and good pasturage for sheep and goats; iron, marble, lignite, and whetstones, are also found.

BE'RGAMOT is the name of various kinds of pear, to which, however, no common distinctive character can be assigned. The name is used both in Britain and upon the continent of Europe. The proper B. pear is probably the *B. Crasanne*, a flattish, rough-skinned pear with a long stalk. It has a very juicy pulp, as soft as butter, of an extremely pleasant flavor, and is esteemed as one of the best dessert pears. Metzger, in his work on the pomaceous fruits (*Kernobstsorten*) of the south of Germany (Frankfort, 1847), describes no fewer than 47 kinds of pears, which all bear the name of B., although some of them differ very widely from each other.

BE'RGAMOT is also the name of a species or variety of the genus *Citrus* (q. v.), also called the B. ORANGE, or MELLAROSA; by some botanists regarded as a variety of the orange (*C. Aurantium*); by others, as a variety of the lime (*C. Limetta*); and elevated by Risso to the rank of a distinct species, under the name of *C. Bergamia*. Of its native country or origin, nothing can be told, except that it was probably derived, like its congeners, from the East. It is now cultivated in the south of Europe; and from the rind of its fruit, the well-known OIL OF B. is obtained, which is extensively used in making pomades, fragrant essences, eau de Cologne, liqueurs, &c. The fruit is pear-shaped, smooth, of a pale-yellow color, and has a green, subacid, firm, and fragrant pulp. The essential oil is obtained by distillation, or by grating down the rinds, and then subjecting them to pressure, which is the better method. The oil is also obtained from other varieties or species of the same genus. It is of a pale-yellow color, or almost colorless. One hundred B. oranges are said to yield about 2½ ounces of oil. Oil of B. is frequently employed for diluting or adulterating the very expensive blue volatile oil of chamomile (q. v.).

BE'RGEDORF, a town of Germany, 10 miles east-south-east from Hamburg. When Lübeck joined the Zollverein in 1868, it resigned to Hamburg, on payment of 200,000 thalers, its share in the government of B., and its small territory. Pop. of the town of B. (1880) 4303. Part of the territory is known by the name of the Four Lands (*Vierländer*). It is inhabited by a well-conditioned and industrious population, much occupied in the cultivation of fruit and vegetables, not only for the market of Hamburg, but for that of London. Peach and apricot orchards, and fields of strawberries, extend over great part of the district. Cattle-husbandry is also carried on, and much attention is devoted to the rearing of poultry. The people of the Four Lands are distinguished from their neighbors by peculiarity of dress, and even each of the four small communities from which the name has been derived has some distinguishing peculiarity of its own.

BE'RGEN, a seaport town of Norway, in the province of the same name, situated on a promontory at the head of a deep bay, called Vaagen. Lat. 60° 24' N., long. 5° 18' E. With the exception of the north-east side, where lofty mountains enclose it, B. is surrounded by water. It is walled, and additionally protected by several forts, mounting in all upwards of 100 guns. The entrance to the harbor is dangerous without a pilot; but within, it is safe and commodious. B. is built in a semicircular form round the harbor, and has a picturesque appearance from the sea. A close inspection discovers it to be generally well and substantially built, but many of the streets are crooked and narrow. It has a cathedral, various churches, hospitals, refuges for the poor, public libraries, &c.; is the seat of a secondary judicial tribunal of one of the three national treasuries, the diocese of a bishop, and the station of a naval squadron. Its chief manufactures are tobacco, porcelain, and cordage. It has numerous distilleries, and some ship-building yards. The principal trade of B., however, is its export of stock-fish (dried fish of the cod family) and cod-liver oil, which it obtains from the northern provinces. Twice a year, the Norlandmen come to B. with their fish, receiving in exchange for them such articles of necessity or luxury as they require. In March and April, as many as 600 or 700 vessels are to be seen in the harbor of B. at once, laden with the produce of the winter-fishing, and with skins and feathers. The summer-fishing is not quite so productive. The annual value of the stock-fish exported

from B. is about 2,000,000 specie dollars (£450,000). In addition, it exports about half a million barrels of herrings, and 20,000 barrels of cod-liver oil, the finest of which is used for medicinal purposes and for lamps, the coarsest for dressing leather. The chief imports are brandy, wine, corn, cotton, woollens, hemp, sugar, coffee, &c. The climate of B. is exceedingly humid, but not unhealthy. B. was founded in 1069 or 1070, by Olaf Kyrre, who made it the second city in his kingdom, and it was soon raised to the first rank. In 1135, King Magnus had his eyes put out here by his rival, Harald Gille, who was himself murdered in B. a year after. In 1164, the legate of the pope crowned King Magnus Erlingson here; and here, a century afterwards, King Hakon was crowned. The black pestilence, which ravaged Norway, first made its appearance in B. in 1348, and the city has since been several times devastated by it. The first treaty entered into with any foreign nation by England, was made with B. in 1217. But the English and Scottish traders were soon displaced by the merchants of the Hanse towns, who continued to exercise and abuse their monopoly until their supremacy was broken by an act issued by Frederick II. of Denmark, in 1560; and in 1763, their last warehouse fell into the hands of a citizen of Bergen. B. was long the most important trading-town of Norway, but has been recently surpassed by Christiania. Pop. (1875) 34,384.

BE'RGEN-OP-ZOOM, a town, formerly strongly fortified, in the province of North Brabant, Netherlands, about 20 miles north of Antwerp, stands on the little river Zoom, at its entrance into the east branch of the Scheldt. Lat. 51° 29′ N., long. 4° 17′ E. The importance of its position rendered it the object of many a contest. The Netherlanders made it one of their strongholds in their struggles with Spain. The Prince of Parma besieged it in vain in 1588; three assaults by the Spaniards in 1605 also failed, as did the siege by the Marquis of Spinola, in 1622, which, after a duration of 78 days and a loss of 10,000 men, was raised on the arrival of Prince Maurice of Orange. The fortifications were afterwards strengthened by the engineer Coehorn, so as to give it the reputation of being impregnable. Yet the French, under Count Löwendal, in 1747, after a siege of two months, and the springing of 41 mines by the assailants, and 38 by the defenders, took the place by storm. In the winter of 1794, it capitulated to Pichegru. Being incorporated with France in 1810, it was blockaded by the English in 1814, who, under Sir Thomas Graham, attempted to surprise the fortress on the night of the 8th of March, with a force of 4000, but after carrying the greater part of the works, they were, through remissness in sending support, overpowered by the brave garrison, and either slain or forced to surrender. The French gave up the fortress under the Treaty of Paris. B. has manufactures of earthenwares, and a large trade in anchovies. Pop. (1880) 10,419.

BERGERAC, a town of France, in the department of Dordogne, about 25 miles south-south-west of Périgueux. It is situated in a fertile plain on the right bank of the river Dordogne, which is here crossed by a fine bridge of five arches. Its principal manufactures are paper, serges, hosiery, hats, earthenware, and iron and copper articles. It is the entrepôt of the trade of the department. The department of Dordogne is celebrated for its wine, which is called B. wine, and also *small champagne*. It is both white and red in color, and takes a high place among the Garonne and Bordeaux wines. B. was taken and fortified by the English in 1345, who, after being driven out by Louis of Anjou, again got possession of it, and retained it until 1450. B. suffered greatly in the religious wars. It was dismantled by Louis XIII. in 1621. Pop. (1876) 10,610.

BERGHAUS, Heinrich, one of the most active promoters of geographical knowledge, was born at Cleves, in Rhenish Prussia, 3d May 1797, and educated at the gymnasium of Münster. As conductor of the road and bridge corps in the department of the Lippe, then (1811) part of the French empire, and afterwards in the Prussian army, he had opportunity to advance his knowledge of geodesy. In 1816, he was made 'geographical engineer' in the war department in Berlin, and was employed on the trigonometrical survey of Prussia, and became (1824) professor of mathematics in the Architectural Academy of Berlin (a post he held till 1855), and (1836) director of the Geographical School in Potsdam. The best known of his chartographical works is his *Physical Atlas* (90 plates, Gotha, 1838—1848), which forms the basis of Johnston's work with the same title published in Edinburgh. He has been employed on an ethnographical map of Germany since 1848. As a writer, he has edited several geographical periodicals. His *Geog. Jahrbuch* (Geog. Annual), published since 1849, forms a supplement to the *Physical Atlas*. Of a more popular nature are his *Physicalische Erdbeschreibung* (Physical Description of the Earth), *Grundlinien der Staatenkunde* (Outlines of the Political Character of States), and *Ethnographie*, all of which appeared at Stuttgard between the years 1846—1850. In 1855 he published a work entitled *Was man von der Erde weiss* (What is known of Earth). In 1855—1856, appeared an *Atlas der Oesterreichischen Monarchie*, and *Landbuch der Mark Brandenburg*. In 1862 appeared his *Landbuch von Pommern*; and in 1863, *Briefwechsel Alexander von Humboldt's mit H. Berghaus*.

BERGHEM, Nicholas, one of the finest of the Dutch painters, was born at Haarlem, 1624, and studied painting first under his father, afterwards under Van Goyen, Weenix the Elder, and other masters. He soon acquired an extraordinary facility of execution; and his industry, naturally great, was stimulated by the cravings of his avaricious wife, who thought he could never earn too much. Accordingly, he scarcely ever left his studio, and we might wonder where he found all the materials for his landscapes, which now decorate the best collections of Europe; but he had carefully studied nature during his long residence at the castle of Bentheim. Warm coloring, natural and original grouping, and a general happy arrangement, are the leading features of B.'s landscapes. Strict criticism may object to some traces of lightness in execution, and may demand greater natural truth, in some points, especially the outlines of animals; but these defects are lost in the general excellence of B.'s pictures. His etchings are highly esteemed. B. died in his native place, 1683.

BERGLER, Joseph, a historical painter of considerable note, was born at Salzburg, 1753. Having studied under Martin Knoller at Milan for several years, B. went to Parma, where, in 1784, his picture of Samson being delivered by Delilah into the hands of the Philistines, obtained the chief prize of the academy there. Returning to Germany, he, in 1786, settled at Passau, where he was appointed painter to Cardinal Auersperg, prince-bishop, and in this capacity painted many fine altar-pieces. B., having been made director of the Academy of Prague in 1800, removed to that city, where he continued to reside until his death in 1829. The impetus which he gave to the fine arts in Bohemia was very marked, and his school furnished a goodly number of eminent artists. His principal works are a *Cyclus*, or series of important events drawn from the history of Bohemia, in sixty-six sheets: 'Libissa, Queen of the Fairies, deciding a Dispute between two brothers for the heritage of their Father;' 'The Deliverance of Charles IV.;' and 'Hermann and Thusnelda.'

BERGMAN, Torbern Olof, a celebrated chemist of the 18th c., was born at Katharinberg, West Gothland, Sweden, March 9, 1735. He was sent at seventeen years of age to the university of Upsala, with a view to prosecute studies qualifying him either for the church or the bar; but disliking both these professions, he devoted himself to natural history, physics, and mathematics, and soon made some interesting discoveries in entomology, while he also distinguished himself as an accurate astronomical observer. In 1767, B. was elected to the chair of chemistry at Upsala, and continued to fill it until his death, which took place at Medevi, in July, 1784. B. published a vast number of dissertations, the most important of which are collected into six octavo volumes under the title of *Opuscula Torberni Bergman Physica et Chemica* (Leip. 1779—1781). His essay on *Elective Attractions* was translated into English by Dr. Beddoes.

BE'RGMEHL, or MOUNTAIN-FLOUR, is a recent deposit of a white or cream-colored powder of extreme fineness, composed almost entirely of the indestructible silicious frustules or cell-walls of *Diatomaceæ* (q. v.). From its resemblance to flour, it has been mixed with ordinary food, in seasons of scarcity, and thus used by the inhabitants of Norway and Sweden, who suppose it to be nutritious. When subjected to a red heat, it loses from a quarter to a third of its weight, the loss consisting probably of organic matter, and this would make it in itself nutritious; but it seems to derive its chief value from its increasing the bulk of the food, and rendering the really nutritious portion more satisfying. On the other hand there have been experiments tending to show that B. does contain a very small proportion—3 or 4 per cent.—of positive nutriment.

Similar deposits occur at Dolgelly in North Wales, at South Mourne in Ireland, and in Mull and Raasay in the Hebrides. The contained organisms show that these beds have been deposited in fresh water.

BERGUES, a town of France, in the department of the Nord, about 5 miles south-south-east from Dunkirk. It is situated on the Colme, at the foot of a hill, was strongly fortified by Vauban, and has the means of laying the valley under water. The canal of B., which admits vessels of 300 tons burden, unites it with Dunkirk and the sea, and its favorable situation makes it the entrepôt of the produce of the adjoining country. It has manufactures of soap, tobacco, and earthenware, and also sugar and salt-refineries. B. was first walled and fortified by Baldwin II., Count of Flanders; and Baldwin IV. erected a splendid abbey, of which two towers only remain, in honor of St. Winnoc, who retired here in the beginning of the 10th c. Between the 13th and 16th centuries, B. suffered much from wars, and changed masters several times. Pop. (1876) 5368.

BE'RGYLT (*Sebastes Norvegicus* or *Scorpæna Norvegica*), a fish of the Mailed Cheeks (q. v.) family, or *Sclerogenidæ*—the family to which gurnards and sticklebacks belong—but so much resembling a perch in appearance, that it was formerly called *Perca marina*, or Sea-Perch. It is sometimes called the Norway Haddock, although it has no resemblance to the haddock. It is an inhabitant of all the northern seas, and is occasionally found on the British coasts at least as far south as Berwick. It is of a red color, dark on the upper parts, reddish-white beneath. Its gill-covers are armed with short spines; the anterior rays of the dorsal fin are strong spines, the posterior portion of the fin has soft rays. The B. attains a length of two feet or upwards. It is good for food, and the Greenlanders use it not only in a fresh but in a dried state. They take it by long lines and baited hooks in the deep bays of their coast.

BERHAMPO'RE, the name of two towns in British India.—1. B., in the presidency of Madras, is a military station in the district of Ganjam. It is in N. lat. 19° 20′, and E. long. 84° 50′, being 525 miles to the north-east of Madras, and 325 to the south-west of Calcutta. The cantonments, themselves on a rocky ledge, have to the south and east a plain of considerable extent, on the nearer edge of which is the native town, with a population of (1871) 21,670.—2. B., or Burhampore, in the presidency of Bengal, is in the district of Moorshedabad, being on the left bank of the Bhagirathi or Bhagruttee, which, itself the first great offset of the Ganges, afterwards joins another great offset, the Jellinghee, to form the Hoogly. B. is in N. lat. 24° 5′, and E. long. 88° 17′, being distant from Calcutta by land and water respectively 118 miles and 161. It has long been one of the principal military stations in British India. The grand square enclosing a spacious parade-ground, is particularly striking; and the quarters of the European officers form handsome ranges of brick-built and stuccoed edifices. There are here a college, hospitals, and mission churches. B. is the seat also of a civil establishment; and the houses of its chief members, erected in convenient spots in the neighborhood, give the place an air of grandeur and importance. B., though at one time extremely unhealthy, from its low and moist site on the delta of the Ganges, has yet been so much improved by sanitary measures, as to be second to no spot of Bengal in salubrity. In the spring of 1857. B. acquired an unenviable celebrity, as being the cradle of the disaffection which so speedily led to the massacre of Meerut. Pop. (1871) 27,110

BE'RI, a town of India, in the British district of Rohtuck, Punjab, in N. lat. 28° 40′, E. long. 76° 40′, 36 miles west-by-north from Delhi. Pop. (1868) 9723.

BE'RJA, a town of Spain, in the province of Andalusia, at the foot of the Sierra de Gador, about 22 miles west of Almeira. It has manufactures of linen fabrics, hats, hardware, and leather, and a trade in wine and oil. Population (1877) 15,500, who are chiefly engaged in mining lead, which is plentiful in the Sierre de Gador. Agriculture is also prosecuted to some extent.

BE'RKELEY, a small town of Gloucestershire, 15 miles south-west of the town of Gloucester, on the small river Avon, a mile and a half east of its junction with the estuary of the Severn. Pop. of borough (1871), 1161; of parish, 5690. The town lies in the fine vale of B., which is 25 miles long, and 4 broad, between the Severn on the west, and beech-covered hills on the east. This vale consists of rich meadow pasture-land, on a deep, fat loam, and is celebrated for its dairies and cheese. The latter is the far-famed 'Double Gloucester,' of which each cow yields 340 lb. a year. Near B. is the entrance to the B. and Gloucester Canal, navigable for vessels of 600 tons. Some trade exists in timber and malt. B. Castle is an embattled building on an eminence south-east of the town, and which, about 1150, was granted by Henry II. to Robert Fitzhardinge, with power to enlarge and strengthen it. Here Edward II. was murdered in 1327 by Maltravers and Gourney. In the civil wars of Charles I., the castle held out for the king, but was taken after a nine days' siege by the Parliamentarians. In the castle is preserved the cabin-furniture of Drake the navigator. Dr. Jenner, the discoverer of vaccination, was a native of B., and is buried in the parish church of St. Mary here.

BE'RKELEY SOUND, the most frequented inlet of the East Falkland Island, near its north-east extremity. It is in lat. 51° 30′ S., and long. 57° 56′ W. Though it is difficult to enter, yet it contains several excellent harbors. Its shores yield ample supplies of water, cattle, and vegetables.

BERKELEY, George, Bishop of Cloyne, and a distinguished philosopher, was the eldest son of William B., a cadet of the family of the Earl of Berkeley. He was born on the 12th March 1684, at Kilcrin, near Thomastown, county of Kilkenny, Ireland. As a boy, he studied at the school of Kilcrin, at which Swift also received his early education; and in his fifteenth year he followed his great countryman to Trinity College, Dublin, where, in 1707, he obtained a fellowship. At Trinity, he enjoyed the society of Swift, who patronized him as he did almost everybody, and who subsequently had a great deal to do in shaping his fortunes.

B.'s career as an author began in 1707 (the year in which he obtained his fellowship) by the publication of a work written three years before, at the age of twenty, entitled *Arithmetica absque Algebrâ aut Euclide Demonstrata*. This was followed, in 1709, by the celebrated essay, *Towards a New Theory of Vision*, in which he demonstrated the dependence of the perceptions of distance, magnitude, and situation on the sense of touch. This essay led to considerable controversy at the time, though its conclusions may now be considered as not admitting of doubt. In 1733, B. produced a pamphlet in vindication of it—viz., *The Theory of Vision or Visual Language, showing the Universal Presence and Providence of the Deity Vindicated and Explained*. By this time he had propounded his system of absolute idealism. His *Treatise concerning the Principles of Human Knowledge* appeared so early as 1710. Its object was to undermine the materialism of the age, by denying, on received principles of philosophy, the reality of an external world. If there is no external world, he argued, the phenomena of sense can be explained only by supposing a Deity continually necessitating perception. B. has since been laughed at by many who could not see how the premises laid in the philosophy of the day led to his system; by many he will always be laughed at as an idle dreamer; but, in point of fact, his system is a monument at once of marvellous subtlety of mind and of the most pious devotion of the intellectual powers to the cause of religion. The object was, as the full title of the book itself sets forth, to inquire into and remove the causes of scepticism, atheism, and irreligion. It is only an illustration of the truth of the old saying, that extremes meet, if, in following out this pious purpose, he prepared the way for a subtler form of scepticism (in Hume's philosophy) than the world had previously known. The reader will find valuable assistance to the apprehension of B.'s system in Sir William Hamilton's Discussions, and in his dissertations and notes to Reid's *Philosophy of the Human Mind*. It must suffice to mention here that B. was the first philosopher who proposed a scheme of absolute idealism.

In 1713, B. went to reside in London, where, in the same year, he published a defence of his ideal system, *Three Dialogues between Hylas and Philonous*. Shortly after this he was appointed chaplain and secretary of legation under Lord Peterborough, whom he accompanied to Italy. In 1721, he returned to London; and in 1724, he became Dean of Derry, with an income of £1100, and resigned his fellowship.

B. was not a man to settle in the enjoyment of leisure and opulence. The Dean of Derry set to devising schemes of usefulness, fixing at last on one by which his deanery and income were to be exchanged for exile and £100 a year. This was the Bermudas College scheme for training pastors for the colonies, and missionaries to the American Indians. Swift, failing to induce him to give the project up, made influence with ministers to support it, which they promised to do. Full of hope, B. prepared for his exile; he married in August 1728, Anna Elvert, daughter of Right Hon. John Forster, Speaker of the Irish House of Commons, and soon after sailed for Rhode Island. The support promised by government was never given to him, and after six years, he returned to England heartbroken with failure, and harassed by creditors. He had barely returned, however, when (1734) he received the bishopric of Cloyne, as a mark of favor from the queen. He was now once more in the enjoyment of leisure for literature. Soon appeared the *Minute Philosopher*, followed by various letters and pamphlets on the state of the country, and in 1749 by *A Word to the Wise*. In 1744, he gave the world his notions of the virtues of tar-water in a book entitled *Siris*. Tar-water appears to have been in his thoughts as in his system—which must have been saturated with it—from this time till his death. His last work was *Farther Thoughts on Tar-water*, published in 1752. The fact is, he was hypochondriacal for many years before his death. He died, 14th January 1753, at Oxford, whither he had gone to live with his son, who was studying at Christ Church. A genial companion, an affectionate and steady friend, he was loved by all of his contemporaries who enjoyed his society; a graceful writer, a subtle philosopher, and an active churchman, his whole life was devoted to usefulness, and ennobled by the purity of his aspirations. The best edition of his works is that of Prof. Fraser, LL.D., 1871.

BERKHA'MSTEAD, Great, or BERKHAMSTEAD ST. PETER'S, a market-town of Hertfordshire, England, situated in a deep valley, on the right bank of the small river Bulborn, on the Grand Junction Canal and the London and North-western Railway, 28 miles north-west from London. The main street is about a mile in length. The town is well built, mostly of brick. The parish church, a cruciform building in the center of the town, is chiefly in the Perpendicular style. The father of the poet Cowper was rector of B., and the poet himself was born here. The town is supposed to be of Saxon origin, and the kings of Mercia had a palace or castle here. William the Conqueror

met the nobles and prelates at B., and took an oath to rule according to the ancient laws and customs of the country. He bestowed the castle and manor of B. on his half-brother, the Earl of Moreton. The castle was rebuilt in the reign of King John. The property having reverted to the crown, was bestowed by Edward III. on his son, the Black Prince, when he created him Duke of Cornwall, and has since been held by the Princes of Wales as Dukes of Cornwall. A few massive fragments of the wall of the castle still remain, to the east of the town. A free grammar-school was founded in the reign of Edward III., and still subsists, having been lately much enlarged and enriched by the establishment of several exhibitions. A charity-school was founded under the will of Thomas Bourne in 1727. Straw-plaiting is carried on to a considerable extent in B., and a vast number of wooden articles are made, as bowls, cricket bats, hoops, toys, &c. There are extensive chemical works, and a considerable trade in timber, malt, and coals. There is a weekly corn-market. Pop. (1871) 4083.

BE'RKSHIRE, a midland county of England, bounded N. by Gloucester, Oxford, and Bucks; E. by Oxford and Bucks; S.E. by Surrey; S. by Hampshire; and W. by Wiltshire. Greatest length, 50 miles; average breadth, 15. Area, 752 square miles, nearly one-half of which is under tillage, one-fourth in pasture, and one-sixteenth in wood. B., which is one of the most beautiful of the English counties, lies in the valley of the Thames, and has an undulating surface, rising in some parts into hills. Older tertiary strata, consisting of London clay, occupy the east part of the country; cretaceous strata, the middle; and oolitic, the west. A range of chalk-hills, or downs, connected with the Chilterns, on the east, and the Marlborough Downs on the west, crosses the country into Wiltshire, from Reading to Wallingford, attaining at White Horse Hill (so called from the gigantic figure of a horse rudely defined in the chalk—a relic of ancient times) a height of 893 feet. Between this range—the west part of which is occupied by sheep-walks—and a smaller oolitic one skirting the valley of the Thames, is the Vale of White Horse, the richest part of the county, and drained by the Ock. To the south of the Downs is the fertile Vale of Kennet, drained by the river of that name, and its feeder, the Lambourn. To the east is the forest district, comprising Windsor Forest, part of Bagshot Heath, &c. The forest chiefly consists of hazel, oak, beech, ash, and alder.

The Thames skirts the whole north border of the county, winding through a course of 100 miles, but in a direct line, only 52, and navigable nearly the whole way. It is the chief river of B., the other rivers of the county being its tributaries; of which the chief are the Kennet, Leddon, and Ock. The Kennet is navigable for 30 miles. The climate of B. is very healthy, being mild in the valleys, and bracing on the highlands. The soil varies greatly: in the valleys, it is generally a fertile loam, with a subsoil of chalk, gravel, or clay. The country between the valleys of Kennet and White Horse consists chiefly of sheep-walks; and along the Thames, and to the west of the Ridge Way, or Downs, it is chiefly dairy and pasture land. The chief crops are oats and wheat. 'Double Gloucester' and 'pineapple' cheese are exported in large quantities to London. There is a superabundance of horses. Swine are extenslvely reared, especially near Faringdon, the breed being one of the best in England. Property is very much divided, and the number of gentlemen's seats and villas is very great. The farms are generally of moderate size. The county is traversed by the Great Western Railway and its branch-lines, and by two canals. B. is divided into 20 hundreds, 151 parishes, and 12 poor-law unions. It returns 8 members to parliament, 3 for the county, 2 for Reading (the county town), and 1 each for Windsor, Wallingford, and Abingdon. Besides these towns, there are the municipal boroughs of Newbury (the scene of two severe conflicts in the civil war) and Maidenhead, and the market-towns of Faringdon, Hungerford, Wantage, Wokingham, East Ilsley, and Lambourn. The population of B. in 1871 was 196,475 (97,078 males and 99,397 females), showing an increase of 20,219 since 1861, when the population was 176,256; at the census of 1881 the population had increased to 218,382. The county has no manufactures of any importance. The British and Roman remains are numerous, including Roman roads, and many camps and barrows. Of the old castles, the principal relic is Windsor (q. v.); of monastic establishments, the abbeys of Abingdon and Reading. The churches are small, and from the scarcity of building-stone, are often constructed of chalk and flint. There are many Norman churches, erected in the 12th and 13th centuries.

BERLE'NGAS, a group of rocky islands in the Atlantic Ocean, off the west coast of the Portuguese province of Estremadura, and 10 miles north-west of Peniche. The principal one, named Berlenga, is fortified, and has been used as a state-prison.

BERLICHINGEN, GOETZ or GOTTFRIED VON, 'of the Iron Hand,' a German knight of the 16th c., may, with Ulrich von Hutten, be considered as the last worthy representative of the chivalry of the middle ages, then expiring. He was born at Jaxthausen, in Würtemberg, in the ancestral castle of his family, which may be traced back into the 10th c. His education was conducted by his uncle Kuno, with whom he attended the diet of Worms in 1495. He gratified his passion for war at first by taking part in several of the quarrels between German princes, and at the siege of Landshut lost his right hand, which was replaced by one of iron, yet shown at Jaxthausen. When the general peace of the country had been established under Maximilian I., Goetz retired to his castle. But a restless spirit, and the general turbulence of the time, involved him in continual feuds with the neighboring barons and free cities, in which he displayed a mixture of lawless daring and chivalrous magnanimity. Having joined Duke Ulrich of Würtemberg against the Swabian league, on the duke's expulsion, he was taken prisoner, and had to pay a ransom of 2000 florins. In the Peasants' War of 1525, he took part with the insurgents, and was chosen leader of a part of their forces. In his narrative, he ascribes this step to compulsion; more likely it was his own restless and turbulent spirit, and a desire for revenge on his old enemies of the Swabian league. On the unfortunate issue of the war, he at first made his escape, but was afterwards fallen upon unawares by a band of leaguers, who extorted an oath that he would appear before the league when summoned. Accordingly, he had to appear at Augsburg, where he was kept in arrest for several years, and at last sentenced to perpetual imprisonment in his own castle, and, in case of his breaking this condition, to a fine of 20,000 florins. He passed eleven years in this state, and was only pardoned on the dissolution of the league. He died July 23, 1562, after having still taken part in campaigns in Hungary and in France. He wrote an account of his own life, published by Pistorius (Nürn. 1731; Bresl. 1813), which furnishes an excellent picture of the social life and manners of the period, and on which Goethe grounded his drama of *Goetz von B.*, translated by Sir Walter Scott.

BERLI'N, the capital of Prussia, and seat of the imperial government of Germany, one of the finest and most important cities of Europe, is situated on the Spree, in lat. 52° 30′ N., long. 13° 24′ E. The city is built upon a flat sandy plain, which, though cultivated, is far from being fertile. The Spree, at this place about 200 feet wide, with a current so sluggish as scarcely to be perceptible, divides the city into two nearly equal parts, and communicates with the Oder and the Baltic by canals. A more unlikely site, in some respects, could hardly have been selected for a city, as, from its flatness, and the sandy character of the soil, much inconvenience results to the inhabitants: in summer, the heat reflected from the sand is very intense, and clouds of dust rise continually; while in winter, the cold is equally great. There being little or no declivity, water stagnates in the streets, producing effects which can easily be imagined. In the Friedrich's-strasse, about 2 miles long, there is not a foot of descent from one end to the other. Notwithstanding these natural disadvantages, however, the advance of the city, especially in late years, has been extraordinary. In 1861, the city covered an area of 14,000 acres, and in 1871 of 24,000 acres. In 1858, the pop. was 455,000; in 1871, it was 825,389 (including 21,000 soldiers); in 1880, 1,122,360. Although, as far back as the 13th century, the central part of the present city was inhabited, B. was long little more than a fishing-village; it was not till the great elector, Frederick-William (1640—1688) had united the separate duchies of which Prussia is now formed, that B. became of consequence as the most central town, and the capital of a large state. His successor, Frederick I., the first king of Prussia, followed the footsteps of his predecessor in enlarging and beautifying the capital; and at the close of his reign, in the end of the 17th century, the population numbered about 50,000. In the next century, it received accessions of French and Bohemian colonists, driven into exile by religious persecutions. Every inducement was then held out to bring foreigners to settle in the rising city. Under Frederick the Great, B. continued to prosper. At his death, the inhabitants numbered 145,000. After the peace of 1815, B. increased with extraordinary rapidity, and, being the seat of government, a focus of the arts and sciences, and a great center of commercial enterprise, it has gradually risen to a position which fairly entitles it to its present rank as the metropolis of the German empire.

The center of the city is now devoted almost exclusively to commerce, and round this part, extending considerably beyond the city boundaries, are congregated the residences of the citizens. Small towns and villages are gradually being incorporated with the great city; Moabit has already disappeared as a separate community, and Charlottenburg, a town of 18,000 inhabitants, is likely soon to follow. B. consists of ten different quarters and six suburbs, containing about 480 streets, 58 squares, 700 public buildings (including 60 churches), and 15,000 private houses (comprising 169,000 dwellings or suites of apartments). The houses are built of brick, plastered or stuccoed outside, and they soon acquire a faded appearance. The style of these has very much altered since 1864. Prior to that, the greater portion of the houses were of one, two, or three stories, but these are fast giving way to

houses of four, five, and more stories, the larger ones predominating. The increase in the value of house-property has been enormous, and the result is that great numbers of the people are driven to take up their abode in cellars underground. About one tenth of the population live in these cellars, huddled together in a manner that proves deleterious alike to their moral and their physical well-being. B. possesses a large number of very fine buildings. Of these may be mentioned the Royal Palace, the Emperor's Palace, and that of the crown prince; the Royal Library, which contains upwards of 700,000 volumes and 15,000 MSS.; the museums, the Arsenal, and the Guard-house. Most of those named are situated in the street 'Unter den Linden' (so called from its double avenue of limes), one of the finest and most spacious streets in Europe. The city is further adorned throughout with numerous statues of military heroes, the equestrian statue of Frederick the Great, by Rauch, being the most remarkable. In regard to educational institutions, B. occupies a high position; in 1873, there were ten gymnasia, with 5333 scholars, fifty-four arts and higher schools, ninety-one public and ninety-six private middle and elementary schools, making in all 251 schools in the city. In addition to these, there were in the same year fifty-nine Kinder-garten (infant-schools). The university, established in 1810, possesses a very high reputation. Among the professors whose talents have rendered it famous are to be found such names as those of Fichte, Hegel, and Schelling. The number of students attending the university averages about 2000. Among the numerous institutions of B. may be mentioned the Academy of Sciences, by far the most important of the kind in Germany; the Academy of Architecture; the Naval and Engineering Colleges; several seminaries for teachers and missionaries; asylums for the deaf, dumb, and blind; besides many learned societies. In 1870, there were 18 theaters in Berlin. About 90 per cent. of the population are Protestants, 6 per cent. Roman Catholics, and 4 per cent. Jews. Church-going, however, seems to be very much neglected; of the total number of Protestants, fewer than 2 per cent., on an average, attend divine worship on Sundays!

The Old Museum contains antiquarian specimens, collections of coins, the Gallery of Ancient Sculpture, the Picture Gallery, with about 1500 paintings. The New Museum contains a very extensive and valuable collection of casts arranged in 12 saloons; the Egyptian Museum, a fine collection of engravings numbering upwards of 500,000; &c. Outside the celebrated Brandenburg Gate (erected in imitation of the Propylæa at Athens, 70 feet high, and 200 feet wide) extends the Thiergarten, the largest and most important park near the town. To the south-west of this lies the Zoological Garden, which has recently been considerably extended. Other places of interest worthy of mention are the acquarium, the new synagogue, the exchange, the opera-house, the royal château of Monbijou, the Warrior's Monument, and the Monument of Victory, 190 feet high, recently erected in commemoration of the greatv ictories of 1870—1871, &c.

The commerce and manufactures of B. have increased so rapidly of late years, that it now ranks among the most important mercantile places of continental Europe. The staple commodities are grain, spirits, and wool. The principal branches of industry are engine-building, which gives employment to 14,700 workers, iron-casting, and the manufacture of woollen and silk goods, and fancy articles; catico-printing is also largely engaged in. In respect of its publishing trade, B. now holds the second rank amongst German cities. In 1875, there appeared 353 journals, of which 33 were daily papers.

BERLIN DECREES. See CONTINENTAL SYSTEM.

BERLIN SPIRIT, a coarse whisky made chiefly from beet-root, potatoes, &c. See DISTILLATION.

BERLIOZ, HECTOR, a fertile musical composer, was born December 11, 1803, at La-Côte-St-André, in the department of Isère, France, where his father was a physician. Against his father's wishes, who intended him to follow the medical profession, he devoted himself to music, and proceeding to Paris, studied at the Conservatoire de Musique under Lesueur and Reicha. In 1828 the second prize at the Conservatoire was awarded to him; and in 1830, his cantata of *Sardanapalus* won the first. He now went to Italy, where he resided about two years; and on his return, published several compositions, the merits of which were much canvassed. His works are too numerous for specification; but among the most successful are the symphonies of *Harold*, *Romeo et Juilette*, and the *Symphonie Funèbre et Triomphale*, the requiem for the funeral of General Damrémont, 1837; the overture to *Carnaval Romain*, and the *Hymne à la France*, performed August 1, 1844, by an orchestra of almost a thousand musicians. B. afterwards conducted many concerts in Russia, Germany, and England. In 1839, he was made a Chevalier of the Legion of Honor; and in 1856, was elected a member of the Institute at Paris. He was also librarian to the Conservatoire. The peculiarity of the compositions of B. consists in their endeavor to make instrumental music the exponent of particular feelings as well as general emotions. Some critics are of opinion that this notion has led the composer into extravagance and incoherence; while others speak in high terms of the freshness and individuality which characterize his style, and look upon him as the chief of the romantic school of music. B. died 9th March 1869.

BERM, in Fortification, is a ledge or pathway, from 3 to 8 feet in width, at the bottom of the outside of a rampart, where it joins the scarp or inner side of the ditch. It is almost on a level with the natural surface of the ground; and serves in part as a passage-way for the troops of the garrison, and in part as a means of preventing the ditch from being filled with earth and rubbish, when the rampart is battered by the besiegers.

DERMO'NDSEY, a south-east suburb of London, on the south bank of the Thames, and traversed by the Greenwich Railway. It has extensive tan-yards and wharfs. Pop. of parish (1871), 80,429.

BERMU'DAS, or SO'MMERS'S ISLES, were so named respectively from Bermudez, a Spaniard, who first sighted them in 1527, and from Sir George Sommers, an Englishman, whose shipwreck here in 1609 was the immediate occasion of their being colonized from Virginia—itself only 4 years old—in 1611. This low and lonely archipelago is a mere group of specks, for, though it numbers perhaps 500 islets, yet it measures only about 12,000 acres in all, the whole occupying a space of about 20 miles in length by little more than 6 in breadth. The value of this natural fortress arises from its situation. In lat. 32° 20′ N., and long. 64° 50′ W., the B. occupy, commercially and politically a commanding position. At a distance of 600 miles from Cape Hatteras in North Carolina, they are about equally remote from the north of Maine and from the south of Florida; again, between the two grand divisions of British America, they form an almost indispensable bond of union; and lastly, they flank, on either side, the two living highways which respectively lead from the North Atlantic to the Gulf of Mexico, and from the Gulf of Mexico to the North Atlantic. The four principal islands are—St. George's, 3½ miles in length; Bermuda, 15; Somerset, 3; and Ireland, 3—the breadth ranging between 2 miles and 1 furlong. The minor islands of St. David, Cooper, Smith, Long-Bird, Nonsuch, &c., forms numerous picturesque creeks and bays of great size and depth, such as the Great Sound, Castle Harbor, Harrington Sound, and others. Most of the other members of the group are individually insignificant, many of them indeed without name or inhabitant. St. George's Isle, the military station of the colony, commands the entrance of the only passage for large vessels—the narrow and intricate channel, which leads to its handlocked haven, being defended by strong batteries.

From the strange shapes of most of the islands, and the number of spacious lagoons, the communications are almost as necessarily by water as those of Venice; while the cedar-boats glide under the bluest sky, through an element so clear as to reveal, even to its lowest depths, the many varieties of excellent fish sporting among the coral rocks, and the exquisitely variegated shells. On the structure and formation of the archipelago, it is necessary merely to add, that it is the most northerly point on the globe where the living zoophyte still piles up its submarine architecture. The climate may be said to complete the paradise, resembling that of Persia, with the peculiar addition of a constant sea-breeze. Between December and March, the thermometer ranges from 60° to 66°; in June, from 83° to 86°; and betwen April and September, from 75° to 79°. As the dewpoint reaches high, the air is moist at all seasons. With respect to productions, the entire soil presents under tillage of every description only 1227 acres; in grass for cattle-fodder; 33; and in wood or pasture, 10,339. Of the cultivated grounds, the main crops are potatoes, onions, and other garden-vegetables, arrow-root, maize, &c. Besides being useful as a station for those British vessels of war which are charged with the care of the West Indies on the one side, and the northern provinces on the other, Bermuda was formerly an important depôt for convicts, but since the year 1862 it has ceased to be so. Between Bermuda and Halifax, Nova Scotia, there is a regular steamer carrying the mails. Pop. (1871) 12,121; (1881) 13,948, there being about seven colored persons to every five whites. The total imports in 1879 had a value of £247,000; the exports, £70,000. The imports for the United Kingdom in 1880 were £67,000; the exports thither, only £5693. The revenue in 1880 was £29,737; the public debt, £10,484. The fisheries are of value. Although vegetation is so luxuriant, yet grain, flour, rice, and also live-stock, are imported from the United States. In the B., emancipation has been decidedly beneficial, though here, as in Antigua, it was carried at once into full effect without the intermediate stage of apprenticeship. The group is under the authority of a governor, a council of nine members, and an assembly of 36. There are 12 free, and 9 private schools. With regard to religion, more than three-fourths of the population belong to the Church of England, which has 4 clergymen. Presbyterians, Wesleyans, and Roman Catholics, have one minister each.

BERN, or BERNE, the most populous, and next to that of the Grisons, the most extensive canton of Switzerland; its area being nearly 2650 square miles. It lies between lat. 46° 20′ and 47° 30′ N., and long. 6° 50′ and 8° 27′ E. It has France on the north; on the other three sides, it is surrounded by its sister-cantons. B. is one of the three governing cantons of the Swiss Confederation (since 1849, it has been the permanent seat of the Swiss government), and had, in 1880, a population of 532,164—about one-fifth of the total inhabitants of Switzerland. Of these, 66,000 were Roman Catholics, the rest Protestants. The fertile valleys of the Aar and the Emmen divide the mountainous Alpine region in the south from the Jura Mountains in the north. The valleys of Simmenthal, Lauterbrunnen, Grindelwald, and Hasli, in the south, called the *Bernese Oberland*, are celebrated for their beauty. The lakes of Thun, Brienz, Neuchatel, and Bienne are in B., which is watered by the Aar and its several tributaries. The climate, from the great difference in the elevations of the territory, is necessarily very variable, and subject to sudden changes, and frequent rains and fogs, but it is generally healthy. The districts of the Aar and the Emmen are the most fruitful, producing corn and fruits of various kinds, and affording excellent pasturage for cattle, which, with dairy produce, form the chief agricultural wealth of Bern. Corn and potatoes are not raised in sufficient quantities for home consumption. The vine grows in some districts, and hemp and flax in small quantities are raised. The horses of the Emmenthal are much prized. The lakes abound with salmon and trout. Iron, lead, and copper are found in the canton, which has also quarries of gypsum, marble, freestone, and granite. Its manufactures, which are not extensive, consist chiefly of linen, coarse woollens, leather, iron and copper wares, articles of wood, and watches. The canton is traversed by good roads, and its lakes and the river Aar are well supplied with steam-packets. The educational condition of the canton is good. B. entered the Swiss Confederation, in which it now holds the second rank, in 1352. In the 15th and 16th centuries, it added to its possessions Aargau and Vaud, which it lost during the wars of the first Napoleon; but it received in return Bienne and its territory, and the greatest part of the bishopric of Basel. The present constitution of the canton, dating from 1846, is one of representative democracy.

BERN, capital of the above canton, is situated in lat. 46° 57′ N., and long. 7° 26′ E., on a lofty sandstone promontory, more than 1700 feet above the sea, formed by the winding Aar, which surrounds it on three sides, and is crossed by two stone-bridges, one of which is a magnificent structure, upwards of 900 feet long, with a central arch 150 feet wide and 93 feet high. The fourth side was defended by fortifications, but these have been converted into public walks. B. has an imposing appearance from a distance and a nearer view discloses one of the best and most regularly built towns in Europe, as it is the finest in Switzerland. The houses are massive structures of freestone, resting upon arcades, which are lined with shops, and furnish covered walks on both sides of the street. Rills of water flow through the streets, which are also adorned with numerous fountains. There are many fine public promenades in the environs, and the view of the Alpine peaks from the city is magnificent. The principal public buildings are a Gothic cathedral, founded in 1421, with some interesting tablets and relics; a new and magnificent structure, designed to accommodate the Swiss diet and administration; the mint, the hospital, and the university. B. has an interesting museum, and a valuable public library of 50,000 volumes. The manufacturing industry of B. is not great—gunpowder, firearms, leather, straw-hats, and paper, are the chief articles. It has a considerable trade in the produce of the surrounding district. Pop. (1880) 44,087. B. was founded by Berthold V. in 1191, who is said to have given it the name B., because he had killed a bear on the spot. A charter from Frederick II., in 1218, made it a free imperial city, and it gradually extended its possessions until it became an independent state; and between 1288 and 1339, successfully resisted the attacks of Rudolf of Hapsburg, Albert his son, and Louis of Bavaria. When the French entered B. in 1798, they found 30,000,000 of francs in the treasury. The corporate property of B. is very large—sufficient to defray all municipal expenses, provide the whole of the citizens with fuel gratis, and besides, to leave a surplus for annual distribution among them. B. is the residence of foreign ministers; and since 1849, the permanent seat of the Swiss government and diet. Haller, the distinguished physiologist was born at Bern. On account of the traditionary derivation of its name (Old Swabian *bern*, a bear), bears have for several centuries been maintained in B. at the expense of the community. The French, when they captured B. in 1798, took possession of the bears, and sent them to the Jardin des Plantes, Paris; but the Bernese have since secured other specimens of their favorite animals, which are one of the 'sights' of the city.

BERNA'LDA, a town of South Italy, in the province of Potenza, 32 miles west-by-south from Saranto. Pop. about 6000.

BERNARD, SAINT, of Clairvaux, one of the most influential theologians of the middle ages, was born at Fontaine, near Dijon, in Burgundy, 1091; became a monk of Citeaux in 1113; founded a new branch of that order at Clairvaux, in Champagne, and himself became its first abbott in 1115; died August 20, 1153; and was canonized by Alexander III., 1174. His ascetic life, solitary studies, and stirring eloquence, made him, during his lifetime, the oracle of Christendom. He was honored with the title of the 'mellifluous doctor,' and his writings were termed 'a river of paradise.' He rejected the doctrine of the immaculate conception, which had been introduced into the French Church, and rose above the cruel prejudices of his age in repressing the monkish persecutions of the Jews in Germany. B. is perhaps most widely known in connection with the disastrous crusade of 1146. Charged by the pope to excite the religious zeal of the people of France and Germany, he accomplished his mission with fatally memorable success. Fields, towns, cities, and castles were in places almost depopulated, and innumerable legions, fired by his prophetic eloquence, hurried to the East, nine-tenths of whom never saw their homes again.

Regarding B. in his more spiritual aspect, we may say that his mystic, but at the same time practical, Christian doctrine was a wholesome antidote to the dry and cold scholasticism which prevailed among the churchmen of his age, although the intolerance with which he treated Abelard (see ABELARD) and Gilbert de Porrée must be reprobated. Luther says of St. B.: 'If there ever lived on the earth a God-fearing and holy monk, it was St. B. of Clairvaux.' In the course of his life he founded 160 monasteries. His writings are exceedingly numerous. They consist of epistles, sermons, and theological treatises. Of the first, we possess 439; of the second, 340; and of the third, 12. They are all instinct with genius, though it is difficult for us now to appreciate their extraordinary influence. The best edition of the works of St. B. is that of Mabillon, printed at Paris in 1690 (2 vols. fol.), reprinted at Venice in 1750 (6 vols. fo'.) at Paris in 1835—1840 (4 vols. 8vo), and again in 1854 (4 vols. 8vo). The monks of the reformed branch of the Cistercians, which he instituted, are often called, after him, Bernardines. He gave name also, in France, to the nuns of the Cistercian order, which his sister, St. Humbeline, is said to have founded.

BERNARD, CLAUDE, a distinguished physiologist, was born at Saint-Julien, near Villefranche, in the dep. of the Rhone, on the 12th July 1813. He studied medicine at Paris; was admitted in 1839 as a pensioner in one of the hospitals; and in 1841, became Magendie's assistant at the College of France. He graduated in 1843 as Doctor in Medicine, and ten years later, as Doctor in Science; and was appointed in Feb., 1854, to the Chair of General Physiology in connection with the Faculty of Sciences in Paris. The same year, he was chosen member of the Academy of Sciences; and in 1855, he succeeded Magendie as Professor of Experimental Physiology in the College of France. B.'s first researches were devoted to the physiological action of the various secretions of the alimentary canal. His Memoir, published in 1844, in the *Gazette Médicale*, treats of the mechanism by which the gastric juice is secreted, and also of the modifications which alimentary substances undergo from that liquid. To the *Comptes Rendus* of the Biological Society he also contributed papers on the Saliva, on the Intestinal Juice, on the Influence of the Different Pairs of Nerves on the Digestive Apparatus, and on the Respiratory and Circulatory Systems. His first really original paper, however, was that on the Function of the Pancreas, in which he demonstrated that that viscus is the true agent of the digestion of fatty bodies. This essay obtained, in 1849, the grand prize in experimental physiology, and was printed in the *Comptes Rendus* of the Academy of Sciences in 1856. In 1849, appeared his first researches on the Glycogenic Function of the Liver, establishing the doctrine, that the blood which enters the liver does not contain sugar; while the blood which leaves that organ, and goes to the heart by the hepatic veins, is charged with it. He also showed the influence of the nervous system on this function, and produced artificial diabetes by division of the pneumogastric. For this discovery, which was keenly criticised, but is now regarded as sound, he obtained, in 1851, the grand prize in experimental physiology. In 1852, he laid before the Institute his Experimental Researches on the great Sympathetic System, and on the Influence exerted by Division of this nerve on the Animal Heat. This paper procured him, for the third time, the prize of experimental physiology in 1853. Since 1854, when he succeeded Roux as Member of the Institute, he has continued his researches on the glycogenic function of the liver, and has also published his courses of lectures at the College of France, on *Experimental Physiology in its Application to Medicine*, (1855—1856); on *The Effects of Toxic and Medicated Substances* (1857); on *The Physiology and Pathology of the Nervous System* (1858); on *The Physiological Properties and the Pathological Alterations of the various Liquids of the Organism* (1859); on *Nutrition and Development* (1860); and his *Introduction to the Study of Experimental Medicine* (1865). In 1862 he became Officer of the

Legion of Honor; in 1867, Commander; and in 1869 he was made a member of the Academy. He died at Paris, 10th February 1878.

BE'RNARD, Great Saint, *Mons Jovis*, a famous mountain-pass in the Pennine Alps, between Piedmont and the Valais. The pass attains an elevation of more than 8000 feet above the sea-level; and almost on its very crest, on the edge of a small lake, which is frozen over nine months out of the twelve, stands the *hospice*, founded, in 962, by Bernard de Menthon, a Savoyard nobleman, for the benefit of pilgrims to Rome, and now largely used by travelers across the Alps. The hospice, next to the Etna Observatory, the highest habitation in Europe, is occupied by ten or twelve St. Augustine monks, who, with their noble dogs of Saint Bernard breed, have rescued many hundred travelers from death by exposure to cold, or burial in the snow, which in winter ranges from 10 to 40 feet in depth. The humanity of the monks shortens their own lives very considerably, the rigorous cold—which has been known to be 29°, and is frequently as low as 18° and 20° below zero F.—and the difficulty of respiration, often compelling them to leave with ruined health before they have completed the period of their vow—fifteen years. They enter on their humane mission at the age of eighteen. The hospice is a substantial stone-building, capable of affording sleeping-accommodation to 70 or 80 travelers, and shelter to about 300. As many as 500 or 600 persons have taken advantage of the hospitality of the monks in one day, and it is calculated that 8000 or 9000 travelers are annually indebted to their kindness. The resources of the monks are mainly derived from voluntary subscriptions and gifts, but they draw some trifle from independent property. Formerly, they had much more from this latter source, but a forced contribution of £4800 to the government of the canton of Valais impaired their revenues very much. The pass, which was traversed in early times by the Romans, Charlemagne, and Frederick Barbarossa, is celebrated for the passage of 30,000 French troops under Napoleon, in May 1800.—Little Saint B., which forms part of the chain of the Graian Alps, is the most convenient of the Alpine passes, and is supposed to have been the one by which Hannibal led his forces into Italy. It also possesses a hospice, which is situated 7192 feet above the sea.

BE'RNARD DOG, Great Saint, a race or variety of dog deriving its name from the hospice of St. Bernard, where it has been long kept by the monks for the purpose of assisting them in the rescue of perishing travelers. Dogs of different races are employed in the same manner at other passes of the Alps. The Saint B. dog is remarkable for great size, strength, and sagacity. The dogs not only accompany the monks and servants of the hospice in the benevolent excursions which they regularly make through the most dangerous parts of the pass, but are sent by themselves to search for travelers who may have wandered, and this their extremely acute scent enables them admirably to do. The learn to know what places are most proper to be searched, and some of them show great alertness when the weather assumes a threatening aspect, as if desirous to be at their work. They carry a small flask of wine or brandy attached to their neck, of which the traveler may avail himself. When they find a traveler benumbed with cold, or discover by the scent that one has been overwhelmed in an avalanche, they endeavor by loud barking to attract the monks to the spot; if they fail in this, and if the traveler is too much exhausted to proceed by their guidance to the hospice, or if they cannot by their own efforts dig away the snow which has covered him, they run to give the alarm by signs which are at once understood. One famous dog, called Barry, in the earlier part of the present century, was instrumental in saving the lives of no fewer than forty human beings. His most memorable achievement was the rescue of a little boy, whose mother had been destroyed by an avalanche, and whom he induced to mount his back, and so carried him safe to the hospice. The skin of this dog is preserved in the Museum at Bern.—The origin of this valuable race of dogs is not well ascertained, although they are supposed to have sprung from the progeny of a Danish dog left at the hospice by a traveler, and of the Alpine shepherds' dogs. Another account represents an English mastiff as one of their progenitors. There are two subvarieties, however; one with rough hair, like that of the Newfoundland dog, and of a white color, with black or tawny spots; the other, with close, short hair, more or less clouded with gray, liver-color, and black. Of the former breed, the number is now small. The head and ears resemble those of a water-spaniel, and the Saint B. dog has therefore been sometimes classed with spaniels (q. v.).

BERNARDIN, Saint, of Sienna, born in 1380 at Massa-Carrara, of a distinguished family, made himself famous by his rigid restoration of their primitive rule amongst the degenerate order of the Franciscans of which he became a member in 1404, after having already, in 1397, joined the brotherhood of the *Disciplinati Mariæ*. In 1438, he was appointed vicar-general of his order for Italy. B. was unwearied and devoted in his activity during the great Italian plague of 1400, both as an impressive preacher and an attendant upon the sick and dying. He founded the *Fratres de Observantia*, a branch of the Franciscan order, which already numbered more than 300 monasteries in Italy during his day. B. died in 1444, and was canonized by Pope Nicholas V. in 1450, his festival being on the 20th of May. His eminently mystical works were published by Rudolf (4 vols., Venice, 1591), and by De la Haye (5 vols., Paris, 1636).

BE'RNARDINES. See Cistercians.

BERNAUER, Agnes, the beautiful daughter of a poor citizen of Augsburg, in the 15th c., whose sad story looks liker romance than history. Duke Albrecht of Bavaria, only son of the reigning Duke Ernst, saw the maiden at a tournament at Augsburg, given in his honor by the nobility, and fell violently in love with her. Albrecht was young, handsome, and manly, and Agnes was not insensible to his attractions and his rank; but she was too pure to listen to his overtures till he promised to marry her. They were then secretly united, and Albrecht carried his young wife to the castle of Vohburg, which he inherited from his mother. Here they enjoyed their matrimonial happiness undisturbed, till Albrecht's father formed the plan of marrying his son with Anna, daughter of Erich, Duke of Brunswick. The determined opposition he met with soon made him aware of his son's attachment to the Augsburgher's daughter, and of the strength of his passion for her; and he resolved to take energetic measures to break it off. He accordingly contrived that, at a tournament at Regensburg, the lists were shut against his son, as one that, against the rules of chivalry, was living with a woman in licentiousness. Albrecht swore that Agnes was his wife, but in vain; he was still excluded. He now made Agnes be openly honored as Duchess of Bavaria, gave her a numerous retinue of servants as a princess, and the castle of Straubing for a residence. She, full of sad forebodings of a dark fate, erected in the Carmelite convent of the place an oratory and a tomb. As long as Duke William, Albrecht's uncle, lived, who was greatly attached to his nephew, nothing further was attempted against the happiness of the lovers. But after his brother's death, Duke Ernst no longer restrained his anger, and, in the absence of Albrecht, ordered Agnes to be arrested and executed without delay. Accused of sorcery, by which she was alleged to have bewitched Albrecht, she was carried, bound hand and foot, by the executioners to the bridge of the Danube, and in the presence of the whole people thrown into the river (October 12, 1435). The current having floated her again to the side, one of the executioners ran with a long pole, and fastening it in her golden hair, held her under the water till she was drowned.

Maddened at this atrocity, Albrecht took up arms against his father, and, in league with his other enemies, wasted the country. It was in vain that Duke Ernst entreated his son to relent. It was not till the Emperor Sigismund, and other friends of the family, united their exhortations, that Albrecht at last returned to his father's court, where, after a time he consented to marry Anna of Brunswick. To regain the forfeited regard of his son, Duke Ernst had a chapel erected over the grave of the murdered lady, and Albrecht founded in the year of her death daily masses for her in the Carmelite monastery of Straubing; even after twelve years he renewed the foundation, and had the bones of his 'honored wife' transferred to the tomb provided by herself, and covered with a marble monument. The unhappy loves of Albrecht and Agnes were long the theme of popular song; and the story has been made the subject of at least three tragedies, one by Jul. Körner (Leip. 1821), another by A. Böttger (3d ed. Leip. 1850).

BERNAY, a town in France, in the dep. of Eure, pleasantly situated on the right bank of the Charentonne, 26 miles west-north-west of Evreux. Pop. (1876) 6087. Woollen, linen, and cotton manufactures are actively carried on, also paper-making, bleaching, dyeing, and tanning. There is a considerable trade not only in the products of these manufactures, but in grain, cider, horses, and cattle. B. is the seat of the greatest horse-fair in France, which is held in Lent, and is attended by nearly 50,000 persons, who congregate from all parts of France, chiefly to purchase post and diligence horses, for which Normandy has long been celebrated. B. is the seat of a tribunal of commerce. The church of St. Croix has a large and magnificent altar, and marble statues and sculptures: the church of La Conture was formerly celebrated for the cure of persons possessed of evil spirits. The grain-market occupies part of the remains of an interesting old abbey church. B. has a communal college, and a hospital.

BE'RNBURG, a town in the German duchy of Anhalt, till 1863 capital of Anhalt-Bernburg, lies on the Saale, 23 miles south of Magdeburg, in lat. 51° 47′ N., long. 11° 45′ E. Two parts of B., surrounded by walls, lie on the left bank of the river, and are united by a bridge with the third part on the opposite side, which has a castle, but is not walled. B. is well built, has several literary and charitable institutions, and manufactures of porcelain, paper, and starch. Pop. (1880) 18,593.

BERNHARD, Duke of Weimar, a celebrated German general, was born 6th August 1604. He was the youngest of the eight sons of John, third Duke of Saxe-Weimar. On the outbreak of the Thirty Years' War, he took the side of Protestantism against the emperor, and first distinguished himself in 1622 at the bloody battle of Wimpfen. Subsequently he became colonel in the army of Christian IV., king of Denmark; took part in the bold expedition of Mansfield through Silesia to Hungary; and after the sudden death of the latter, reunited himself with the Danes under the markgraf of Baden-Durlach. At the solicitations of his brothers, however, he now withdrew from the Danish service, and returned to Weimar in March 1628. Three years later, Gustavus Adolphus made his appearance in Germany, and B. was one of the first who flew to his standard. After a brilliant career, he became suddenly ill, and died at Neuburg on the Rhine, 8th July 1639; according to some, of a pestilential disorder then prevalent in the camp; but according to B.'s own opinion, and that of others, of a poison, administered by his physician, Blandini, who is supposed to have been in the pay of France.

BERNI, Francesco,, called also Berna or Bernia, a favorite Italian poet, from whom comic or jocose poetry has the name *Versi Berneschi*, was born at Campovecchio, in Tuscany, about 1490. He first entered the service of Cardinal Dovizio da Bibbiena, and was afterwards for several years secretary to Ghiberti, chancellor to Clement VII., and Bishop of Verona. About 1533, he betook himself to Florence, where he was made a canon, and lived in favor with the two Medici, Duke Alessandro, and Cardinal Ippolito, till his death in 1536. His *Opere Burlesche* (2 vols., Flor. 1548; Lond. 1721) are to be found in the *Classici Italiani* (Mil. 1806). His recast or rifacimento of Boiardo's *Orlando Innamorato* was received with such favor that it was thrice reprinted from 1541—1545. A critical edition was published at Florence, 1827. Berni's version is still read in Italy (and justly so) in preference to the original.—Count Francesco Berni, b. 1610, d. 1693, the author of eleven dramas, and some lyric pieces, is not to be confounded with the former Berni.

BERNIER, François, a French physician and traveler, was born at Angers, in France. Having taken his degree of Doctor at Montpellier, he departed for the East about 1654, and visited Syria, Egypt, Arabia, and India, in the last of which countries he resided for twelve years in the capacity of physician to Aurungzebe. On his return to France he published an account of his travels in India in 1670—1671. The work is delightful in style, accurate in the delineation of manners and customs, as well as in the descriptions of places, and clear in the exposition of the causes of those political events that carried Aurungzebe to the throne. He visited England in 1685, and died at Paris on the 22d of September 1688.

The titles of his chief works are as follows: *Voyages de M. Bernier contenant la Description des Etats du Grand Mogol, de l'Indoustan, du Royaume de Cachemire, &c., Mémoire sur le Quiétisme des Indies; Abrégé de la Philosophie de Gassendi; Sentiment de M. Descartes.*

BERNI'NA, a mountain of the Rhætian Alps, upwards of 13,000 feet high, in the Swiss canton of Grisons, with a remarkable and extensive glacier, Morteratsch. The B. Pass, which attains an elevation of 7695 feet, and over which a carriage-road has been constructed, unites the valleys of the Engadine and Bregaglia on the north with the Valteline on the south, but is dangerous on account of avalanches.

BERNI'NI, Giovanni Lorenzo, a famous Italian sculptor and architect in the time of Pope Urban VIII., was born at Naples, 1598. He early devoted himself to sculpture, and in his eighteenth year finished his admired group of Apollo and Daphne, which gave promise of greater excellence than was afterwards realized by the artist. Pope Urban VIII. employed B. to produce designs for the embellishment of the Basilica of St. Peter at Rome. The bronze *baldacchino*, or canopy, covering the high-altar of that edifice, the palace Barberini, the front of the College de Propaganda Fide, the church of Sant' Andrea à Mont Cavallo, and numerous ornaments in St. Peter's, are by Bernini. His greatest work in architecture is the colossal colonnade of St. Peter's. In 1665, B. accepted the flattering invitation of Louis XIV., and traveled to Paris with a numerous retinue and great pomp. In Paris, he resided above eight months; but not wishing to interfere with the designs of Claude Perrault for the Louvre, he confined himself entirely to sculpture. His visit, however, proved a highly remunerative one. Richly laden with gifts, he returned to Rome, where he died, November 28, 1680, leaving a large fortune (about £100,000) to his children. Besides his works in sculpture, B. also left numerous paintings behind him. No artist, perhaps, was ever so much admired and rewarded during his lifetime as B.; but time has rather subtracted from than added to his fame.

BERNOUI'LLI was the name of a family that produced a succession of men, who became famous over all Europe for the successful cultivation and extension of various branches of mathematical and physical science. The family originally resided in Antwerp, whence, in 1583, its attachment to the reformed religion forced it to seek an asylum in Frankfort. Afterwards, the Bernouillis settled in Basel, where they achieved the highest professional honors. Eight of them became highly distinguished; but special mention can be made here only of the three most celebrated —James, John, and Daniel.

James B. was born at Basel, 25th December 1654, where he also died, 16th August 1705. He devoted his life to the study of mathematics, of which he became professor, in the university of Basel, succeeding in that chair the distinguished Megerlin. Among his first works were, *A Method of Teaching Mathematics to the Blind*, and *Universal Tables on Dialling*. These were followed by *Conamen Novi Systematis Cometarum*, being an essay on comets, suggested by the appearance of the comet of 1680; and an essay *De Gravitate Ætheris*. Besides a variety of memoirs on scientific subjects, he published no other work of importance. *De Arte Conjectandi* was a posthumous work concerning the extension of the doctrine of probabilities to moral, political, and economical subjects. His memoirs will be found in the *Journal des Savans* and *Acta Eruditorum;* his collected works were published in 2 vols. 4to, at Geneva, in 1744. Among his triumphs are to be recorded his solution of Leibnitz's problem of the isochronous curve, his determination of the catenary, and investigation of the properties of isoperimetrical figures. At his request, a logarithmic spiral was engraved on his tomb, with the motto, *Eadem mutatâ resurgo.*

John B., brother of the preceding, was born at Basel, 27th July 1667. He and James were the first two foreigners honored by being elected associates of the Academy of Sciences at Paris, and members of the Academy of Berlin. John devoted himself to chemical as well as mathematical science. In 1694, he became a Doctor of Medicine, and soon after Professor of mathematics at Gröningen, whence he only removed to succeed his brother James in the University of Basel. His forte was pure mathematics, in which he had no superior in Europe in his day. He died 1st January 1748. Among his achievements are the determination of the 'line of swiftest descent,' and the invention of the 'exponential calculus.' His collected works were published at Geneva, in 4 vols., 4to, 1742; and his correspondence with Leibnitz, in 2 vols., 1745.

Daniel B., born at Gröningen, 9th February 1700, died at Basel, 1782, was the son of John. Like his father, he devoted himself to medicine as well as to mathematics. The family reputation early helped him to the professorship of mathematics at St. Petersburg, which he held for several years. Thence, however, he ultimately retired to Basel, much against the will of the czar. At Basel, he occupied in succession the chairs of anatomy and botany, and of experimental and speculative philosophy. He published various works between 1730 and 1756, of which the chief are concerned with pneumatical and hydro-dynamical subjects.

BERNSTEIN, George Heinr., a distinguished orientalist, Professor of Oriental Languages in the university of Breslau, was born 12th January, 1787, at Kospeda, near Jena, where his father was pastor. In 1806 he entered the university of Jena, where he devoted himself to the study of theology, philosophy, and Eastern languages. In 1812 he was appointed extraordinary professor of Oriental Literature in Berlin, and in 1821, regular professor. In 1843, he was appointed to Breslau. Besides a number of lesser treatises, and of contributions to scientific and critical journals, he established his reputation as an oriental scholar by the publication of an Arabic poem of Szatieddin of Hilla (Leip. 1816). But his greatest achievements were in Syriac literature. Besides several pamphlets, expository and critical, which appeared between 1837 and 1847, B. has given in his lexicon to Kirsch's *Chrestomathia Syriaca*, of which he brought out a new edition (2 vols., Leip. 1832—1836), proofs of his diligent and successful research in the domain of Syriac lexicography. He contemplated publishing a great Syriac lexicon, but did not live to complete the work. He died 7th April 1860.

BE'ROE, a genus of *Acalephæ* (q. v.), of a division distinguished as *Ciliograde*, i. e., moving by means of *cilia* (q. v.), very different from the Medusæ, and of higher organization. This genus is now the type of a family, characterized by a nearly globular or ovai body, of a delicate jelly-like substance, with an alimentary canal passing through its axis, which is vertical as the animal floats in the water; the body strengthened by bands of somewhat firmer texture, 'which run like meridian lines from pole to pole.' These bands are covered with rows of large cilia, the motion of which is extremely rapid, and is evidently controlled by the will of the animal, so that it swims with rapidity, and easily changes its course. The motion of the cilia causes a beautiful iridescence: the animals are also phosphorescent by night. *B.* (or *Cydippe*) *pileus* (figured in the article Acalephæ) is a beautiful little creat-

ure, very abundant in the sea on many parts of the British coasts. It is provided with two very long and slender tentacula, which proceed from the sides of the body, and are covered with a great number of still finer filaments. These organs are probably employed for seizing food. This, and other kinds of B., form a great part of the food of whales.

BERO'SUS, an educated priest of Babylon, who had a knowledge of the Greek language, and probably lived about 260 B.C. He wrote, in Greek, three books of Babylonian-Chaldæan history, in which he made use of the oldest temple archives of Babylon. The work was highly esteemed by Greek and Roman historians, but unfortunately only a few fragments have been preserved by Josephus, Eusebius, Syncellus, and others. Even these fragments are of great value, as they relate to the most obscure portions of Asiatic history. They have been edited by Richter in his *Berosi Chaldæorum Historiæ quæ supersunt*, 1825. The *Antiquitatum Libri Quinque cum Commentariis Joannis Annii*, first published in Latin by Eucharius Silber (Rome, 1498) as a work of B., and often republished, was the pseudonymous work of the Dominican, Giovanni Nanni of Viterbo.

BERRE, Etang de, an extensive lagoon of France, department Bouches-du-Rhône, with large salt-works and eel-fisheries. It discharges its surplus waters into the sea by the Port-du-Bouc.

BERRY (*Bacca*), the term employed in botany to designate a description of fruit more or less fleshy and juicy, and not opening when ripe. The inner layers of the pericarp (q. v.) are of a fleshy or succulent texture, sometimes even consisting of mere cells filled with juice, whilst the outer layers are harder, and sometimes even woody. The seeds are immersed in the pulp. A B. may be one-celled, or it may be divided into a number of cells or compartments, which, however, are united together not merely in the axis, but from the axis to the rind. It is a very common description of fruit, and is found in many different natural families, and both of exogenous and endogenous plants. As examples, may be mentioned the fruits of the gooseberry, currant, vine, barberry, bilberry, belladonna, arum, bryony, and asparagus, which, although agreeing in their structure, possess widely different properties. Some of them, which are regarded as more strictly berries, have the calyx adherent to the ovary, and the placentas—from which the seeds derive their nourishment—parietal, that is, connected with the rind, as the gooseberry and currant; others, as the grape, have the ovary free, and the placentas in the center of the fruit.—The orange and other fruits of the same family, having a thick rind dotted with numerous oil-glands, and quite distinct from the pulp of the fruit, receive the name *hesperidium;* the fruit of the pomegranate, which is very peculiar in the manner of its division into cells, is also sometimes distinguished from berries of the ordinary structure by the name *balausta*. See Pomegranate. Fruits, like that of the water-lily, which at first contain a juicy pulp, and afterwards, when ripe, are filled with a dry pith, are sometimes designated *Berry-capsules*. The gourds, also, which at first have 3—5 compartments, but when ripe, generally consist of only one compartment, are distinctively designated by the term *pepo*, *peponium*, or *peponida*, to which, however, *gourd* may be considered equivalent.

BERRY, or BERRI, one of the old French provinces (now forming the departments of Indre and Cher, q. v.), in lat. 46° 10'—47° 40' N., and long. 1°—3° E., its greatest length being about 100 miles, and its greatest breadth 90. Having come into the possession of the French crown, it gave title at various times to French princes, the younger son of Charles X. being the last who held it.

BERRY, Charles Ferdinand, Duke de, second son of the Count of Artois (afterwards Charles X.) and of Maria Theresa of Savoy, was born at Versailles, January 24, 1778. In 1792, he fled with his father to Turin; fought with him under Condé against France; afterwards visited Russia, and lived for some time in London and Edinburgh. In 1814 he returned to France, and the following year was appointed by Louis XVIII. commander of the troops in and around Paris. In 1816, he married Caroline Ferdinande Louise, eldest daughter of Francis, afterwards king of the two Sicilies. On this marriage the continuance of the elder Bourbon line depended. The Duke de B. was assassinated on the 13th February 1820, as he was conducting his wife from the Opera-house to her carriage, by a person named Louvel. He left only one daughter, Louise-Marie-Thérèse d' Artois, Mademoiselle de France, born 1819; but on the 29th September 1820, the widowed duchess gave birth to the prince, Henry, Duke of Bordeaux, afterwards styled Count of Chambord. After the July revolution, 1830, in which the duchess exhibited immense force of character and courage, offering herself to lead on the troops against the insurgents, she, with her son, followed Charles X. to Holyrood, but left a considerable party in France in favor of the pretensions of her son as Henry V. of France. During a visit to Italy, the duchess was so far encouraged in her ambition, that a project was formed for reinstating the Bourbons in France; and, accompanied by several friends, she landed near Marseille, April 29, 1832. After many adventures, she was betrayed, and was imprisoned in the citadel of Blaye. The confession of the duchess, that she had formed a second marriage with the Neapolitan marquis, Lucchesi-Palli, destroyed at once her political importance, and the government set her at liberty. She died in 1870.

BERRYER, Pierre Antoine, a distinguished French advocate and party politician, was born in Paris, 4th January 1790, and first distinguished himself by his defence of victims of the restoration. In 1829 he was chosen deputy, and ever afterwards steadily represented the rights and policy of the elder Bourbons. His legitimist tendencies kept him for a time in the political background under Louis Philippe; but as the legitimist party in the chamber increased, his position grew in importance. He repeatedly undertook the defence of persons prosecuted by the government, not only of his own party, but republican leaders. It was he who defended Louis Napoleon in the Chamber of Peers after the Boulogne *attentat*. With the elder Bourbons he was in constant communication, and was one of the heads of the legitimist party who made a pilgrimage to the Count of Chambord in London, in 1843. After the revolution of 1848, he represented the Bouches-du-Rhône; seemed inclined to support the government of the president, Louis Napoleon; and became a member of his privy-council. But this did not hinder him from going to Wiesbaden, in 1850, to do homage to the Count of Chambord. On that occasion, he was openly spoken of as the future minister of Henry V. When Changarnier was removed from his command, B. united with Thiers and others to oppose the pretensions of the president, and he was one of the few who boldly protested against the *coup d'état*. In 1854, he was elected a member of the French Academy. His inaugural speech contained some uncomplimentary allusions to the Lower Empire, and its publication was prohibited, the prohibition, however, being removed in 24 hours. B. added greatly to his reputation as an orator by his defence of Montalembert (q. v.) against the government prosecution in November 1858. He died 29th November 1868.

BERSAGLIE'RI is the name given to the riflemen or sharpshooters the Italian army. After the disastrous campaign of Charles Albert against the Austrians in 1848—1849, and the abdication of that monarch, his son, Victor Emmanuel, commenced a remodelling of the Sardinian army. One improvement, brought about by General Alessandro della Marmora, was the formation of a corps of bersaglieri. These were light active soldiers, dressed in a picturesque but serviceable dark-green uniform, and armed with long rifles. Two battalions of these riflemen formed part of the Sardinian army during the Crimean war. On the 16th of August 1855, they took part in the battle of the Tchernaya. During the Italian war of 1859, the B. were engaged in many operations requiring dash and brilliancy. There are over 40,000 B. in the regular army.

BE'RSERKER (*ber*, bare, and *serkr*, shirt of mail), a redoubtable hero in Scandinavian mythology, the grandson of the eight-handed Starkader and the beautiful Alfhilde. He despised mail and helmet, and, contrary to the custom of those times, went always into battle unharnessed, his fury serving him instead of defensive armor. By the daughter of King Swafurlam, whom he had slain in battle, he had twelve sons, who inherited the name of B. along with his warlike fury.

BERTH, or BIRTH, in nautical language, is nearly equivalent to *room* or *space*. A ship's B. is the space which she occupies when at anchor, including a small breadth of sea all around her. The same name is also given to a messing or sleeping room on board ship, in a sense not very different from that of the word *cabin*. To 'B.' a ship's crew, is to allot to each man the place where his hammock, &c., are to be placed. In the third-class cabins of passenger-steamers, where many sleep in one room without partitions or divisions, each one's crib or bedplace is his berth.

BERTHA, the name of several famous women of the middle ages, half-historical, half-fabulous (see Berchta). St. Bertha, whose day is kept on the 4th July, was the beautiful and pious daughter of Charibert, king of the Franks, who having married (560 A.D.) Æthelbert, king of Kent, became the means of his conversion, and of the spread of Christianity among the Anglo-Saxons. In the romances of the Charlemagne cycle, there figures a Bertha, called also Berthrada with the Big Foot, as the daughter of Count Charibert of Laon, wife of Pepin, the Little, and mother of Charlemagne. In the romances of the *Round Table*, again, Bertha is the name of a sister of Charlemagne, who makes Milo d'Anglesis the father of Roland. Better known is Bertha, daughter of Burkhard, Duke of the Alemanni, and wife of Rudolf II., king of Burgundy beyond Jura, who, after Rudolf's death (937), acted as regent for her infant son, Konrad; afterwards married Hugo, king of Italy; and died towards the close of the 10th c. This queen had the character of an excellent housekeeper, and is

represented on seals and other monuments of the time as sitting on her throne spinning.

BERTHIER, Alexandre, Prince of Neuchatel and Wagram, and Marshal of the French Empire, was born at Versailles, November 20, 1753. His father, a military engineer, trained him for the army, which he entered in 1770, and fought with Lafayette in the American War of Independence. At the outbreak of the French Revolution, he was appointed major-general of the National Guard at Versailles, and rose to be a general of division, and chief of the staff in the Army of Italy, 1795; and in 1798, in the absence of Bonaparte, entered the papal territory, and proclaimed the republic in Rome. He accompanied Napoleon to Egypt in the same year as chief of the staff, a post which he also held in all the subsequent campaigns. At the revolution of 18th Brumaire (1799), he became war-minister, and (till 1808) as such signed many important treaties and truces. He always accompanied the emperor, and often rendered important services; for the part he took in the battle of Wagram, he received one of his many distinctions. B. was Napoleon's proxy in the marriage of Maria Louisa, at Vienna, 1810. In the campaigns of 1812, 1813, and 1814, he was constantly by the emperor's side, and acted both as chief of the staff and as quartermaster-general. It was only B.'s love of order, quick insight, and activity that could have superintended the movements of so many armies. Napoleon did him full justice on this score, asserting at the same time that he was incapable of leading the smallest *corps d'armée* alone.

On the fall of Napoleon, B. hardly showed due gratitude for the favors heaped upon him. He had to surrender the principality of Neuchatel; and not to lose more, he submitted to Louis XVIII., who made him a peer and marshal, with the title of Captain of the Guards. Napoleon, who never doubted his secret attachment, made overtures to him from Elba: these he neither answered nor yet revealed to Louis, which made him suspected by both. On the return of Napoleon from Elba, in a fit of irresolution B. retired to Bamberg, in Bavaria, to his father-in-law, Duke William, where his mind became unhinged with the conflict. On the 1st July 1815, while looking from the balcony of the palace at a division of Russian troops marching towards the French frontier, the bitter sight was too much—he threw himself down into the street, and thus ended his life. His *Mémoires* appeared in 1826.—He had two brothers, Victor Leopold, and Cæsar, who both served with distinction, and rose to be generals.

BERTHOLLET, Count Claude Louis, one of the most distinguished theoretical chemists of his time, was born at Talloire, a village of Savoy, near Annecy, on the 9th December, 1748. He studied at the university of Turin, and obtained a medical degree there in 1768. He afterwards went to Paris, where he was appointed physician to the Duke of Orleans. He now applied himself with great assiduity to chemistry; in 1781, he was elected a member of the Academy of Sciences, and, some time after, the government made him superintendent of dyeing processes. In this situation he published a very valuable work on dyeing. In 1785, he announced his adherence to the antiphlogistic doctrines of Lavoisier, with the exception that he did not admit oxygen to be the acidifying principle, and herein he has proved to be right. In the same year, he published a paper on 'dephlogisticated marine acid'—now called chlorine—pointing out its use for bleaching purposes; and following up the experiments of Priestley, he showed ammonia to be a compound of three volumes of hydrogen gas, and one volume of azotic gas. During the early part of the French Revolution, B. traveled through the country, giving instruction as to the best means of extracting and purifying saltpetre to be used in the manufacture of gunpowder, and also as to the process of smelting and converting iron into steel. His joining the expedition of Napoleon to Egypt led to the formation of the Institute of Cairo. On his return from Egypt, he was made a senator by Bonaparte, who also conferred on him several marks of honor, and made him a count. Notwithstanding, he voted for the deposition of Napoleon in 1814. On the restoration of the Bourbons, he was made a peer; but all his honors never made him other than a simple and unassuming gentleman. Besides the additions to chemical knowledge already mentioned, he, in conjunction with Lavoisier, and two other chemists, promulgated a new chemical nomenclature which has proved valuable to science. He died at Paris, 7th November, 1822.

BERTHOLLE'TIA. See Brazil Nuts.

BERTIN, Louis François, called Bertin L'Ainé, an eminent French journalist, was born in Paris, 1766. He began writing for the press in 1793, and in 1799 set on foot the *Journal des Débats* (q. v.). B.'s royalist principles offended the government of Napoleon, and cost him imprisonment and banishment to Elba; whence, however, he escaped to Rome, where he formed a friendship with Châteaubriand. In 1804, he returned to Paris, and resumed the editorship of the *Débats*, but was much hampered by Napoleon, who imposed on the paper the title of *Journal de l'Empire*, and by subjecting it to police revision, gave it almost an official character. When B., in 1814, became free to follow his own bent, the journal reverted to its royalist principles. During the Hundred Days, it fell into other hands, till the return of the Bourbons restored it once more to B., who, in the meantime, had taken part in the *Moniteur de Gand*. Throughout the restoration, B. gave almost constant support to the ministerial party. Though he did not join in the protest of the liberal journals against the *ordonnances*, he gave his adhesion to the July monarchy, and continued faithfully to support it. He continued to edit the *Débats* till his death, 13th September 1841.

BERTIN, Louis Marie Armand, son of the former, was born in Paris, 1801, and became, after the restoration, secretary to Châteaubriand during his Embassy in England. In 1820, he joined the editorial staff of the *Journal des Débats*, and at his father's death assumed the chief direction. As a journalist he contrived, as well as his father, to maintain a certain independence of the government. B. died at Paris, January 11, 1854.

BERTINO'RO, a town of Italy, in the province of Forli, formerly belonging to the Papal States, six miles south-east from Forli, pleasantly situated on a hill, the slopes of which are famous for their wines. At the foot of the hill, to the west, flows the Ronco. B. is the seat of a bishop, and has a cathedral, three other churches, and five convents. It was one of the ancient fiefs of the Malatesta, by whom it was given to the church. Pop. of commune 6388.

BERTRAND, Henry Gratien, Count, one of Napoleon's generals, known for his faithful attachment to the emperor through all his fortunes, was born at Châteauroux, 1773, and early entered the armies of the Revolution as engineer. He accompanied the expedition to Egypt, and directed the fortification of Alexandria. Returning with the rank of general of brigade, he distinguished himself at Austerlitz, and became the emperor's adjutant; and, after the battle of Aspern in 1809, for establishing bridges over the Danube, he was created Count and governor of Illyria. After sharing with credit in the subsequent campaigns, he retired with the emperor to Elba, was his confidant in carrying out his return to France, and finally shared his banishment to St. Helena. On Napoleon's death, B. returned to France, where, though sentence of death had been pronounced upon him—a sentence which Louis XVIII. had wisely recalled—he was restored to all his dignities, and, in 1830, appointed commandant of the Polytechnic School. He formed part of the expedition, which, in 1840, brought back the remains of Napoleon to France. His death took place at Châteauroux, 31st January 1844.

BERVIC, Charles Clement Balvay, a celebrated French engraver, was born at Paris in May 1756. In 1790, he made himself famous by a full-length engraving of Louis XVI., from the picture by Callet, one of the finest works of the kind ever produced. The engravings of the Laocoon, Regnault's 'Education of Achilles,' and Guido's 'Rape of Deianira,' also from B.'s graver, display equal beauty of manipulation, and fully higher power. B. died March 23, 1822.

BERWICK, James Fitz-James, Duke of, was the natural son of James II., by Arabella Churchill, sister of the Duke of Marlborough. He was born in 1670, in France, where he was educated, and entered the army. After serving in Hungary under Charles of Lorraine, he returned to England shortly before the revolution of 1688, which he exerted himself to prevent. In 1689, he accompanied his father in his Irish expedition, and after the death of St. Ruth, had the nominal chief command. He next served in Flanders, under Marshal Luxembourg, and afterwards under the Duke of Burgundy and Marshal Villeroi. In 1706, he was created a marshal of France, and sent at the head of an army to Spain, where he established the throne of Philip V. by the decisive victory of Almanza. For this important service, he was made a grandee of Spain, under the title of Duke of Liria and Xerica. After several years of inactivity, he received the command, in 1734, of an army intended to cross the Rhine. While besieging Philipsburg, he was killed by a cannon-ball. Contemporary testimony, confirmed by his military conduct, shows B. to have possessed some of the best qualities of a great commander. His defensive campaign in 1709, in Provence and Dauphiné, against the superior force of the Duke of Savoy, has always been regarded as a triumph of strategic skill. He was twice married. His son by the first marriage succeeded to the dukedom of Liria; his dukedom (De Fitz-James) and estates in France passed to his children by the second marriage.

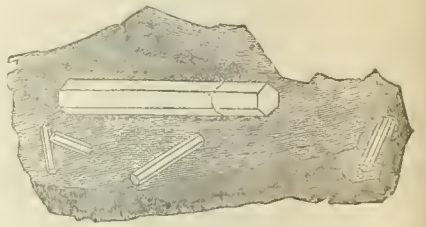
BE'RWICK, North, a seaport town in Haddingtonshire, at the entrance to the Firth of Forth, 19 miles E.N.E. of Edinburgh. Formerly a fishing-village, N. B. has now become a fashionable watering-place. It unites with Lauder, Dunbar, Jedburgh, and Haddington, in returning one member to parliament. Pop. (1881) of burgh, 1698; of parish, 2688. The parish includes the Bass Rock, North Berwick Law, and the ruins of Tantallon Castle. The castle is graphically described in Scott's *Marmion*. It is an

irregular pile, two miles east of the town, on a high rock, surrounded by the sea on three sides, with a ditch on the land-side, where there was formerly a drawbridge. It was a stronghold of the Douglas family. N. Berwick Law is a conical hill of an elevation of 612 feet, on the south, close to the town.

BE'RWICKSHIRE, a maritime and border county in the south-east extremity of Scotland, is bounded N. by Haddington; S. and S.E. by Roxburgh and Northumberland, having a detached portion of Durham on its S.E. limits; E. by the German Ocean and Berwick-on-Tweed; and W. by Mid-Lothian and Roxburgh. It extends from E. to W. 35 miles, from N. to S. 22 miles, and has an area of 464 sq. m., or 297,161 statute acres. B. is divided into three districts—the Merse, the Lammermoors, and Lauderdale. The largest and most fertile district is the luxuriant valley of the Merse, believed to be the most extensive and richest piece of level land in Scotland, extending to nearly 130,000 acres. The Lammermoors, consisting of 90,000 acres, chiefly pastoral, divide the valley of the Tweed from Mid-Lothian and Haddington. Lauderdale, in extent about 67,000 acres, comprising a mixture of hill and dale, runs along the banks of the Leader Water. From its commencement at Lamberton to St. Abb's Head, the coast line of B. extends 8½ miles, or allowing for headlands, 9½. The coast is rocky and bold, with only two bays, at Eyemouth and Coldingham respectively. Geologically, as well as topographically, B. possesses numerous interesting features—the Lammermoors (the principal summits of which are Lammer Law, Crib Law, Sayer's Law, and Clint Hill, ranging from 1500 to 1600 feet high), consist of Silurian strata, stretching to St. Abb's Head; in the south, carboniferous rocks are found, while an extensive bed of red sandstone extends easterly from the center of the county to the sea-coast. On the coast porphyry is found, and some traps and syenite in the interior. Ironstone and thin seams of coal occur, as well as gypsum, clay, and shell-marl. The Blackadder, Whitadder, and Leader streams, the river Eye being the only exception, are tributaries of the Tweed. Population (1871) 36,486; (1881) 35,392; parishes, 31; inhabited houses, 7103; constituency (1882), 1846; upwards of 70 places of worship, of which about one half belong to the Established Church, and the remaining half is divided between the Free and U.P. denominations. B. returns one member to parliament. Agriculturally, B. occupies a prominent position, and in 1881, 194,413 acres were under cultivation, of which 64,217, were under corn crops, and 34,292 under green crops. In 1875, 192,480 statute acres were farmed by 983 tenants and owners. B. is, however, almost entirely barren of hives of manufacturing industry. The principal towns are Dunse, or Duns, the most populous, the birthplace of Thomas Boston, Dr. M'Crie, and as some contend, of Duns Scotus; Greenlaw, the county town; Lauder, a royal burgh; Eyemouth, a prosperous fishing-station; Coldstream, where General Monk first raised the Coldstream Guards; Ayton; and Earlston, the Ercildoune of Thomas the Rhymer. Dunse being more central than Greenlaw, the great bulk of the county business has been transferred thither. Many names famous in Scottish annals are closely associated with B.; amongst others, ancestors of the royal Stuarts; the noble family of Douglas; the Earl of Bothwell, who was sheriff of B.; the brave but unfortunate son of James II., styled Duke of B.; the great Marlborough (Baron Eyemouth); and the records of the Court of Session show that no fewer than 23 judges were natives of B. The antiquities of the county are few, the chief being the ruins of Dryburgh Abbey, Coldingham Priory, Fast Castle, and the remains of British and Roman camps and barrows.

BERWICK-ON-TWEED, a seaport town at the mouth of the Tweed, 58 miles S.S.E. from Edinburgh. It is the frontier town of England and Scotland, and with its liberties, comprising an area of about 8 miles, forms an independent borough and county by itself separate from England and Scotland; and since the Municipal Reform Act of 1835, its proper designation is 'County of the Borough and Town of Berwick-upon-Tweed.' It has its own quarter sessions and recorder, its own magistrates and petty sessions, and maintains its own police staff. The municipal and parliamentary boroughs are co-extensive. Pop. (1881) 13,995, an increase since 1871 of 713; inhabited houses, 2370, increase, 268; constituency, 1148, returning two members to parliament. The past history of B. is full of interest, especially in regard to the Border wars. The authentic records of B. begin in the reign of Alexander I., 12th c., when it was one of the principal seaports in the kingdom. B. finally passed into the possession of England in 1482. The town has an antiquated and somewhat decaying appearance. It is girded with old fortifications, and has large barracks. Tweedmouth and Spittal (the latter a favorite watering-place), on the south side of the Tweed, both within the municipality of B., are reached by an old stone bridge, and a magnificent viaduct of 28 arches spans the river, and connects the North-eastern with the North British Railway. The shipping belonging to the port in 1880 was 22, tonnage 1893, and over 500 fishing-boats. The harbor commissioners resolved, with the view of resuscitating the trade of the port, to construct a wet dock, at a cost of £40,000; this undertaking, commenced in 1873, is now completed. Of recent years the salmon fishings have improved, but the herring fishing has declined. For the manufacture of agricultural implements B. stands high, and in Spittal there are several large artificial-manure works. It has 20 places of worship, 4 belonging to Church of England, 3 to Church of Scotland, 4 Eng. Presbyterian, 4 U. P., and 5 of other denominations. 14 day-schools, including corporation's academy. Public institutions include infirmary and dispensary, museum, literary institute, and subscription library. Besides several new ecclesiastical edifices and schools erected of late years, a freemasons' hall, a good templars' hall, and a mission hall were built in 1873.

BE'RYL, a mineral which scarcely differs except in color from Emerald (q. v.), never exhibiting the bright rich green which characterizes that gem, but colorless, yellowish, greenish-yellow, or blue. The finer varieties, which are transparent and of beautiful color, are distinguished as *Precious B.*, and are sometimes called *Aquamarine*. These occur in crystals similar in form to those of emerald; but the regular hexagonal prism is more frequently modified by truncation on the angles or edges, acumination, &c. The prisms are often long. Their sides are longitudinally striated, often deeply so; but the truncating or terminating planes are smooth. The coarser varieties of B. (*Common B.*) are also found crystallized, but often massive. B. occurs chiefly in veins that traverse granite or gneiss, or imbedded in granite; sometimes it is found in alluvial soils formed from such rocks. Common B. is found in a number of places in Europe; Rubislaw, near Aberdeen, is a British locality. The mountains of Aberdeenshire, and those of Mourne in Ireland, yield Precious B., which is also found in several parts of the continent of Europe and of New England but principally in Brazil and Siberia. It is much valued as a precious-stone, although not so much as the emerald.



Beryl, in its primary form.

BERZE'LIUS, Johann Jacob, Baron, one of the greatest of recent chemists, was born at Westerlösa, in East Gothland, Sweden, 20th August, 1779. While studying for the medical profession at the university of Upsala, he was more attracted by the preparatory natural sciences, especially chemistry. After being some time employed in medical practice and lecturing, he was appointed (1806) lecturer on chemistry in the Military Academy of Stockholm, and, in the following year, professor of medicine and pharmacy. He was shortly after chosen president of the Stockholm Academy of Sciences; and from 1818 till his death, 7th August 1848, held the office of perpetual secretary. The king raised him to the rank of baron; other honors from learned societies were conferred on him; and the directors of the Swedish Ironworks, in consideration of the value of his researches in their particular branch of industry, bestowed on him a pension for life. In 1838, he was made a senator; but he took little part in politics. The field of his activity lay in his laboratory, where he acquired a name of which his country is justly proud. His services to chemistry are too vast to be described here. The science of chemistry as at present organized, rests in a great measure upon the discoveries and views of B., although in not a few points he has been controverted, or found wrong. His multiplied and accurate analyses established the laws of combination on an incontrovertible basis; and to him we owe the system of chemical symbols.

He discovered the elements selenium and thorium, and first exhibited calcium, barium, strontium, columbium or tantalum, silicium, and zirconium, in the metallic form. The blowpipe in the hands of B. became a powerful instrument in the analysis of inorganic substances. The multitude and accuracy of his researches in every branch of chemical inquiry make it difficult to conceive how one man could have accomplished so much. Of his numerous writings, the most important is his *Lärebok i Kemien* (Textbook of Chemistry, 3 vols., Stock. 1808—1818), which has since passed through five large editions, on each occasion being almost wholly rewritten. The best known edition is that published in 8 vols. at Brussels in 1835. The book has been translated into every European language. His essay *On the Use of the Blowpipe* exhausts the subject, while his *Annual Reports on the Progress of Physics, Chemistry, and Mineralogy*, undertaken at the request of the Academy of Sciences in 1822, have proved very valuable to science. Scarcely less so have been the *Memoirs Relative to Physics, Chemistry, and Mineralogy*, of which he was one of the originators and conductors, and to which, during the twelve years they were

published, from 1806 to 1818, he contributed forty-seven original papers.

BESANCON (*Vesontio*), capital of the French department of Doubs, and formerly capital of Franche-Comté, is situated on the river Doubs, which divides into two parts, about 45 miles east of Dijon. Lat. 47° 14′ N., long. 6° 3′ E. It was strongly but irregularly fortified by Vauban, the citadel being considered impregnable. Since that time, the fortifications have been extended and strengthened, and B. is now considered one of the strongest military positions in Europe. It was the ancient Vesontio, Besontium or Visontium, and was a considerable place even in the time of Cæsar, who, in 58 B.C., expelled from Vesontio the Sequani, and, in the neighborhood of the city, gained a victory over Ariovistus. It then became an important Roman military station. In modern times, after undergoing many changes, it finally came into the possession of France in 1674. Several streets and places in B. still bear old Roman names; and in the neighborhood are found ruins of a triumphal arch of Aurelianus, an aqueduct, an amphitheater, and a theater which must have been large enough to contain 20,000 spectators. Among the modern structures, the Cathedral and the churches of St. John and the Magdalen, with the Prefecture and the half-Gothic, half-Roman palace of Cardinal Granvella, are most remarkable. B. has considerable manufactures, chiefly watches (of which more than 300,000 are made annually), porcelain, carpets, iron-wire, and beer, and is an important entrepôt for the produce of part of Switzerland and the south of France. 600,000 bottles of Seltzer water are annually manufactured. Pop. (1881) 57,039.

BESA′NTS, or BEZA′NTS, circular pieces of bullion, generally gold, without any impression, supposed to represent the old coinage of Byzantium, brought home by the Crusaders, and hence of frequent occurrence as heraldic charges. B. are generally introduced into the arms of banks, and also into those of individuals who have been specially connected with money. Similar figures, when not colored *or* (gold), or *argent* (silver), are known in heraldry by the general term of *roundels*. A *bezanty cross*, is a cross composed of B.; and *bezanty*, or *bezantée*, is the term used when the shield, or any particular charge, is strewed with besants.

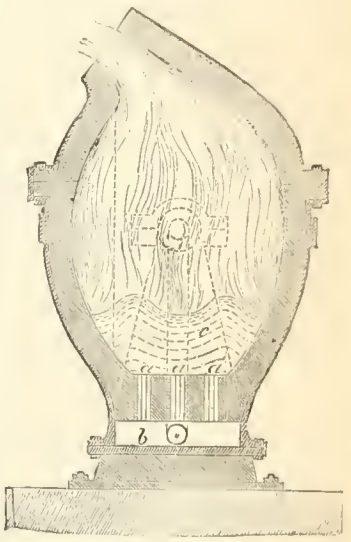
BESIEGING. See SIEGE.

BESSARA′BIA, a government in the south-west of Russia, on the Rumanian frontier. The area, enlarged by the restoration in 1878 of the portion ceded to Moldavia in 1856, is about 18,000 square miles; the population, now nearly 1,400,000, is composed of Russians, Poles, Walachians, Moldavians, Bulgarians, Greeks, Armenians, Jews, Germans, and Tatars, with a sprinkling of gipsies. The Dniester flows along the whole of its northern and eastern boundaries; the Pruth separates it from Moldavia on the west; and it has the Danube on the south. B. is also intersected by several considerable streams; which are, however, much reduced by the summer heats. The climate is, on the whole, mild and salubrious. In the north-west, the country is traversed by well-wooded offshoots of the Carpathian Mountains. Generally, however, B. is flat and fertile, but for want of proper cultivation the land does not yield the rich returns it is capable of doing. Wheat, barley, and millet are raised to some extent, as well as hemp, flax, tobacco, fruit, and wine; but the breeding of cattle forms the chief business of the inhabitants. Salt, cattle, wool, and tallow are exported; leather, soap, and candles are manufactured. B., which fell under the power of the Turks in 1503, suffered heavily in all wars with Russia, and was ceded to Russia in 1812. By the treaty of Paris, the portions of B. lying along the Pruth and the Danube —about 4000 square miles, with some 200,000 inhabitants, were assigned to Moldavia; at the Berlin Congress of 1878, this region was again transferred to Russia.

BESSA′RION, JOHANNES, or BASILIUS, born at Trebizond, on the Black Sea, 1395, is remembered as one of the earliest of those scholars who, in the 15th c., transplanted Greek literature and philosophy into the west, and rescued the mind of Christendom from the trammels of scholasticism. B. imbibed his love of Plato's writings from his tutor, Gemistus Pletho. As Bishop of Nicæa, B. accompanied the Greek emperor, John Palæologus, to Italy; and effected, at the council of Florence in 1439, a union between the Greek and the Romish Churches, which, however, was of short duration. Soon afterwards, he joined the Romish Church, but always retained a glowing love of his native land. He was made cardinal by Pope Eugene IV. in 1439. Ten years after, Nicholas V. created him Cardinal-bishop of Sabina, and in the same year Bishop of Frascati. For five years, also, he discharged the duties of papal legate at Bologna. After the fall of Constantinople, B. visited Germany; and at the diets of Nuremberg, Worms, and Vienna, endeavored to promote a crusade against the Turks. In philosophy, he professed to be a follower of Plato, but without depreciation of Aristotle. His writings, consisting of Latin translations of Greek authors, defensive treatises of the Platonic philosophy, with discourses and letters, have never been published collectively. Twice he was nearly elected pope; but his partiality for the heathen philosophy was probably regarded as some disqualification by the sacred college. B. died at Ravenna, November 19, 1472, leaving his collection of 600 valuable Greek MSS. to the St. Mark's Library Venice.

BESSÈGES, an industrious and thriving town of France, in the north of the dep. of Gard, 11 miles north from Alais. It is situated on the river Ceze. A railway connects B. with Alais. There are extensive coal-mines in the neighborhood. Pop. (1875) 7953.

BESSEMER PROCESS FOR MAKING STEEL. The boldest and most noted attempt which has yet been made to improve on the older methods of making both malleable iron and steel, is that of Sir Henry Bessemer, whose process was patented in 1856. Bessemer's first idea was to blow air through molten cast-iron till the whole of the carbon was oxidized when malleable iron was required, and to stop the blowing when a sufficient degree of decarburisation was effected in order to produce steel. He has hitherto failed to produce malleable iron of the least service by his process, so that, as a metallurgical operation, it is at present confined to the manufacture of steel. But neither can serviceable steel be made by the plan first specified by Bessemer, except from the best charcoal iron, such as the Swedish. In England, where charcoal iron is not used for this purpose, the process can only be successfully conducted by first oxidizing the whole of the carbon and silicon, and then restoring the proper amount of carbon by the addition of a small quantity of a peculiar cast-iron of known composition, called *spiegeleisen*. Moreover, until recently, hæmatite pig was the only kind of English iron which could be employed, as that made from clay iron-stone contained too much phosphorus and sulphur; but by the Thomas-Gilchrist modification of the Bessemer process impure ores can now be employed. See IRON.



Bessemer Converting Vessel.
a, a, a, tuyeres; *b*, air-space; *c*, melted metal.

The various steps in the Bessemer process, as at present conducted, are as follow: Pig-iron is melted either in a cupola or reverberatory furnace, and run in the liquid state into a converting vessel, such as is shown in section in the figure. This converter, or 'kettle,' as it is called in Sheffield, is of wrought-iron, lined either with firebrick or with a siliceous material called 'ganister,' and is suspended on trunnions, so as to admit of its being turned from an upright to a horizontal position by means of hydraulic appartus. The capacity of a converter varies from three to ten tons. In the bottom there are seven tuyères, each with seven holes of one half-inch in diameter, through which atmospheric air is blown with a pressure of from 15 to 20 lbs. per square inch by a blowing-engine.

The molten iron in the converter is therefore resting, from the first, on a bed of air, the strength of the blast being sufficient to keep it from falling through the tuyères into the blast-way. During the blowing off of the carbon at this stage, a striking and magnificent effect is produced by the roar of the blast, and the volcano-like shower of sparks and red-hot fragments from the mouth of the converter, as well as by the dazzling splendor of the flame. In about fifteen or twenty minutes, the whole of the carbon is dissipated. This first 'blow' being over, the converter is lowered to a horizontal position, and presently a red stream of molten spiegeleisen is run into its mouth, till it amounts to from 5 to 10 per cent. of the whole charge. As already stated, the spiegeleisen restores the proper amount of carbon to produce steel; and after it is added, the blast is again turned on for a few minutes to secure its thorough incorporation. There is a circular pit in front of every two converters, with a hydraulic piston in its center, and on its counterpoised arm a large ladle is hung, so that it can sweep the whole circumference. Round this the ingot-molds are arranged, and the hydraulic machinery is so conveniently planned that, simply by moving levers, a man standing on a small platform can empty the contents of the huge converters into the ladle, raise or lower the ladle itself, and turn it round from point to point, so as to fill the molds by means of a plug in its bottom. Steel made in this way is not sufficiently dense, and accordingly the moulds are lifted off the ingots by means of a hydraulic

crane, and the latter removed while still hot, and condensed under heavy steam-hammers. After this, they are rolled into rails, tires, plates, and other heavy objects, for which this steel is suitable. Although, as already said, Bessemer steel will not do for tools and cutting instruments, nor even for such comparatively coarse objects as the springs of railway waggons, yet the great value of the invention is shown by the fact that 800,000 tons of steel are annually made by this process in Great Britain, the number of converting vessels in use being about 120. (For the Thomas —Gilchrist process, see IRON.) Large quantities are also manufactured by it in Sweden, Russia, Prussia, Belgium, and France. It is likewise extensively employed in America, where Mr. Hay has seemingly improved the process by adding a *matte* of several metals and metalloids along with the spiegeleisen. See IRON.

BESSEL, FRIEDRICH WILHELM, one of the most distinguished of modern astronomers, was born at Minden, July 22, 1784. In 1806 he was, on the recommendation of Olbers, whom he had greatly assisted by his remarkable expertness in calculation, appointed assistant to Schröter at Lilienthal. In 1810, he published his researches on the orbit of the great comet of 1807; which gained for him the Lalande prize of the Paris Academy of Sciences. In the same year he was appointed director of the new observatory to be erected by the king of Prussia at Königsberg; and repairing thither immediately, superintended the erection and the mounting of the instruments. The establishment was completed in three years. In 1818, B. published his *Fundamenta Astronomiæ*—giving the result of Bradley's Greenwich observations—a work upon which he had been engaged for eleven years. This work is one of the highest value to astronomers. It is described by a competent authority as having laid the foundations of the principal improvements which have been made in astronomy since the date of its publication. In 1830 appeared his *Tabulæ Regiomontanæ*, forming a kind of supplement to the above work. Besides numerous papers of an important character (nearly 200 in all) scattered through various scientific journals, he also published an inquiry on the *seconds' pendulum* for Berlin (1828, and again in 1837), *Astronomical Researches* (2 vols., Königsb. 1841—1842). His paper on the precession of the equinoxes gained him the prize of the Berlin Academy. After a series of three years' observations he succeeded in determining the annual parallax of the fixed star 61 Cygni (see STARS), an achievement honorable not only as the first of its kind, but for the marvellous skill and patience necessary for its accomplishment. In the years 1824—1833, B. made a series of 75,011 observations in 536 sittings, and completed a catalogue of stars (extending to the ninth magnitude) within the zone from 15° N. to 15° S. declination. These were afterwards reduced by Weisse. In one of his lectures, delivered at Königsberg in 1840, B. indicated the existence of the new planet afterwards discovered by Le Verrier, and named Neptune; and but for the death of a favorite son, he in all probability would have undertaken the investigation of the problem. B.'s *Popular Lectures on Astronomy*, given at Königsberg, 1832—1844, were edited by his friend Schumacher, and published at Hamburg in 1848, two years after his death, which took place March 7, 1846. All scientific associations, both on the continent and in England, were eager to confer honor on themselves by enrolling B. as one of their members. He was a thoroughly practical man of science, never allowing himself to be carried away by any theory, however inviting, and particularly remarkable for the precision of his calculations, being satisfied with nothing less than perfect exactness.

BESSENO'VA, a small town of the Austrian empire, in South Hungary, on the north bank of the Aranka, eight miles west-south-west from St. Miklos. Pop. 7896.

BESSIERES, JEAN BAPTISTE, Duke of Istria, and Marshal of the French Empire, was born at Preissac, in the department of Lot, August 1768. After serving for a short time in the constitutional guard of Louis XVI., in November 1792, he entered the army of the Pyrenees as a private soldier. In less than two years, he had attained the rank of captain, and passing into the Army of Italy, he distinguished himself greatly in the battles of Roveredo and Rivoli. Having been made chief of a brigade in 1798, he in that year accompanied Bonaparte to Egypt, and made himself conspicuous at the siege of St. Jean d'Acre, and at the battle of Aboukir. Afterwards, he took a prominent part in the battles of Marengo, Olmütz, Austerlitz, Jena, Friedland, and Eylau; and within five years (from 1800 to 1805), he was made successively general of brigade, general of division, and marshal of France. For his gallant behavior in Spain, he was, in 1809, created Duke of Istria. In the Russian campaign, he commanded the cavalry of the Guard, and during the disastrous retreat from Moscow, the services he rendered were of the utmost importance. In 1813, he received the command of the whole of the French cavalry. On the morning of the battle of Lützen, while leading on foot the *tirailleurs* to reconnoitre the field from the defile of Rippach, he fell mortally wounded by a bullet. The news of his death was kept concealed from the army throughout the day. Bonaparte lost in B. one of his ablest officers and his most faithful friend.

BESTIAIRES (Fr.), the name given to a class of written books of great popularity in the middle ages, describing all the animals of creation, real or fabled, and generally illustrated by drawings. They were most in fashion during the 11th, 12th, and 13th c. They served as encyclopædias of the zoology of those ages, but they had also another use. The symbolism which was then so much in vogue fastened spiritual meanings upon the several animals, until every quality of good or evil in the soul of man had its type in the brute world. It is in this way to the *B.* that we must look for explanation of the strange, grotesque creatures which are found sculptured on the churches and other buildings of the middle ages. There were B. both in prose and in verse, in Latin and in the vernacular. A few sentences from *Le Bestiaire Divin de Guillaume, Clerc de Normandie, Trouvère du XIII.e Siècle* (Caen 1852), may help to give some notion of the class of works of which it is a fair example. 'The unicorn,' he writes, 'has but one horn in the middle of its forehead. It is the only animal that ventures to attack the elephant; and so sharp is the nail of its foot, that with one blow it rips up the belly of that most terrible of all beasts. The hunters can catch the unicorn only by placing a young virgin in the forest which it haunts. No sooner does this marvellous animal descry the damsel, than it runs towards her, lies down at her feet, and so suffers itself to be taken by the hunters. The unicorn represents our Lord Jesus Christ, who, taking our humanity upon him in the Virgin's womb, was betrayed by the wicked Jews, and delivered into the hands of Pilate. Its one horn signifies the gospel truth, that Christ is one with the Father,' &c.

BESTUSCHEW, ALEXANDER, a Russian novelist, born about 1795, was captain in a dragoon regiment, and adjutant to Alexander, Duke of Würtemberg. Having been involved with his friend Rylejew in the conspiracy of 1825, he was degraded to the ranks, and exiled to Yakutz, but after long entreaty, permitted to enter the army of the Caucasus, as a private in 1830. In June 1837, he fell in a skirmish with the as yet unconquered mountaineers. Two years before his exile he together with his friend Rylejew, who was executed in 1825, had published the first Russian almanac, *The Pole Star*. His later works, consisting chiefly of novels and sketches, written under the name of Cossack Marlinski, bore the impress of his own life and adventures in the Caucasus. They excel in depicting the wilder aspects of nature and the excitement of a soldier's life, but fail in the delineation of character, and are often exaggerated, and sometimes absurd. His principal works are the tale of *Mullah Nur*, and the romance of *Ammalath Beg*, which last relates the treachery of a Circassian chief, and gives interesting pictures of the scenery of the Caucasus. Several of his novels were translated into German by Seebach (Leipsic 1837), and his collective works appeared at St. Petersburg in 1840, under the name of Marlinski's Tales. His three brothers were implicated in the military conspiracy of 1825, and hanged by the special order of the emperor.

BETA'NZOS (anciently *Brigantium Flavium*), a town of Spain, province of Corunna, 10 miles south-west of the city of the same name. Ancient granite gateways still defend its narrow streets. It has manufactures of linen, leather, and earthenware. Pop. (1877) 8000.

BE'TEL, BE'TLE, or PAWN, a narcotic stimulant, much used in the East, and particularly by all the tribes of the Malay race. It consists of a leaf of one or other of certain species of pepper, to which the name of betel-pepper is indiscriminately applied, plucked green, spread over with moistened quick-lime (*chunam*) generally procured by calcination of shells, and wrapped around a few scrapings of the areca-nut (see ARECA), sometimes called the betel-nut, and also known as *Pinang*. This is put into the mouth and chewed. It causes giddiness in persons unaccustomed to it, excoriates the mouth, and deadens for a time the sense of taste. It is so burning, that Europeans do not readily become habituated to it, but the consumption in the East Indies is prodigious. Men and women, young and old, indulge in it from morning to night. The use of it is so general as to have become matter of etiquette; a Malay scarcely goes out without his betel-box, which one presents to another as Europeans do their snuff-boxes.

The chewing of B. is a practice of great antiquity, and can certainly be traced back to at least the 5th c. B.C. It gives a red color to the saliva, so that the lips and teeth appear covered with blood; the lips and teeth are also blackened by its habitual use, and the teeth are destroyed, so that men of twenty-five years of age are often quite toothless. Whether the use of B. is to be regarded as having any advantages, except the mere pleasure afforded to those who have acquired the habit of it, to counterbalance its obvious disadvantages, is a question upon which difference of opinion subsists. Some have represented it as beneficially promoting the secretion of saliva, strengthening the digestive

powers, and warding off the attacks of fever; whilst others pronounce against it an unqualified condemnation. Sir James Emerson Tennent, in his valuable and interesting work on Ceylon, expressed the opinion that it is advantageous to a people of whose ordinary food flesh forms no part, and that it is at once the antacid, the tonic, and the carminative which they require.

The name B. is often given to the species of pepper of which the leaves are ordinarily chewed in the manner just described, which are also called B.-PEPPER or PAWN. Some of them are very extensively cultivated, particularly *Chavica Betle*, *C. Siraboa*, and *C. Malamiri*, climbing shrubs with leathery leaves, which are heart-shaped in the first and second of these species, and oblong in the third. They are trained to poles, trellises, or the stems of palms, and require much heat with moisture and shade; upon which account, in the north of India, where the climate would not otherwise be suitable, they are cultivated with great attention in low sheds, poles being placed for their support at a few feet apart. Hooker mentions in his Himalayan Journal, that these sheds are much infested by dangerous snakes, and that lives are therefore not unfrequently lost in the cultivation of betel.—The genus *Chavica* is one of those into which the old genus *Piper* (see PEPPER) has recently been divided. The requisite qualities of B. are probably found in the leaves of numerous species not only of this but of other genera of the same family. The leaf of the Ava (q. v.) is sometimes used.

BE'THANY, meaning a 'boat-house;' called 'Lazariyeh,' or 'Town of Lazarus,' by the natives of Palestine, in reference to the event narrated in Scripture. It is a retired spot, beautifully situated on the southern slope of the Mount of Olives, 3 miles from Jerusalem, with a population of about 500, principally Latins. There is nothing remarkable about the village except some ruins, among which are some which are said to have been the house of Martha and Mary, and the cave or grave of Lazarus, the descent into which is effected by 26 steps cut in the solid rock, leading to a small chamber, about 5 feet square, also excavated. The appearance of the cave certainly corresponds with what is said about it in Scripture—'It was a cave, and a stone lay upon it' (St. John xi. 38). Near to the cave are the ruins of a fort built by Queen Melisinda in 1132, to protect the nunnery founded by her in honor of Martha and Mary.

BE'THEL, called Betein by the natives, about 10 miles from Jerusalem, mentioned in Scripture as the scene of Jacob's dream. Here also Abraham pitched his tent. Now a heap of ruins, almost entirely deserted, or only inhabited by a few straggling Arabs.

BETHELL, THE RIGHT HON. RICHARD, BARON WESTBURY, an eminent lawyer, born at Bradford, Wiltshire, in 1800, son of a physician at Bristol. From Bristol grammar-school, he went at the age of 14, to Wadham College, Oxford, where he was first-class in classics, and second-class in mathematics, and took his degree of B.A. at the early age of 18. After being a private tutor at Oxford, he studied law, and was called to the bar at the Middle Temple in November 1823. In 1840 he was made a Queen's counsel. Elected, in April 1851, M.P. for Aylesbury, on the formation of the Aberdeen ministry in December 1852, he was named Solicitor-general, and shortly after knighted. From November 1856 to March 1858, he was Attorney-general. In 1861 he was made Lord Chancellor, and at the same time raised to the peerage. He resigned the great seal, however, in 1865, and on July 20, 1873, he died. B. was conspicuous for his exertions in the cause of law reform, in improving the system of education for the bar, and in abolishing the ecclesiastical courts, &c.

BETHE'SDA, POOL OF, meaning 'House of Pity.' The scene of Christ's cure of the impotent man (St. John v. 2–9), and resort of the 'impotent, blind, halt, and withered,' once filled with water, 'which an angel went down at certain seasons and troubled,' is now dry and used as a deposit for dirt and rubbish. It is situated within the gates of Jerusalem, near St. Stephen's gate and the Temple of Omar; measures 460 feet in length, by 130 in breadth, and 75 in depth.

BE'THLEHEM, or BEIT-LAHAM, meaning 'House of Bread,' celebrated in Scripture as the birthplace of our blessed Saviour, and of King David, is now a small unwalled village, situated at a distance of 5 miles south of Jerusalem. The population, about 3000 souls, is wholly Christian—that is Latin, Greek, and Armenian. The village is situated in the center of a most interesting country; and the roof of the Latin monastery—the only public building of any importance, enclosing the cave which is the alleged place of our Lord's nativity—commands a beautiful and extensive view of the surrounding country: in the distance, east, are the mountains of Moab and the plains of the Jordan; south, stands the hill of Tekoah, familiar as the scene of the pastoral life of the prophet Amos; beyond, and rather more to the east, lies the wilderness of Engedi, to which David retreated for the purpose of concealing himself against the pursuit of Saul, and where the allied armies of the Amorites, Moabites, and others, encamped when they came forth against Jehosaphat; north, is the road to Jerusalem, with the mountains of Judea and Rachel's tomb. The Convent of the Nativity, which encloses the supposed manger, &c., is a large square building, more resembling a fortress than the quiet habitation of the recluse, was built by the Empress Helena, 327 A.D., but was destroyed by the Moslems in 1236, and, it is supposed, restored by the Crusaders.

Within it is the Church of the Nativity, which, like and in connection with the Church of the Holy Sepulchre at Jerusalem, is subdivided among the Latins, Greeks, and Armenians, each community having a separate portion of the edifice for devotional purposes. The church is built in the form of a cross; the nave, which is by far the finest part of the building belongs to the Armenians, and is supported by 48 beautiful Corinthian columns of solid granite, each between 2 and 3 feet in thickness, and about 17 in height. The other portions of the church, forming the arms of the cross, are walled up. At the further end of that section, which forms the head of the cross, and on the threshold, is a sculptured marble star, which the Bethlehemites say covers the central point of the earth! Here a long intricate passage descends to the crypt below, where the blessed Virgin is said to have been delivered. The walls of the chamber are hung with draperies of the gayest colors; and a silver star, with the words, '*Hic de virgine Maria Jesus Christus natus est*,' marks the spot of the nativity. The manger stands in a low recess cut in the rock, a few feet from this star.

The other objects of interest in the church are the chapel and tomb of St. Jerome, who became a monk of this convent towards the end of the 4th c.; the chapel and tomb of Santa Paula, a Roman lady, and the founder of several nunneries at Bethlehem; the tomb of St. Eudosia; and the pit into which it is supposed the bodies of the murdered innocents were cast. B. is under the jurisdiction of the pasha of Jerusalem. The Bethlehemites chiefly gain their subsistence by the manufacture and sale of crucifixes, beads, boxes, shells, &c., of mother-of-pearl and olive-wood. Much wine is made at B. which is considered all over Palestine next best to the Lebanon wine.

BE'THLEHEM is the name of the chief settlement of Moravians in Pennsylvania, U. S.

BE'THLEHEMITES, or BE'THLEHEMITE BROTHERS, the name of the order of monks at Cambridge in the 13th c.; also of an order founded in Guatemala, 1673. The followers of Jerome Huss were styled B., from Bethlehem Church in Prague, where their leader preached.

BETHLEN-GABOR (or, as he would be called in Western Europe, GABRIEL BETHLEHEM or BETHLEN, it being a common custom in Hungary and Transylvania to make the baptismal follow the family name) was descended from an ancient and distinguished Protestant family of Upper Hungary, which also possessed important estates in Transylvania, and was born in 1580. He rose to prominence during the troubles which distracted the principality in the reigns of the two Bathories, Sigismund and Gabriel; and on the death of the latter of these unfortunate princes, succeeded (1613), by the aid of the sultan, in being chosen sovereign prince of Transylvania, the House of Austria being at that time in no condition to offer effective opposition. In 1619, when the Bohemians rose in defence of their religious and political rights, they looked eagerly for support to B., who had already gained a wide reputation as a warrior and a champion of Protestanism; and the Transylvanian prince, too glad of such an opportunity to gratify his ambition at the expense of his enemy, Austria, eagerly proffered his support. He accordingly marched into Hungary, took Kaschau, his advance more resembling a triumphal procession than a hostile invasion, and on arriving under the walls of Presburg was greeted with every mark of joy by the citizens. With an army now swelled by Hungarian volunteers to nearly 100,000 men, he pursued his route towards Vienna, driving before him the Spaniards under Bucquoy, and the Austrians under Dampierre; and would doubtless have captured the capital, had not the severity of the season, and the want of provisions, combined with the reinforcements of his opponents, and the defeat of his lieutenant, Ragotski, in Hungary, compelled him to retreat for a time. However, though he retired as far as Kaschau, he did not relinquish his hold of Hungary, of which, by the assembled diet, he had been crowned king at Presburg, 25th August, 1620; but, resuming the offensive, on the defeat and death of Bucquoy, before Neuhausel, he recovered the fortresses which the imperialists had retaken, and spread terror and devastation to the gates of Vienna. His allies, the Protestants of Germany, being apparently crushed, B. concluded peace with Ferdinand II., receiving the town of Kaschau, with seven Hungarian counties adjoining Transylvania, the principalities of Oppeln and Ratibor in Silesia, and the dignity of prince of the empire. This treaty, however, was soon broken by the emperor, who thought so favorably of his own situation as to imagine he could violate his agree-

ment with impunity; but he was soon undeceived, for B. raising an army of 60,000 men, invaded Moravia, obtained the solemn renewal of the former treaty, and then retreated homewards. His marriage with Catharine of Brandenburg in 1625 involved him once more in the Thirty Years' War; but he finally retired from the contest in the following year, and thenceforth devoted himself exclusively to the internal affairs of Transylvania. He died in 1629, after a lingering and painful illness.

B.'s reign was a glorious and flourishing epoch in the history of the little principality; for not only did the great successes achieved through his military talents give a prestige to its arms, but his protection of science and letters, in both of which he was well accomplished did much to aid the progress of learning. He founded the Academy of Weissemburg at Karlsburgh, and installed there, as professors, Opitz, Alstedt, Besterfild, and Piscator. —His brother STEPHEN succeeded him, but was soon compelled to resign the throne.—To the same family of Bethlen belong JOHN and WOLFGANG, both Chancellors of Transylvania, the former of whom is celebrated for his work *Rerum, Transylvanicarum, libri iv.* (Hermannstadt, 1683), which gives the history of the principality from 1629 to 1663; and the latter of whom wrote a History in 16 books, the MS. of which, from long neglect, had been much damaged, but which was afterwards restored and completed, and published (6 vols.) at Hermannstadt in 1792, under the title of *Wolfgangi de Bethlen Historia de Rebus Transylvanicis* (1526—1609).

BE'THNAL GREEN, an eastern suburb of London, in Middlesex, including Victoria Park. Pop. (1881) 127,006, many being silk-weavers. It possesses a museum, a branch of the one at South Kensington.

BETHSAI'DA, on the lake of Galilee, mentioned in the Scripture as the city of Peter and Andrew and Philip, now a heap of ruins overgrown with grass.

BETHSHE'MESH ('House of the Sun,' or 'Sun Town;' modern name, *Ain-esh-Shems*, 'Fountain of the Sun,' now distinguishable by neither house nor fountain from which it was likely to derive its name), a ruined city of Palestine, 15 miles west-south-west of Jerusalem, finely situated on the point of a low ridge, commanding an extensive view of the country, rendered interesting by the exploits of Samson. B. was a sacerdotal city belonging to the tribe of Judah, bordering alike on the possessions of Dan and of the Philistines, and fixed by Eusebius ten Roman miles from Eleutheropolis, on the Nicopolis road. It is interesting as the place where the Ark of the Lord first rested, after the Philistines had sent it back (1 Sam. vi.). One of Solomon's twelve purveyors resided at B., where also was fought the battle between Judah and Israel, in which Jehoash captured Amaziah (2 Kings xiv. 11, 13). B. was taken by the Philistines during the reign of Ahaz, and from that time disappears from sacred history.

BETHUNE, a town of France, in the department Pas-de-Calais, situated on a rock overlooking the river Brette, and the canals of Lawe and Aire, 16 miles north-north-west of Arras. It is strongly fortified, part of the works and citadel having been constructed by Vauban. It has manufactures of linen and cloth, and a considerable trade in the agricultural produce of the surrounding country. Taken by the French in 1645, it was retaken by the allies in 1710, but was restored to France by the Treaty of Utrecht. The first artesian wells are said to have been bored here. Pop. (1876) 9315.

BE'TICK, or BE'TIK, on the river Oxus, Central Asia, 'one of the greatest ferries between Persia and Turkistan.' Lieutenant Burnes, who in 1834 published an account of his travels in Central Asia, says the Oxus is here 650 yards broad and 25 to 29 feet deep.

BE'TJUANS, or BECHUA'NAS, the name of an extensive nation of Southern Africa, occupying the country between 25° and 29° E. long., and extending from 28° S. lat. northward beyond the tropic of Capricorn. The B. are generally of a peaceful, indeed cowardly disposition, and are divided into many tribes under the government of chiefs who exercise a kind of patriarchal authority over them. According to Dr. Livingstone, the different tribes take their names from certain animals, 'showing probably that in former times they were addicted to animal worship. The term Bakatla means, "they of the monkey;" Bakuena, "they of the alligator;" Batlápi, "they of the fish;" each tribe having a superstitious dread of the animal after which it is called. They also use the word "bina," to dance, in reference to the custom of thus naming themselves, so that when you wish to ascertain what tribe they belong to, you say, "What do you dance?" It would seem as if that had been part of the worship of old.' Many tribes formerly existing are extinct, as is evident from names that have now no living representatives. The B. have a vague notion of a Supreme Being, but no intelligent idea of his attributes. Dr. Livingstone describes the tribe to which he attached himself—the Bakuena or Bakwains—who are favorable specimens of the nation, as generally slow 'in coming to a decision on religious subjects; but in questions affecting their worldly affairs they are keenly alive to their own interests.' In all agricultural matters they are very acute, exhibiting a wonderful knowledge of the properties of the soil, as well as of the nature and habits of animals. They have a superstitious reverence for a class of impostors calling themselves 'rain-doctors,' who profess to be able to bring down rain in dry seasons by a certain specific, composed of all kinds of disgusting animal and vegetable substances. One peculiarity of the B. is their inability to build their houses square; all erections take a circular form.

BETROTHMENT, a mutual engagement by a man and woman with a view to marriage. This anciently consisted in the interchange of rings, kissing, joining hands, and the testimony of witnesses; and the ecclesiastical law punished the violation of such B. by excommunication; but such a spiritual consequence was abolished by the 26 Geo. II. c. 33. A previous B. had also been regarded as a legal impediment to marriage with another. 'It was not,' says Mr. Macqueen, in his *Treatise on the New Divorce Jurisdiction*, 1858, p. 73, 'by the axe that the promoter of the English Reformation extinguished his marriage with Anne Boleyne. He first carried her into the Ecclesiastical Court, and there obtained a sentence, on the ground of her alleged precontract with Northumberland.' The aggrieved party, since the 26 Geo. II., has been left to the only remedy of an action for breach of promise. In Scotland, there is the same mode of redress consequent on a refusal to proceed to matrimony; but in that country, where the B. or engagement can be shown to have been a clear, free, and deliberate *present consent* on the part of both the man and woman to form the relationship of husband and wife, such a contract may be enforced against the recusant party; and indeed it constitutes marriage itself. See MARRIAGE, PROMISE, HUSBAND AND WIFE.

BETTERTON, THOMAS, a celebrated actor, for about half a century the chief ornament of the English stage, was born in London, 1635, and died there in 1710. The best contemporary judges, such as Addison, Cibber, &c., bear admiring witness to his dramatic powers, which overcame the natural disadvantages of a low voice, small eyes, and an ungainly figure. His private character was highly estimable, cheerful, modest, and generous. After a retirement of many years, it became known that his circumstances were very straitened, and it was determined to give him a public benefit. On the 6th April 1709, the spirited veteran (then in his 74th year) appeared with immense *éclat* in the youthful part of Valentine in Congreve's *Love for Love*. He acted several times again. Mrs. B. took the same rank among contemporary actresses as her husband did among actors.

BETTING, or WAGERING, is an inveterate practice of the English, which is exemplified in almost all classes of society, but more particularly in relation to horse-racing; bets as to which will be the winning horse at a particular race, being entered into by the highest as well as the lowest of the people. Sanctioned by fashion, betting on horses is carried on to so ruinous an extent in the metropolis, that the legislature has interfered to check the evil. The haunts of betters, called BETTING-HOUSES, are suppressed by the 16 and 17 Vic. c. 119. The act declares them to be a common nuisance, and contrary to law, and prohibits them under very severe penalties. But it provides that its enactments shall not extend to stakes or deposit due to the winner of any race, or lawful sport, game, or exercise. The act was extended to Scotland in 1874. See GAMBLING.

BE'TTOLA, a town of Northern Italy, in the province of Piacenza, about 20 miles south-west of the town of the same name. It is situated on the Nure, in a fertile district. Pop. 5668.

BE'TULA. See BIRCH.

BETULA'CEÆ, or BETULI'NEÆ. See AMENTACEÆ and BIRCH.

BE'TWAH, a river of India, which, after a north-east course of 340 miles, joins the Jumna on the right, about 20 miles to the east-south-east of Calpee. It rises in the Vindhya Mountains, which, uniting the West and the East Ghauts at their northern extremities, form the dividing ridge between the basins of the Nerbudda and the Ganges. It runs through beds of iron ore, and waters the towns of Bileah and Jhansi. The source of the B. is in lat. 23° 14' N. and long. 77° 22' E., and its mouth in lat. 25° 57 and long. 80° 17'. It is described as a very great river, being, even in the dry season, half a mile wide at its junction with the Jumna. It is, however, not navigable in any part of its course.

BEUKELZOON, WILLIAM, a person in humble life, belonging to the small town of Biervliet, in Holland, was the first who succeeded in salting and preserving herrings in a satisfactory manner. This improvement, which is said to have taken place in the year 1386, communicated a great impetus to the industry of the fisheries of Holland. It is related that the emperor, Charles V., made a

pilgrimage to the tomb of B., and there ate a herring in expression of his gratitude for the invention. The derivation of *pickle* from B.'s name, also written Beukels, Bökel, &c., is fantastic. B. died in 1397.

BEUST, Friedrich Ferdinand Freiherr von, German statesman, one of the most prominent modern politicians. His family is of old nobility, distinguished both in the field and the cabinet. B. was born on 13th January 1809, at Dresden, and after a careful preliminary education in Dresden, he attended the universities of Göttingen and Leipzig. Having conceived early a liking for politics, he devoted himself to diplomacy. After spending some time in travel (1834—1835), he served as secretary of embassy, first in Berlin, and then in Paris. In 1838, he represented his government at Munich, where he began to show his diplomatic talents, and soon acquired a certain celebrity. Eight years later, he went to London in the same character, from which he was removed in 1848 to Berlin. When called back to Dresden in 1849, he received the portfolio of Foreign Affairs. In this office, he declared against the adoption of the new constitution for the German Empire, and when thereupon an insurrection broke out in Dresden, he called in the assistance of Prussian military, which speedily crushed it. A few years later, he was made Minister of the Interior. On the death of Frederick VII. of Denmark (1863), B. came forward prominently as the exponent of the German national feeling on the Slesvig-Holstein question. In the name of his government, he disavowed the London protocol, and urged a policy favorable to the wishes of the Duchies, and in harmony with the national feeling of Germany. And, indeed, so prominent and popular did he become at this time, that he was sent as representative of the German Bund (the first that ever was sent) to the London Conference, where he stood his ground firmly, taking for his basis the principle of nationalities. Always the friend of Austria, he naturally supported that country in the crisis of 1866, joining in the declaration of war against Prussia, against the wishes of at least the liberal party in Saxony. After the termination of the 'six weeks' war,' he was obliged, at the demand of Prussia, to resign his office. He has since entered the service of Austria, and risen to the head of affairs. The chief result of his policy in the reorganization of the empire in the reconciliation of Hungary (1867) on the footing of its remaining a separate kingdom. See Germany. In 1871, he resigned the office of Chancellor, and from that year till 1879 was ambassador in England.

BEU'THEN, or BUTOM, a town of Prussian Silesia, the capital of a circle of the same name, in the government of Oppeln, and 50 miles south-east from Oppeln, near the Polish frontier. It has manufactures of woollen cloths and earthenware. The language generally spoken is Polish. Pop. (1880) 22,811.

BE'VEL, a term used by builders to describe a sloped or canted surface. See Splay.

BE'VELAND, North and South, two islands in the estuary of the Scheldt, Netherlands province of Zeeland. South B. is the largest and most fertile, containing 84,000 acres, with a population of 34,325. The chief town, Goes (Hús), near the north side, is well built, and has 6239 inhabitants. Making salt, leather, beer, candles, oil, chocolate, weaving cottons, and book-printing are the chief industries. South B. produces wheat and other grain, colza, madder, potatoes, and fruit abundantly. Fish are plentiful. North B. is low and marshy, has an area of 15,250 acres; pop. (1875) 7308, employed with agriculture. Both islands have suffered dreadfully from inundations. In 1532, North B. was completely covered with water, many of the inhabitants perishing; and it remained submerged for several years. At the same, the flourishing town of Romerswaal was separated from South B., and afterwards so encroached on by the sea, that the whole of the inhabitants had to leave it. The islands also suffered considerably from inundation in 1808. Within recent years, much good has been effected by drainage.

BEVELLED-GEAR. See Gearing.

BEVERIDGE, William, Bishop of St. Asaph, was born at Barrow, Leicestershire, in 1638. Entering St. John's College, Cambridge, at the age of fifteen, he at once became remarkable for his diligence and piety, and particularly for his devotion to the study of oriental languages, a treatise on which he published at the age of twenty. In 1660, having obtained his degree of M.A., he was ordained both deacon and priest. After many excellent preferments in which he was remarkable for his devotion to his pastoral duties, he was, in 1704, appointed to the bishopric of St. Asaph, having previously refused to accept that of Bath and Wells, on the deprivation of Dr. Thomas Kenn, for not taking the oaths to the government of William III. He died March 5, 1708, leaving the great bulk of his property to the Societies for the Promotion of Christian Knowledge, and the Propagation of the Gospel in Foreign Parts, and a reputation for sincere piety and great learning. His works, which, besides the treatise mentioned, include another on chronology, a collection of canons from the time of the apostles to that when the synod of Constantinople restored Photius, and various sermons and works of a religious kind, with a life, were collected and published in 9 vols. 8vo in 1824, by the Rev. Thomas Hartwell Horne.

BEVERLAND, Adrian, a Dutch scholar who, by several of his writings, but more especially by his unorthodox interpretation of the Fall, caused great excitement among the theologians of his day. He was born at Middelburg, in Zeeland, about the middle of the 17th c.; had studied law, visited the Oxford University, and was settled as an attorney in Holland, when, in 1678, he published his pamphlet, *Peccatum Originale*, which was not only burnt at the Hague, but led to his own imprisonment, and to his expulsion from Utrecht and Leyden, whither he had wished to betake himself. On his return to the Hague, he wrote *De Stolatæ Virginitatis Jure* (The Hague, 1680), which gave still greater offence than his first work. Soon after, he came to England, where he found a supporter in Isaac Vossius, and probably received his degree as doctor of civil law in Oxford. But it would appear from his virulent attacks against several dignitaries of the English Church, that he met with a good deal of theological opposition in England also. Probably it was the death of his benefactor, Isaac Vossius, in 1689, that led him in 1693 to repudiate his earlier writings, and to regret their tone. Having become insane, he appears to have died in England soon after 1712. In spite of his numerous enemies, B. stood high in the friendship of some of the most distinguished men of his time. His views respecting original sin have been often expressed by others, both before and after his day, though in a less flippant style. His works are now mere bibliographical curiosities.

BE'VERLEY, the chief town of the E. Riding of Yorkshire, 1 m. W. of the river Hull, with which it communicates by canal, and 10 m. N.N.W. of the city of Hull. B. formerly returned two members to parliament, but was disfranchised in 1870. Its trade consists in corn, coal, and leather, and there are several whiting and agricultural implement manufactories. The finest object in B. is the superb Gothic minster, or the Collegiate Church of St. John, ranking next to York Minster among the ecclesiastical structures of the country, and exhibiting different styles of Gothic architecture; the oldest part being of the 13th c. The choir contains the celebrated Percy shrine, of the most exquisite workmanship. The grammar-school of B. is so old, that the date of its foundation is unknown. B. arose out of a priory founded about the year 700, and received its name from Beverlac, 'lake of beavers,' from the great number of these animals in a neighboring lake or morass. Pop. (1871) 10,218; (1881) 11,442.

BEVERLOO', a village of Belgium, in the province of Limbourg, 12 miles north-west of Hasselt. On the extensive heath near is the permanent military camp for the instruction of the Belgian army.

BE'VERWYK, a pleasant village in N. Holland, with extensive meadows on one side and well-wooded country-seats on the other, 7 miles north from Haarlem; pop. (1875) 3339, who live by gardening and various trades. Strawberries and vegetables are cultivated for the Amsterdam and Haarlem markets. There is a haven with a branch canal leading to the large canal from the North Sea to Amsterdam.

BEW'DLEY (formerly Beaulieu, from its pleasant situation), a town on the right bank of the Severn, in the north-west of Worcestershire, 14 miles N.N.W. of Worcester. Pop. of parl. bor (1881) 8677; mun. bor. 3088. B. returns one member to parliament. It has manufactures of leather, combs, lantern leaves, carpets, and iron and brass wares. The chief transit for goods is by the Severn. Near the town is a public park of 400 acres, with fine groves of elm, oak, and plane.

BEWICK, Thomas, a celebrated wood-engraver, was born at Cherryburn, near Newcastle-on-Tyne, in 1753. Apprenticed to Beilby, an engraver in Newcastle, he displayed such extraordinary aptitude in his art, that, at the age of 17, he was intrusted with the cutting of the whole of the diagrams in Hutton's treatise on Mensuration. He afterwards illustrated Gay's *Fables*, obtaining in 1775, for one of the cuts, the 'Old Hound,' the prize which the Society of Arts had offered for the best wood engraving. In 1790, B., who had entered into partnership with Mr. Beilby, completed, along with his brother John, who was his pupil, the illustrations for a *General History of British Quadrupeds*, a work which raised his reputation far above that of any of his contemporaries, and gained for him the honorable and not undeserved appellation of the reviver of wood-engraving. Considered as works of art, these illustrations are still unrivalled in graphic force of expression and fidelity to nature, though the great mechanical improvements in the art introduced since B.'s time have rendered them inferior in clearness and delicacy of execution to some of the best cuts of the present day. Assisted by his brother, B. illustrated Goldsmith's *Traveller* and *Deserted Village*, Parnell's *Hermit*, and Somerville's *Chase*; and in 1797 appeared the first volume of his *History of British Birds*, which was followed in 1804 by the second. This

splendid work was entirely B.'s own, his brother having died in ln 1795. B.'s last work, the unfinished proofs of which he received the Saturday before his death, which took place at Gateshead, November 8, 1828, is called 'Waiting for Death,' and represents an old worn-out horse, with great pathos and truth. It was designed to assist in the prevention of cruelty to animals. A large cut of a bull—of the Caledonian breed—is considered B.'s *chef-d'œuvre*. B. had many pupils, some of whom were afterwards eminent as engravers. See *Life* by D. C. Thomson (1882.)

BEX, a village of (1870) 3804 inhabitants, in the Swiss canton of Vaud, situated on the high road to the Simplon, about 26 miles south-east of Lausanne. It is remarkable for its extensive salt mines, salt works, and sulphur baths. One of the mines, called *Du Bouillet*, has a gallery 7½ feet high, and 5 feet wide, extending horizontally into the mountain a distance of more than 2000 yards. The quantity of salt annually produced at B. is between 1000 and 2000 tons.

BEX'AR, San Antonio de, a thriving town of Texas, on the San Antonio River, at a distance of 110 miles to the south-west of Austin city. It is growing rapidly in population (which amounted in 1880 to 20,550), and in wealth. The place possesses six newspapers, several seminaries, three flouring-mills, three breweries, &c. San Antonia de B. was famous in the conflicts between the Mexican authorities and the American adventurers, more especially for the indiscriminate slaughter by the former of Colonel Crockett and his garrison.

BEŸ'ERLAND, a district in S. Holland, bounded south by the Hollandsch Diep and Haringvliet. It has several thriving villages, of which Old B. has 4620 inhabitants; South B. 1703; and New B. 1263; the whole canton, 16,000. The people are engaged in agriculture, have many orchards, and grow flax extensively. An inland shipping trade is carried on in summer.

BEY'ROUT, or BEIRUT, the Berothai or Berothah of the Old Testament (2 Samuel viii. 8, and Ezekiel xlvii. 16); and the Berytus of the Romans. It was besieged and captured by Baldwin I., king of Jerusalem, in 1111; recaptured from the Christians in 1187. In 1197, it again came into the hands of the Christians, and then successively under the Saracen, Seljukin and Turkish sultans. In course of the operations to support the Turkish claims against the assumed power of the pasha of Egypt, B., in 1840—1841 was bombarded by the English fleet under Sir C. Napier, taken, and delivered over to the Turks. There are three castles still standing out in the sea, whose battered walls bear witness to the efficacy of the British cannon. There are no ancient monuments worth visiting.

B. is a flourishing commercial town, situated in a most picturesque position on the coast of Syria, and at the foot Lebanon, 55 miles from Damascus, and 147 from Jerusalem. It is the chief seaport, market-town, and emporium of all the trade with the shores of Syria, Palestine, and Cilicia; and has a population of about 70,000 (the majority of whom are Christians) against 12,000 in 1835. A considerable increase in population is due to the settlement, in 1860, of numbers of the Christian refugees from Damascus. Several British merchants are established in B., and there is a branch of an English bank (the Ottoman). B. supplies the Lebanon, Damascus, and the north of Syria to Antioch and Joppa, with European manufactures and goods. French steamers, carrying mails, leave B. every week for Marseille.

British steamers ply regularly between England and B. every fortnight, bringing Manchester manufactures, prints, chintzes, Birmingham and Sheffield cutlery, &c., and returning to England with madder roots, wool, silk, and bitumen. Since 1859, a direct trade has been carried on between B. and the United States of America, the articles sent to the United States being wool and olive-oil; and since the opening of the Suez Canal, a direct Eastern trade in spices, indigo, and mocha coffee has sprung up. There is good anchorage in the roadstead, with shelter during stormy weather in the Beyrout River, about 3 miles from the town; and in 1874, £10,000 was allotted by the authorities for the construction of a harbor. About 350 merchant vessels of different nations visit and leave B. every year. The commerce is steadily increasing. In 1848, the imports were only £546,266; in 1873, they were £1,323,152. The exports in 1848 amounted to £253,648; in 1873, they were £668,568. In 1853, the imports into B. from Great Britain were £225,875; in 1871, they had increased to £676,900. A commercial tribunal, composed of European and native merchants, to adjudicate all mercantile disputes and bankruptcies, has lately been established; and consuls from all nations reside at Beyrout. Shipbuilding has begun to attract the attention of the natives, who have built and launched at B. several vessels of fifty to eighty tons within the last few years. There are extensive factories in the neighborhood, producing 'Syrian silk,' which is much esteemed in the London and Lyon markets. In 1859, a line of omnibuses, the first ever seen in Syria, was established at Beyrout. The natives at first regarded them with great astonishment, and crowded from all sides to see them pass. A French company completed in 1862 a good road from B. to Damascus. In 1875, an English company completed an extensive system of water-works, bringing a supply of excellent water from the Nahr-el-kelb, or Dog River, a distance of 9 miles. The town has lately been improved by the removal of the walls which formerly surrounded it. From its proximity to the mountains of Lebanon, on which the climate is most agreeable and salubrious, B. is an attractive place of residence; and it might rise into importance but for its odious Turkish custom-house arrangements and system of government.

BEZA, Theodore (properly, De Bèze), next to Calvin the most energetic and influential of the Genevese reformers, was born of a noble family at Vezelai, in Burgundy, 24th June 1519. He received an admirable education in Orleans, from Melchior Wolmar, a German, who was especially learned in the Greek language, and also imbued with the principles of the Reformation, which he communicated to his pupil. As early as 1539, B. became known as a writer of witty and elegant but indecent verses, the publication of which (1548) caused him many bitter regrets in after days, when his heart was purer. In his twentieth year, he obtained his degree as licentiate of civil law, and went to live in Paris, where he appears to have spent several years in a kind of fashionable dissipation, though he does not accuse himself of any gross profligacy. B. possessed a handsome figure, which together with his fine talents and good birth, opened to him the most brilliant prospects. Although not a priest, he pocketed the revenues of two benefices, while his income was largely increased by the death of an elder brother. It was the desire of his relatives that he should enter the church, but a private marriage which B. had contracted, rendered this impossible.

A severe illness now attacked him, during the lapse of which, the folly and sinfulness of his career vividly presented themselves to his conscience; he repented, and on his recovery, in order to avoid the perils and perplexities of his position, he went to Geneva along with his wife, October 1548. Shortly after, he was appointed Greek professor at Lausanne, an office which he held for ten years. In 1550, he published with success a melodrama, entitled *The Sacrifice of Abraham*, and delivered lectures on the Epistle to the Romans and the Epistles of Peter to crowded audiences. Out of these lectures ultimately sprang his Translation of the New Testament into Latin. In 1559, he went to Geneva, where he became Calvin's ablest coadjutor, and was appointed a theological professor and president of the college. He had already signalized himself by his work *De Hæreticis a Civili Magistratu puniendis*, in which, like many other good but mistaken men, he approved of the burning of Servetus. His diplomatic tact was particularly good. He induced the king of Navarre to exert his influence on behalf of the persecuted French Protestants, and was persuaded by the latter to attend the conference of Catholic and Protestant divines, held at Poissy in 1561. Here his courage, presence of mind, and dexterity made a very favorable impression on the French court. Catharine de' Medicis entertained so high an opinion of his abilities, that she desired him to remain in France. While in Paris, he often preached before the king of Navarre and Condé. On the outbreak of the civil war, he accompanied the latter as a kind of military chaplain, and after his capture attached himself to Coligny. In 1563, he once more returned to Geneva. In the following year, Calvin died, and the care of the Genevese church now fell principally upon his shoulders. He presided over the synods of French Reformers, held at Rochelle in 1571, and at Nimes in 1572. In 1574, he was deputed by Condé to transact important business at the court of the Palatinate; and in 1586 measured himself with the Wurtemberg divines, especially Jacob Andreä, at the religious conference held at Montbeliard. In 1588, his first wife died, and although verging on seventy, he married another—an awkward circumstance, it must be confessed, and one which his enemies, the Jesuits, tried to make a handle of; but B., who still retained complete mastery over his faculties, retorted with his accustomed liveliness and skill. In 1597, his calumniators spread the extremely foolish report that B. was dead, and at the last hour had returned to the bosom of the church. The witty patriarch replied in a poem full of sparkling vigor. He died 13th October 1605, at the ripe age of 86.

B. was thoroughly grounded in the principles of his master, Calvin, in whose spirit he vigorously ruled the Genevan Church for forty years, exercising the influence of a patriarch. To secure its unity, strength, and permanence, he spared no pains, sacrificing even his personal possessions. By his abundant learning, his persevering zeal, his acute intellect, his fine eloquence, and his impressive character, he rendered it important services. His numerous theological writings, however, cannot be said to have proved attractive to posterity. They have almost ceased to be read. The works by which he is best known are his translation of the New Testament into Latin, and his *History of the French Protestants from* 1521 *to* 1563.

BEZA'NT. See BESANT.

BE'ZDAN, a market-town of the Austrian empire, in the Hungarian province of Bacs, about three miles east of the Danube, and 12 miles west-north-west from Zombor. Pop. (1880) 7715.

BEZIERS, a city of France, in the department of Herault, lat. 43° 21′ N., and long. 3° 13′ E. It is pleasantly situated on a hill, in the midst of a fertile country, at the junction of the Orb and the Canal du Midi, about 38 miles south-west of Montpellier. It contains some interesting architectural and antique buildings—the principal being the cathedral, a noble Gothic edifice; the churches of La Madeleine and St. Aphrodise; and the ancient episcopal palace. The old citadel has been destroyed, but the walls still remain, and are made use of as a promenade. B. has manufactures of silk stockings, woollens, gloves, parchment, glass, soap, leather, and much esteemed confectionaries. It has also extensive brandy distilleries, and is the center of most of the trade of the district. The town is supplied with water raised from the Orb by means of a steam-engine. Pop. (1876) 36,928; (1881) 42,135.

B. is a place of great antiquity, and still contains Roman remains. It is historically interesting in connection with the massacre of the Albigenses, its inhabitants having been indiscriminately put to the sword by Simon de Montfort and the pope's legate, for having afforded protection to the fugitives in 1209. B. suffered also in the religious wars of the 16th c.

BE'ZOAR (Pers. *pazar*, a goat; or *pa*, against and *zachar*, poison), a concretion found in the stomachs of goats or antelopes, and formerly much valued on account of imaginary medicinal virtues, particularly as an antidote to poisons. Concretions of various kinds are found in the stomachs of herbivorous quadrupeds, very generally having for their nucleus some small indigestible substance which has been taken into the stomach. Sometimes they are of a radiating structure; sometimes formed of concentric layers; sometimes they are principally composed of superphosphate of lime, sometimes of phosphate of ammonia or magnesia. Other concretions found in the intestines, &c., of various animals are sometimes also called bezoar. See CALCULI. The value of a B. being supposed to increase with its size, the larger ones have been sold, particularly in India, for very great prices.

BHADA'RSA, a town of British India, in the chief-commissionership of Oude, on the Tons, 75 miles east from Lucknow. Pop. 5000, of whom 2000 are Mussulmans.—Here is an eleemosynary establishment, founded by the Nawab Vizier Asaf ud Dowlah, with an endowment of 15,000 rupees a year, the proceeds of which are divided indiscriminately among Mussulmen and Hindu religious mendicants. It is under the charge of a Seiad, or descendant of Fatima.

BHADRINA'TH, a town of Gurhwal, in the lieut.-governorship of the North-western Provinces, India, situated in a valley of the Himalaya, 25 miles to the south of the Manah Pass, which leads into Tibet. Lat. 30° 44′ N., long. 79° 32′ E. Its highest point is 10,294 feet above the level of the sea; while about 12 miles to the west, there is a group of summits, called the Bhadrinath Peaks, having the respective elevations of 23,441, 23,236, 22,934, 22,754, 22,556, and 21,895 feet; the east also, and the south-west, presenting detached mountains of similar magnitude. B. is situated on the right bank of the Vishnugunga, a feeder of the Aluknunda, which itself again unites with the Bhageerettee to form the Ganges. The chief attraction of the place is its temple, which, though the actually existing edifice is modern, is said to be an establishment of great antiquity. This temple overhangs a tank of about 30 feet square, which is supplied, by a subterranean passage, from a thermal spring in the neighborhood. As ablution in these waters is held to cleanse from all past sins, B. is a grand resort of pilgrims, every year bringing large numbers, but every twelfth year, when a periodical festival is celebrated, collecting fully 50,000. From November to April, the temple and its deity are abandoned even by the attendant Brahmins, on account of the cold.

BHAGAVAD-GITA (i. e., Revelations from the Deity) is the title of a religious metaphysical poem, interwoven as an episode in the great Indian epic poem of the Mahâbhârata (q. v.). Two hostile armies, the nearly related Kurus and Pândus, are drawn up in opposition, ready for battle; the trumpets sound the opening of the combat; and the Pându Ardshuna mounts his chariot, which is guided by the Deity himself, as charioteer, in the human form of Krishna. But when Ardshuna perceives in the hostile army his relatives, the friends of his youth, and his teachers, he hesitates to commence the struggle, held back by the doubt whether it were lawful for him, for the sake of the earthly gain of reconquering his father's kingdom, to transgress the divinely approved ordinances for the government of the state. Upon this, Krishna sets forth, in a series of eighteen poetic lectures, the necessity of proceeding, unconcerned as to the consequences. In the progress of his long discourse, a complete system of Indian religious philosophy is developed, in which the highest problems of the human mind are treated with as much clearness of thought as elegance of language. It is impossible to determine exactly when and by whom the work was composed. It is not, however, one of the first attempts of Indian philosophy, for it is rather of an eclectic nature; and before it could have been composed, there must have been a period of long-continued intellectual cultivation in many philosophic schools.

It is not unlikely that it was written in the first century after Christ. The work is looked upon with great reverence in India, and it has accordingly been made the subject of numerous commentaries (the best is that of Śridhara-Svâmin, published in Calcutta in 1832), and it has likewise been translated into various Indian dialects. Five different metrical versions in Hindi appeared in Bombay in 1842; a translation into the Telugu dialect in Madras, 1840; into the Canarese, Bangalore, 1846, &c. The best critical edition of the Sanscrit text is that of A. W. von Schlegel (2d ed., Bonn, 1846), to which is added a Latin translation. Among the other translations may be mentioned that into English by Wilkins (Lond. 1785), who had the credit of first making the work known in Europe; that into German, by Peiper (Leip. 1834); and the Greek translation by Galanos (Athens, 1848). See W. von Humboldt's treatise *Upon the Episodes of the Mahâbhârata* (Berlin, 1827); and see the B. translated by Telang, forming vol. viii. of *The Sacred Books of the East* (1882).

BHAGULPO'RE, the capital of a district and division of the same name in Behar, presidency of Bengal, lat. 25° 11′ N., long. 87° E. It stands on the right bank of the Ganges, which is even here 7 m. wide in the rainy season. A seminary for English instruction has been here established by the British government. It is the headquarters of the troops for keeping in check the Sonthal tribes. Pop. (1871) 69,678. In the vicinity of the town, are two round towers of about 70 feet in height, of the origin or object of which nothing is known.—2. B., as a district, contains 4327 sq. m. and (1871) 1,826,290 inhabitants. It lies S. of Nepaul, in lat. 24° 17′—26° 20′ N., long. 86° 15′—88° 3′ E. About a fifth is covered by hills, which, stretching to the S.-W., connect themselves with the Vindhya Mountains, the grand dividing-ridge between the Nerbudda and the Ganges.—3. The division of B. has an area of 18,685 sq. m. and a pop. of (1871) 6,613,358.

BHAMO', a town of Burmah, on the Upper Irawaddy, 40 miles to the west of the Chinese frontier, and 180 to the north-north-east of Ava. It contains 1000 houses, and has round it many populous villages. It is the chief mart of the trade with China, the imports being woollens, cottons, and silks, which are brought chiefly by caravans. B. has also a considerable trade with the tribes of the neighborhood, who exchange their native produce for salt, rice, and a sauce made of dried fish. There is a British Resident, and steamers ply to Rangoon.

BHANG, the eastern name for Hemp (q. v.).

BHANPURA. See BAMPURA.

BHARTRIHARI is the name of a celebrated Indian writer of apothegms. Little is known regarding the circumstances of his life. A legendary story makes him the brother of King Vikramâditya, who lived in the 1st c. B.C., and relates of him, that after a wild licentious youth, he betook himself in later years to the ascetic life of a hermit. His name has been given to a collection of 300 apothegms—whether it be that he actually wrote them, or, as is more probable, that the apothegms were popular works, written by many various authors, but ascribed, according to the Indian custom to some personage well known among the people in legends and tales. Cheerful descriptions from nature, and charming pictures of love, alternate in these apothegms, with wise remarks upon the relations of life, and profound thoughts upon the Deity and the immortality of the soul. Bohlen has published an excellent critical edition (Berlin, 1833), with a supplement *Variæ Lectiones* (Berlin, 1850), as well as a successful metrical translation into German (Hamburg, 1835). B. has a certain special interest as having been the first Indian author known in Europe, 200 of his apothegms have been translated in 1653, by the missionary, Abraham Roger, in a learned work published at Nuremberg, under the quaint title, *Open Gates to Hidden Heathenism.*

BHATGO'NG, one of the chief towns of Nepaul, situated about 9 miles south-east from Khatmandu. It contains a palace of striking appearance, and other notable buildings. It is the favorite residence of the Brahmans of Nepaul, who form the greater part of its inhabitants. Its present pop. is estimated at 12,000, but it is supposed to have once contained 60,000 inhabitants.

BHAVANI-KUDA'R, or BHOVANI-KUDAR, a town in the presidency of Madras, in the district of Coimbatoor, 58 miles to the north-east of the city of that name. It takes its name from its position at the confluence of the Bhavani or Bhovani, and the Cauvery. It is worthy of notice chiefly for its temples of Vishnu and Siva. Pop. (1871) 6776.

BHAWLPOO'R, the capital of the protected state of the same name in India, is situated on a tributary of the Ghara, which, formed by the junction of the Sutlej and the Beas, falls into the Chenab about fifty miles further down, in lat. 29° 24′ N. and long. 71° 47′ E. It has a circuit of four miles—part, however, of the enclosed space being occupied by groves of trees; and its population is estimated at 20,000. B. has manufactures of scarfs and turbans, chintzes and other cottons, and the immediate neighborhood is remarkably fertile in grain, sugar, indigo, tobacco, and butter, with an abundance of mangoes, oranges, apples, and other fruits, in perfection. For external commerce, too, B. is favorably placed, standing at the junction of three routes respectively from the east, south-east, and south; while, towards the north, the Hindu merchants, who are very enterprising, have dealings with Bokhara, and even with Astrakhan.—2. The state of B. lies in lat. 27° 41′—30° 25′; and long. 69° 30′—73° 58′ E. The area is about 15,000 square miles—the population being approximately estimated at 472,800 in 1871, or rather more than 31 inhabitants to a square mile. The country is remarkably level: only about one-sixth is capable of cultivation. The fertile portion, skirting the Ghara and the Indus, has a purely alluvial soil; but the remainder, though presenting many traces of former cultivation and population, is now, from want of water, an irreclaimable desert either of hard dry clay, or of loose shifting sands. Besides beasts of chase, such as tigers, boars, &c., B. abounds in domestic animals, such as camels, kine, buffaloes, goats, and broad-tailed sheep. In few parts of the world are provisions finer or cheaper. The principal exports are cotton, sugar, indigo, hides, drugs, dye-stuffs, wool, ghee or butter, and provisions in general. The principal imports are the wares of Britain and India. In 1866, the state, at the request of the leading men, was taken under British management till the young nabob should be of age. The great majority of the inhabitants are Mohammedans.

BHEL, or BAEL. See ÆGLE.

BHOOJ, the capital of Cutch, in India, situated at the foot of a fortified hill of the same name, where a temple has been erected to the cobra da capella, in lat. 23° 15′ N., and long. 69° 44′ E., about 35 miles from the sea. It contains about 20,000 inhabitants. Its mosques and pagodas, interspersed with plantations of dates, give to the town an imposing appearance from a distance. In 1819 it suffered severely from an earthquake. It is celebrated over India for its manufactures in gold and silver.

BHO'PAL, the capital of the territory of the same name, in India, lies in lat. 23° 14′ N., and long. 77° 33′ E. It is surrounded by a dilapidated stone-wall of about two miles in circuit. The fort, which is the residence of the nawab, stands on a huge rock outside the town. B. is worthy of notice mainly in connection with two immense tanks in the immediate neighborhood—one of them being 2 miles in length, and the other measuring 4½ miles by 1½. As each sends forth a river, they have most probably been formed by the embanking and damming up their respective streams.—The territory of B. is a protected state, under the immediate superintendence of the governor-general. It is situated within the basins of the Ganges and Nerbudda, in lat. 22° 32′—23° 46′ N., and long. 76° 25′—78° 50′ E.; its area being estimated at 6764 square miles, and its population, on an assumed average for Central India, at 662,872. Though the vast mass of the people are Hindus, yet the government is Mohammedan, and is understood to be more popular in its character than any other in India.

BHOTA'N, or BOO'TAN, and independent territory in the north-east of India, on the southern slope of the Himalayas, in lat. 26° 18′—28° 2′ N., and long. 88° 33′—92° 30′ E., being bounded on the E. by Assam, on the S. by Bengal, and on the W. by Sikkim. With an area of 10,000 to 20,000 square miles, it was estimated in 1864 to contain only 20,000 inhabitants, but later information points to a larger figure. The whole surface may be described as mountainous, with a gradual slope from north to south. Generally speaking, the middle ranges are the most productive. While the south presents but a scanty vegetation, and the north rises far above the limit of perpetual snow, the central regions, at an elevation of 8000 or 10,000 feet above the sea, are covered with the finest forests of oak and pine. Nearly all sorts of grain—wheat, barley, rice, maize, and buckwheat—are here and there cultivated on favorable spots; but much grain is still imported from Bengal, being obtained, as well as sugar and tobacco, in return for native cloths, rock-salt, rhubarb, Tibet goods, mules, and ponies. The religion is Buddhism, the monastic endowments of its priests absorbing a large part of the national property. The government, almost purely ecclesiastical, is in the hands of an oligarchy. The Dherma Rajah, the nominal head, is treated rather as a god than as a sovereign; while the Deb Rajah, the actual head, is controlled in almost everything by a council of eight. Polyandry and polygamy equally conspire to keep down the numbers of the population.

BHOWA'N, BHOWANY, BHEWANNEE, or BHIWANI, a town of British India, in the district of Hissar, Punjab, 55 miles west of Delhi. The pop. in 1868 was 32,254.

BHU'JI, or BHJI, a small hill-state of India, extending for about 20 miles along the left bank of the Sutlej, and about 7 miles at its greatest breadth. Its pop. is about 20,000. Having been overrun by the Goorkhas, it was on their expulsion, bestowed by the British government on the present family.

BHURTPO'RE, the capital of the protected state of the same name in India, is a large town measuring about eight miles in circuit, and containing, it is said, about 100,000 inhabitants, in lat. 27° 12′ N. and long. 77° 33′ E. It is worthy of notice chiefly on account of its two sieges in 1805 and 1825. The strength of the place lay in a mud-wall, which was practically shot-proof, and surrounding a ditch, which might at any time be filled with water from a neighboring lake. On the first occasion, Lord Lake's assaults were all baffled by this trench thus flooded. On the second occasion, however, Lord Cumbermere, having arrived in time to cut off the communications of the garrison with the lake above mentioned, overcame his principal difficulty; but even then the mud-wall would yield only to mining.—2. The protected state of B. is situated in lat. 26° 48′—27° 50′ N., and in long. 76° 54′—77° 49′ E.—its area being estimated at 1978 square miles. The population in 1871 was 743,710, giving an average of less than 400 to a sq. mile. The country suffers from want of water, having only three perennial streams, of which two, however, are mere rills in dry season; and yet, in many parts, the soil is rendered highly productive by means of irrigation. The principal crops are grain, cotton, and sugar. In the height of summer, the climate has been compared to the extreme glow of an iron-foundry, the thermometer having been known to stand at 130° F. in the shade. The rajah's revenue is stated at £242,375 a year; and his military force is said to amount to 5400 men of all arms.

BIA'FRA, BIGHT OF, a large bay of the Atlantic Ocean, on the west coast of Africa, at the head of the Gulf of Guinea, between Cape Formosa (which divides it from the Bight of Benin) on the north, and Cape Lopez on the south. Its extreme width between these two points is nearly 600 miles, its depth, to the mouth of the Old Calabar River, about 250 miles. The northern shores of the Bight, comprehended under the general name of the Calabar coast, and the eastern coast, south of Cape St. John, are low and flat. Near Old Calabar, the country becomes hilly, and opposite Fernando Po, it rises into the lofty range of the Cameroons. The principal rivers flowing into the Bight are the Niger, or Quorra, the New and Old Calabar Rivers, the Rio del Rey, the Cameroon, and the Gaboon. The creeks and estuaries of the rivers are generally lined with dense thickets of mangrove, which sometimes grow in the water, their lower branches covered with oysters. In the Bight of B. are the three islands of Fernando Po, St. Thomas, and Prince's Island. The chief European stations on the coast are Duke Town, in Old Calabar, where there is a flourishing missionary station, and Naango, or George's Town, a small commercial town on the estuary of the Gaboon.

BIA'LYSTOK, a fortified town of Western Russia, in the government of Grodno. It is situated on the Bialy, an affluent of the Narew, 45 miles south-west of Grodno, in lat. 53° 8′ N., long. 23° 18′ E. B. is well built; lime-trees border several of the streets, and give it a very pleasant aspect. It has a palace and park, now belonging to the municipality, but formerly belonging to the Counts of Braniski, and called the 'Versailles of Poland,' a commodious market, and several churches. It has manufactures of woollens, hats, leather, soap, tallow, &c. Pop. (1880) 36,252.

BIA'NA, a town of India, in the Rajpoot state Bhurtpore. It was once a place of much greater importance than it now is, and was one of the most famous forts in India. The town contains many temples, and the whole ridge of the hill is covered with the remains of large buildings. A high pillar of stone called Bhim Lat, or the *Staff of Bhim*, is conspicuous over a wide extent of country.

BIANCAVI'LLA, a town of Sicily, in the province of, and about 14 miles north-west of the city of Cantania. It is about 10 miles distant from Mount Etna, on the south-west declivity of which mountain it is situated. It has a trade in grain, cotton, and silk. Pop. 12,500.

BIANCHI'NI, FRANCESCO, celebrated for his antiquarian and astronomical investigations, was born December 13, 1662, at Verona, where he received his early education in the Jesuit's College. At Padua he studied theology, mathematics, and above all, botany; and then proceeded to Rome, where he became intimate with the most distinguished *savans* of the day, and devoted himself to the study of jurisprudence and foreign languages. Alexander VIII. bestowed upon him a rich benefice, and Clement XI. appointed him secretary to the commission for reforming the calendar. B. was employed to draw a meridian line in the church of Santa Maria degli Angeli, in Rome, which he successfully accom-

plished. After traveling through France, Holland, and England, he returned to Italy, with the design of drawing a meridian line from the Adriatic to the Mediterranean like that drawn by Cassini across France. The operations connected with this project occupied him eight years; but a variety of other labors, as well as want of means, prevented its completion. Besides several memoirs and dissertations on antiquarian and astronomical subjects, we may mention his *Istoria Universale Provata coi Monumenti e Figurata coi Simboli degli Antichi* (Rome 1694), and his fine edition of the work of Anastasius, *De Vitis Romanorum Pontificum*, which was completed by his nephew Guiseppe B. (4 vols., Rome, 1718—1734). B. died in March 1729, and a monument was erected to his memory in the cathedral of Verona.

BIARD, AUGUSTE FRANÇOIS, a French painter, known in almost every department of his art, but chiefly distinguished for his animated and often comical representations of ordinary life and manners (*peinture de genre*). B.'s merits, and the school to which he belongs, will be sufficiently understood when we mention that his countrymen have styled him the Paul de Kock of painting! He was born at Lyon in 1800, and was at first destined for the church; but subsequently educated at the School of Art of his native city. He traveled in early life in Malta, Cyprus, Syria, and Egypt, where he made sketches, and stored his memory with images which he used in after-years. In 1839, he visited Greenland and Spitzbergen, and of this journey one of the fruits was his famous picture of a battle with polar bears. In 1859 he visited Mexico. The first picture which gained him distinction was his 'Babes in the Wood' (1828); and one of his best is the 'Beggar's Family,' exhibited in 1836. His picture, 'Les Comediens Ambulants,' is in the Luxembourg. Many continental galleries possess examples of B.'s pictures, and in England they have always been much sought after.

BIARRITZ, a maritime village of France, in the department of the Basses-Pyrénées, about 5 miles south-west of Bayonne. The late emperor and the empress, attracted by its pleasant situation and salubrity, latterly made it a summer residence; and the presence of the court of course tended to increase greatly the fame of its baths and singular grottoes. Pop. (1876) 3348.

BI'AS, one of the seven sages of Greece, lived in the time of the Lydian king. Alyattes, and his son, Crœsus, about 570 B.C. He was generally employed as a political and legal adviser in difficult questions. At the overthrow of Crœsus, when the Ionians dreaded an invasion by Cyrus, they were advised by B. to take their personal property and colonize Sardinia; but this advice was rejected, and the Ionians, after a vain defence, were subjugated by the generals of Cyrus. When the people of Priene—the birthplace of B.—were making preparations to escape from their besieged city, B., in reply to one who asked why he was not occupied like other citizens, employed the words which have become a Latin proverb, *Omnia mea mecum porto*, 'I carry all my goods with me.'—Orelli, *Opuscula Græcorum Veterum*, &c., 1819.

BIB, POUT, or WHITING POUT (*Gadus luscus* or *Morrhua lusca*), a fish of the same genus with the Cod (q. v.) and Haddock (q. v.), pretty common on many parts of the British coasts, found also on those of Norway, Sweden, Greenland, &c. It is seldom more than a foot long, but remarkably differs from all other British fishes of the same family (*Gadidæ*, q. v.) in the great depth of its body, which equals at least one-fourth of the entire length. The back is arched, and the nape exhibits a rather sharp ridge. The eyes and other parts of the head are invested with a singular loose membrane, which the fish can inflate at pleasure. There is a dark spot at the origin of each of the pectoral fins, as in the Whiting (q. v.). The names Bib and Pout, both originally local English names, were at one time supposed to belong to distinct species (called *G. lusca* and *G. barbata*), but it appears now to be pretty certain that these are really one. In Scotland, this fish is generally called *Brassy*. It is well known in the London market, is in best condition in November and December, and is much esteemed for the table.

BI'BERACH, a town of Würtemberg, in the circle of the Danube. It is situated on the Reiss, in the charming valley of the same name, about 23 miles south-south-west of Ulm; and is surrounded by portions of the old ramparts flanked with towers. It has manufactures of machinery, artifical flowers, leather, children's toys, &c. Pop. (1880) 1718. In October 1796, Moreau won a great victory over the Austrian general Latour at B., the latter losing 4000 prisoners and 18 pieces of cannon. Here also, in 1800, Saint Cyr defeated the Austrian general Kray. B. fell into the possession of Baden in 1802, but four years afterwards, was ceded to Würtemberg. Wieland the poet was born in the immediate vicinity.

BI'BERICH, a village in the province of Hesse-Nassau, on the right bank of the Rhine, and about 4 miles from Wiesbaden, is noted for its splendid palace. The views of the river-scenery from B. are unrivalled. Pop., including Mosbach (1880), 8499.

BI'BIRI, BI'BIRI BARK, AND BI'BIRINE. See GREENHEART.

BIBLE (Gr. *Ta Biblia*, 'The Books'—see BOOK) is the name given by Chrysostom in the 4th c. to that collection of sacred writings recognized by Christians as the documents of their divinely revealed religion. Both as regards language and contents, they are divided into two parts—the Old and New Testament, or rather, the Old and New Covenant; for the word *testamentum* is only a translation into the later Latinity of the 2d c. of the Greek *diatheke*, 'covenant.' The history of the Old Testament is connected with that of the new by a series of writings not received by Protestants as canonical, and collectively styled the *Apocrypha* (q. v.).

The OLD TESTAMENT is a collection of 39 books, written partly in the Hebrew, and partly in the Chaldaic language, and containing all the remains of Hebrew-Chaldaic literature down to the middle of the 2d c. B.C. By an artificial arrangement under the letters of the Hebrew alphabet, the number of books has been limited among the Jews to 22. These writings were spoken of in the time of Christ; and for some indefinite period before his time, as *graphé*, Scripture, or Holy Scripture, or, as 'the Law and the Prophets.' Sometimes the Psalms and the remaining holy writings (*hagiographa*) are distinctively noticed. The *usus loquendi* of the New Testament (Matt. xi. 13, xxii. 40; Acts xiii. 15; Luke xxiv. 44, &c.) is evidence of this. The Law comprised the Pentateuch, or the first five books. The Prophets were subdivided into earlier and later: the former including the books of Joshua, Judges, Samuel, and Kings; and the latter containing the three great prophets, Isaiah, Jeremiah, and Ezekiel—as well as the twelve minor prophets. The third division of the Old Testament embraced the hagiographa, consisting of the books of Job, Proverbs, Psalms, the Song of Solomon, Ecclesiastes, Ruth, Lamentations, and Esther, together with the books of Daniel, Ezra, Nehemiah, and 1 and 2 Chronicles. With regard to the order of these several books, the Alexandrine translation, the Fathers of the Church, and Luther, on one side, differ from the Jews; again, among the Jews, the Talmudists differ from the Masoretes, while a difference is also found between Spanish and German MSS. Hence have sprung the different arrangements of the books of the Old Testament.

The Septuagint is generally adduced in proof of the existence of these books in a collected form as early as 285 B.C., but an examination of the Aristean fiction (see ARISTEAS and SEPTUAGINT) is sufficient to show that at that period no more than the Pentateuch was translated into Hellenistic Greek. The earliest indubitable notice is found in the prologue to the Alexandrine translation of the book of Jesus, son of Sirach, written by his grandson probably about 130 B.C., which demonstrates that the Law and the Prophets then existed in a collective form; but this language does not prove that the third division was then concluded, though neither does it disprove it. This conclusion is first definitely ascertained from the catalogue given by Josephus, who flourished after the middle of the first century of the Christian era, while Philo, who flourished 41 A.D., quotes casually from nearly the whole of them.

As regards the genuineness and authenticity of the Old Testament, there has been much discussion in modern times. The generally received opinion is, that the various books were *originally* written wholly or chiefly by the persons whose names are affixed to them, except Judges (Samuel), Ruth (Samuel), Esther (Mordecai), Kings and Chronicles (Ezra and Jeremiah), and perhaps Job (Moses ?); but that these MSS. having perished in the destruction of the first temple, when Nebuchadnezzar took Jerusalem, the members of the Great Synagogue (q. v.)—which included Ezra, Nehemiah, Haggai, Zechariah, Malachi, and afterwards Simon the Just—50 years after the building of the second temple, acting in accordance with a divine commission, rewrote the Old Testament; or rather made a recension of other existing copies, to which were subsequently added the books of Ezra and Nehemiah. Thus the canon was concluded. This was the belief of the Jews themselves at a later period; the *Pirke Aboth* (Sayings of the Fathers), one of the oldest books of the Talmud, as well as other Jewish records, distinctly assert it. It is, however, simply a tradition, and though possibly true, is necessarily incapable either of demonstration or refutation. In the absence of any direct and conclusive evidence on this point, the contents of the Old Testament have been minutely analyzed by modern German critics, who have attempted to show that they bear internal evidence of having been composed generally at a later period than is ordinarily believed. Their work has now been taken up by English, Dutch, and French scholars, of whom perhaps the most notable are Colenso (see NATAL) and Kuenen, and prosecuted with keenness and vigor.

The Samaritans, who were at enmity with the Jews, recognized only the five books of Moses, and a corrupt version of the book of Joshua, as canonical. On the other side, the Egyptian Jews, for whom the Alexandrine version of the Old Testament was made,

received as canonical several writings which were rejected, or subordinated as apocryphal (see Apocrypha), by the Jews of Palestine. The primitive church, in the period which elapsed before the canon of the New Testament was completed, referred to the Old Testament for proof of doctrines; but, on account of the prevalent ignorance of the Hebrew and Chaldee languages among the early Christians, the Alexandrine Greek version was the authority employed. As this included the apocryphal books, rejected by the Jews of Palestine, the earliest Christian Fathers made the same use of these writings as of the others; but the growth of criticism during the next two centuries was fatal to their reputation, or at least to their authority. We do not find, however, that they were formally designated 'apocryphal' until the time of Jerome (5th c.), though the Greek Church, in the previous century, had approximated to this mode of viewing them, by affirming them to be *not* canonical, but only edifying, and also by issuing lists or catalogues of those books which were recognized as canonical. In the Latin Church, on the other hand, these writings were received as canonical after the 4th c., though Jerome, Hilarius, Rufinus, and Junilius wished to distinguish them from the canonical books by the name of *libri ecclesiastici*. The Protestants, at the Reformation, returned to the distinction originally made by the Palestinian Jews between the Hebrew Scriptures of the Old Testament and the apocryphal works included in the Alexandrine version and the Latin Vulgate. Luther, in his translation of the B., included the Apocrypha as 'books not to be placed on a level with the canonical Scriptures; but profitable for reading.' The Council of Trent, which seemed to think that the only safe path for Catholicism to pursue was the exact opposite of that on which Protestantism moved, declared that whoever denied the canonical character of the Apocrypha should be *anathema*.

The New Testament, or the collection of canonical scriptures containing the history and doctrines of Christianity, may be divided into three chief sections: 1. The historical books, or the four gospels, and the Acts of the Apostles. 2. The didactic and pastoral writings, which include the Epistles of Paul to the Romans, Corinthians, Galatians, Ephesians, Philippians, Colossians, Thessalonians, Timothy, Titus, and Philemon, the Epistles to the Hebrews (which does not state the writer's name), the two Epistles of Peter, the three epistles of John, the Epistles of James and Jude. 3. The prophetical section, consisting only of one book, the Apocalypse, or Revelation of St. John the Divine. The primitive Christians referred for proof of doctrine, &c., only, so far as we are aware, to the Old Testament, and quotations from it by the apostolic Fathers are numerous enough; but we find few clear and certain references to the didactic portions of the New Testament. The reason of this appears to be, that the lapse of time had hallowed the Old Testament, and given to it that superior authority which springs from venerable age. The generation which immediately succeeded that of the apostles—and indeed, so far as we can see, the same may be said of the apostles themselves—did not consider the apostolic writings of equal importance *as writings* with the sacred books of the Old Testament. Besides, most of the epistles were of little use in controversy, for the earliest heretics denied the apostleship of St. Paul; while both parties admitted the authority of the Septuagint, and found in it their common weapons of argument. Nevertheless, we occasionally find references to the didactic portions or the New Testament, such as those to Romans, 1st Corinthians, Ephesians, Hebrews, and James, in Clemens Romanus; to 1st Corinthians, and Ephesians, in Ignatius; to Romans, 1st Corinthians, 2d Corinthians, Galatians, Philippians, 1st Timothy, 2d Timothy, 1st Peter, and 1st John, in Polycarp. Still more uncertain are the references of the apostolical Fathers to the gospels. The notices found in Barnabas, Clemens Romanus, Ignatius, and Polycarp are only sufficient to indicate that all the great facts of Christ's life were known to the churches, and that the doctrinal significance of these had begun to be realized. They do not, however, demonstrate the existence of written gospels, but they prove that Christianity rests on a historic basis. Their silence in relation to the written gospels now constituting a portion of the canon of the New Testament, is at first sight singular; but when we reflect that the facts of the Saviour's life and teaching were apparently quite familiar to the churches—so familiar, indeed, that no explanation was needed in alluding to them—we see that the necessity of the apostolic fathers quoting from the Evangelists ceases. It is contended, that any specific quotations would have been a work of supererogation; whereas, in the case of the didactic epistles, which were written originally for the benefit of particular churches, and conditioned by their special circumstances, and the contents of which, therefore, could not be so well or widely known, quotations or allusions might more naturally be looked for. But evidence of this *negative* character for the existence of the evangelical records, however prebable, is very uncertain, and its uncertainty is increased by the use made of writings which, at a later period, were rejected as apocryphal.

First, in the second half of the 2d c., more distinct references to the gospels are found in Papias (died 163), in Justin Martyr (died 166 A.D.), in his pupil Tatian (died 176), in Athenagoras (died 180), and in Theophilus, who wrote about the year 180. None of these writers, however, name the authors from whom they quote, though Papias—the earliest, but not the most trustworthy of them—bears direct and minute testimony of the existence of gospels by St. Matthew, St. Mark, St. John, the catholic epistles, and the Apocalypse, whence it has been concluded that the authenticity of the apostolic memoirs was not then settled, and perhaps not even investigated; but anonymous quotation seems to have been a characteristic carelessness of the time, for of this kind are 117 of Justin Martyr's references to the Old Testament. The great fact on which a constructive Christian criticism leans in regard to the evidence of these writers is, that they do not speak of the gospels or apostolic memoirs as things which had only recently made their appearance, but as well known and long established. Justin even states that the 'apostolic memoirs' were regularly read in the churches for the edification of believers—a fact which clearly indicates their superior sanctity and general reception. The Tübingen school contend that these apostolic memoirs could not have been the canonical gospels, but must rather have been the primitive evangelical records out of which the canonical gospels were formed; but it cannot be said that the crititism of Baur and his followers, in spite of its profound and searching character, has seriously imperilled the claim to apostolic antiquity put forth on behalf of the New Testament Scriptures.

Nevertheless the idea of a strict and pure New Testament canon (see Canon) is not discernable in the church in Justin Martyr's time. There is no positive evidence in favor of its existence; but this is not to be wondered at, for the consciousness of freedom in the Holy Spirit, which penetrated the Christians of the 1st c.; the opposition of what in continental theology are termed the Petrine and Pauline (q. v.), i. e., the Judaising and anti-Judaising parties, which does unquestionably appear to have existed; the still living tradition of the apostles; the difficulty of diffusing apostolic writings sent only to particular churches; the absence of criticism; the vacillation in determining the point where the apostolic men ceased; the use in the worship of God of the Old Testament, and, in particular churches, of casual Christian writings not now looked upon as canonical: all these causes together operated in hindering, till the middle of the 2d c., a formal collection of New Testament writings of any compass or critical value, though it seems quite clear that they existed separately, and were regarded as the most authoritative records of the new dispensation. The earliest trace of such a collection (the ten Pauline epistles without the pastoral epistles) appears after the middle of the 2d c. in opposition to that gnostic perversion of primitive Christianity which had been introduced by Marcion of Pontus.

The *Muratorian Canon* in the West, and the *Peshito* (q. v.) in the East, both belonging to this period, which has been called the 'Age of the Apologists,' furnish important evidence in regard to the New Testament canon, for both refer to nearly every book now received as authoritative, the exceptions being, in the former, the Epistle of James, the Epistle to the Hebrews, and 2 Peter; in the latter, Jude, 2 Peter, 2 and 3 John, and the Apocalypse. In the close of the 2d, and in the beginning of the 3d c., Irenæus, Clemens Alexandrinus, and Tertullian bear testimony to the recognition of the four gospels, the Acts of the Apostles, the thirteen Pauline epistles, the 1st Epistle of Peter, the 1st Epistle of John, and the Apocalypse, as canonical writings. But they do even more than bear testimony to their recognition—they appeal to antiquity for proof of the authenticity of the books which they used as Christian Scriptures. On this point, Tertullian is especially precise, and his most convincing argument on behalf of the 'surety of the gospels' is, that 'the very heretics bear witness to them.' They did not, it is admitted, acknowledge the whole of the New Testament canon, but this is explicable on the hypothesis, which is justified by investigation, that the portions rejected were those that seemed alien to their own opinions. Two distinct collections of writings are now noticed—the *Instrumentum Evangelicum*, containing the four gospels; and the *Instrumentum Apostolicum*, containing the Acts of the Apostles, along with the Pauline and other epistles. Respecting several parts of the New Testament canon, differences of opinion prevailed in early times, nor was the war of criticism closed until the 6th c., for considerable difference of opinion existed in regard to the value of the testimony of the early apologetic authors. Origen doubted the authority ot the Epistle to the Hebrews, of the Epistle of James, of Jude, of the 2d of Peter, and the 2d and 3d of John; while, at the same time, he was disposed to recognize as canonical certain apocryphal scriptures, such as those of Hermas and Barnabas, which were decidedly rejected by the Church. The Apocalypse was treated as a dubious part of the canon down to the 7th c. The learned and circumspect Father, Eusebius, in the 4th c., in a passage of his *Church History*, distinguishes three classes of New Testament Scriptures: 1. Universally received Scriptures (*homologoumena*), the four gospels, the Acts of the

MAP
OF THE COUNTRIES
mentioned in the
BIBLE.
THE WORLD
showing the portion known to
THE HEBREWS.
THE WORLD
as peopled by the
DESCENDANTS OF NOAH.
MAP OF
SHEBA, OPHIR
&c.
Supposed Situation of PARADISE
Longitude East of Greenwich

Apostles, the fourteen Pauline epistles, the 1st Epistle of John, the 1st of Peter, and with a certain reservation, the Apocalypse of John. 2. Scriptures not universally received, or not received at all. These he calls 'disputed' (*antilegomena*), and subdivides them into such as were generally known and approved by most —viz., the epistles of James, Jude, 2 Peter, 2 and 3 John; and such as were 'spurious' (*notha*)—viz., the Acts of Paul, the Shepherd, the Apocalyse of Peter, the Epistle of Barnabas, the Institutes of the Apostles, and the Gospel of the Hebrews. 3. Heretical forgeries, such as the gospels of Peter, Thomas, Matthias, which Eusebius pronounces to be 'altogether absurd and impious.'

The Western Church, which was more conservative and less critical than the Eastern Church, completed the canon with greater rapidity. Although the eastern Council of Laodicea (360—364), in determining the canon of the New Testament, excluded the Apocalypse, the western synods of Hippo-Regius (393), Carthage (397), the Roman bishop, Innocent I. (in the beginning of the 5th c.), and the *Concilium Romanum* under Gelasius I. (494), recognized the entire canon of the New Testament as we find it in the present day. The doubts entertained by individuals respecting some parts of the canon had become exceptional and unimportant at the close of the 7th c. Owing to the want of Greek scholarship, as also, perhaps, to the growing idea of an infallible church papacy, there was no criticism worthy of the name during the middle ages. Doubts, therefore, respecting the Epistle to the Hebrews and the Epistles of James and Jude were first revived, after a long quietude, at the time of the Reformation. Erasmus denied the apostolic origin of the Epistle to the Hebrews, 2 Peter, and the Apocalypse. Luther ventured to declare the Epistle to the Hebrews and the Apocalypse 'apocryphal.' Melanchthon, Gerhard, and Chemnitz went in the same direction, and even Calvin denied the Pauline authorship of the Epistle to the Hebrews. But biblical criticism, for reasons both political and ecclesiastical, soon became dormant, and so remained for nearly two centuries, when it was revived by a liberal Catholic writer, Richard Simon (died 1712), who first conceived the plan of 'an historico-critical introduction' to the B.; afterwards, the labors of Lowth, Semler, Herder, Griesbach, Michaelis, Eichhorn, and others, gave a new impulse to scriptural exegesis. In Germany, we may name among writers on the conservative and orthodox side, the Catholic divines Jahn and Hug, with the Protestant writers, Hengstenberg, Hävernick, Guerike, Delitzsch, and Caspari: on the other side, Berthold, De Wette, Credner, Reuss; and since the publication of the *Life of Jesus* by Strauss, the 'New Tübingen school,' with F. Baur (q. v.) at his head has questioned the authenticity and apostolical antiquity of all the New Testament scriptures, except the four larger Epistles of Paul—to the Romans, the Corinthians (1st and 2d), and the Galatians. The critical labors of Ewald (especially on the Old Testament), of Hilgenfeld, and of Keim have exerted important influence.

But, as might have been expected, the effects of the strife could not always remain confined to Germany. They have been felt more or less over all Protestant countries, England, Holland, and America, and even Catholic France, which has no theology to contend for, shows the influence of the new movement. Renan (q.v.), who in his *Vie de Jésus* excited a vivid sensation, has followed up his first work by a series of volumes on the early history of Christianity. In England, during the 18th c., several valuable apologetic works were published, such as Lardner's *Credibility of the Gospel History*, and Paley's *Horæ Paulinæ*. In the early part of the 19th c. appeared Horne's *Introduction to the Study of the Scriptures*, which has been frequently reprinted. Since then, Tregelles, Davidson, Westcott, and numerous other scholars, have entered the field; and it is not too much to affirm, that, among the more earnest class of the British theologians, there exists at this moment a keener spirit of impartial inquiry, as regards the foundations of biblical criticism, than Britain has ever previously witnessed. The practical tendencies of the Anglo-Saxon mind long restrained it from interfering in what seemed to be a mere maze of unprofitable speculation; but now that its deep and vital relations to the ground-work of men's actual and possible beliefs have begun to be felt, these very practical tendencies are manifestly asserting themselves, and we may confidently anticipate that a large measure of attention on the part both of the clergy and laity will soon be given to this most important of all branches of knowledge.

Editions of the Bible: History of the Text.—As both the Old and the New Testament were written in ancient languages, and transcribed in times when philological criticism hardly existed, the examination and comparison of various editions, with a view to obtain the greatest possible purity of text, forms an important part of theological study.

Text of the Old Testament.—The first duty of an impartial critic of this question is to lay aside both of the extreme and utenable opinions regarding the Hebrew text of the Old Testament, viz.— —1st, that it has come down to us in an absolutely faultless condition, by miraculous preservation; and 2d, that it has been wilfully and unscrupulously falsified by the Jews. That there are erroneous readings, nobody doubts. The real task devolving on a student of this branch of theological science is to explain these on natural principles, and by collating the various recensions, to endeavor to obtain a pure text, or as close an approximation to that as may be possible. The following is a tolerably complete classification of the causes of errors. 1. Errors arising from *imperfect sight or occasional inattentiveness;* as when transcribers substituted one letter for another similar in appearance, transposed letters, words, and sentences, and omitted the same; of which there are various examples. 2. Errors arising from *imperfect hearing*, of which there are not many examples. 3. Errors arising from *defective memory;* as when a transcriber fancied that he knew certain words, phrases, or clauses, on account of their having occured before; of these there are occasional examples. 4. Errors arising from *defective judgment;* as when words were wrongly divided, or abbreviations wrongly resolved; also from the *custodes linearum* (i. e., the letters which filled up the occasional vacant space at the end of lines) and marginal remarks being sometimes incorporated with the text. These not unfrequently happen. 5. Errors arising from a *well-meant desire* on the part of the transcriber to explain or amend a text, really or apparently obscure. In this respect the Samaritans are greatly to blame. A very knotty point is the conditions of the text before and at the close of the canon. The opinion of Eichhorn, De Wette, and others is, that while the books circulated singly in a sphere of uncertain authority, they were greatly corrupted; in support of which, considerable evidence is adduced, but still the probabilities are, on the whole, against such a supposition, and it is better to suppose that the conflicting accounts of the same events which are to be met with, especially in the historical books, arise not from the carelessness or corruptions of copyists, but rather from the original authors or compilers having consulted differing documents.

From recent investigations, it appears clear that the strict dogmatic Jews of Palestine and Babylon were generally far more careful in their preservation of sacred records than the Samaritans and the Alexandrines, the latter of whom were remarkable for their free, philosophizing, non-textual spirit. In the schools of learning in Jerusalem at the time of Christ, presided over by Hillel, who had come from Babylon, and Shammai, and in those which flourished elsewhere in Palestine, after the fall of the metropolis, for instance, at Lydda, Cæsarea, Tiberias, &c., as also in the academies of Sora, Pumpeditha, and Nahardea, near the Euphrates, at a later period, the text of the Old Testament was defined with great care, first by the Talmudists, who seem to have adhered very closely to the ancient text, and after the completion of the Talmud at the close of the 5th c. by the *Masorites*. See Massorah. This care was at first bestowed only on the consonants of the Hebrew text. The Masoretic vowel system, which sprang from that already existing among the Syrians and Arabians, was developed from the 7th to the 10th centuries at Tiberias. By the 11th c. it appears to have been completed, while the Spanish rabbis of the next century seem ignorant of its then recent origin. (For proof of this, see Davidson's *Text of the Old Testament Considered*, 1856.) After the 11th c., the Masoretic text, with its perfected system of vowels and accents, became the standard authority among Jewish scholars. The comparative values of the different readings in the various MSS. had by that time been carefully determined, and the chief business of copyists, henceforth, was to make faithful transcripts.

The earliest printed editions of the Hebrew B. bear a close resemblance to the MSS. 'They are without titles at the commencement, have appendices, are printed on parchment with broad margin, and large ill-shaped type the *initial* letters being commonly ornamented either with wood-cut engravings or by the pen. These letters, however, are often absent. With vowels, the editions in question are very imperfectly supplied. Separate parts of the B. were first printed.' The Psalms appeared in 1477, probably at Bologna; the Pentateuch at Bologna in 1482; the Prophets in 1486; the Hagiographa in 1487. To most of these were subjoined the rabbinical commentary of Kimchi. The whole of the Old Testament appeared in small folio at Soncino, 1488, and appears to have been followed by the edition of Brescia (1494), which was used by Luther in his translation of the Old Testament. The *Biblia Polygotta Complutensia* (1514—1517), the *Biblia Rabbinica* of Bomberg, edited by Rabbi Jacob-Ben-Chajim (Venice, 1525—1526), which has been adopted in most of the subsequent editions—the Antwerp *Biblia Polyglotta* (8 vols., 1569—1572), also the editions by Hutterus (Hamburg, 1587, and frequently reprinted), Buxtorf (Basel, 1611), and especially that by Jos. Athias (Amsterdam, 1661—1667)—all these are celebrated, and have supplied the basis of later editions by Simon, Hahn, Theile and others. In the 17th c., a vehement controversy arose regarding the integrity of the Hebrew text; one party maintained that the Masoretic text was greatly corrupted, and contrasted it unfavorably with that of the Samaritan Pentateuch. The chief advocates of this view were Vossius, Whiston, Morin, and Capel-

lus. On the other hand, Buxtorf, Arnold Bootius, Wasmuth, and others, defended the absolute purity of the Masoretic text, even to the inspiration of the vowel-points, which Buxtorf, in the preface to his grandfather's *Tiberias*, gravely asserts to have been first invented by Ezra. This controversy had at least one good result. It led to an extensive examination of Hebrew MSS. in the next century. Kennicott collated 630, 258 throughout, the rest in part; De Rossi, 751, of which all but 17 were collated for the first time. Many still remain uncollated. The result of this elaborate investigation has been to convince scholars that the Masoretic text is substantially correct. All known codices confirm it; the oldest of the professedly literal versions, as well as the Targums of the time of Christ, furnish similar satisfactory evidence; and when we consider the *bibliolatrous* tendencies of the Jews *after* their return from exile, whatever may have been the case before, we may safely conclude that we now possess the text of the Old Testament much in the same condition as it was at the close of the canon.

At first, there were no intervening spaces between Hebrew words; afterwards, small intervals appear to have been occasionally allowed. With the introduction of the *square* character, the use of small interstices to separate words became general. The Talmud prescribes how much space should be between words in sacred MSS. designed for the synagogue. Various divisions according to the sense were also introduced at an early period. In the Pentateuch there were two, termed respectively *open* and *closed*. The former were intended to mark a change in the matter of the text; the latter, slight changes in the sense. Of these, the Pentateuch contained 669, named *parshioth* (sections). This division is probably as old, or nearly so, as the practice of reading the Law. It is found in the Talmud, while the division into 54 *great parshioth* is first found in the Massorah, and is not observed in the rolls of the synagogues. The poetical books were also subjected, from a very early period, to a stichometrical division, according to the peculiarities of Hebrew versification. In order to facilitate the reading and understanding of the prose books, a division into logical periods was also made, which is mentioned in the *Mishna* (q. v.) while in the *Gemara* (q. v.) its authorship is ascribed to Moses. From it sprang our present division of the Scriptures into verses. It is highly probable that these divisions were long handed down orally. Our present division of the Old Testament into chapters is a later invention, and, though accepted by the Jews, is of Christian origin; it may be dated as far back as the 13th c., some assigning it to Cardinal Hugo, others to Stephen Langton, Archbishop of Canterbury. It was first employed in a concordance to the Vulgate, whence it was borrowed by Rabbin Nathan in the 15th c., who made a similiar concordance to the Hebrew Bible. Nathan's divisions are found in Bomberg's Hebrew B. of 1518. Verses were first introduced into editions of the Hebrew B. by Athias of Amsterdam, 1661, but were employed in the Vulgate as early as 1558. The first *English B.* divided into verses was published at Geneva in 1560.

New Testament.—The original MSS. of the New Testament were probably all written on papyrus, the cheapest, but least durable material that could be obtained for the purpose. It was therefore impossible, considering the constant handling to which the documents must have been subjected by the eager converts, that they could have lasted for any length of time. Indeed no authentic notices of them have come down to us, and it is a curious fact that, in the controversies of the 2d c., no appeal is made to the apostolic originals. But the number of copies was very great. The text of these, however, did not always agree. Variations originated, to a considerable extent, from the same causes as operated in the case of the Old Testament, viz., imperfect vision or hearing, misunderstanding, carelessness, or an uncritical judgment on the part of transcribers; but it is natural to suppose that, on account of the greater freedom of spirit and thought which characterized primitive Christianity, compared with Judaism, a latitude of conviction in regard to the value of the *letter* of Scripture, also influenced the churches. The *idea* of inspiration (q. v.), it is now admitted by the most enlightened theologians, was progressively developed. In the earliest ages it did not exist in any dogmatic form whatever. Christians were content to believe that the evangelists and apostles spoke *truth*, by the help of the Holy Spirit, without perplexing themselves with the question, whether the words were purely divine or purely human in their origin. They had a gospel to preach, and a world to convert, and were therefore not in a mood to discuss mechanical notions. This also must have operated in producing the textual variations referred to, many of which are of such a nature as to clearly prove that the commentators or transcribers thought themselves at liberty to alter or improve the expression. Nor must we overlook the fact, that the different culture and tendencies of the Eastern and Western Churches also caused very considerable changes. Modern criticism reckons no less than 80,000 variations in the existing MSS. Nevertheless, one fact stands out, solid and imperishable, amid all the tiny fluctuations of verbal criticism, viz., that, with one or two exceptions, no material difference exists, or in all probability ever did exist, in New Testament MSS. The *general* Christian consciousness, which was the real guardian of their integrity, had been grounded too deeply in the facts, doctrines, and ethics of a historic Christianity to follow in the wake of sectarian or heretical modifications of the truth. It instinctively turned, as it were, from a sense of affinity to those apostolic records, the tone of which most closely corresponded to its own spiritual character and development, and thus unconsciously prevented any incongruous changes from being effected in the mass of MSS. Of these MSS., upwards of 1400 are known to scholars, and have been collated, and no essential discrepancy has been detected. Of course, it can be urged that all the MSS. belong to a period when the Church had gathered itself up into two great wholes—the Latin and Greek, and when, therefore, a general conformity in MSS., as in other things, is only to be expected; but the fragments which are found in the earliest Church Fathers exhibit substantially, though not verbally, the same text, and we may therefore fairly infer that this unintentional harmony in part argues the general harmony of the earlier and later MSS.

Some slight attempts seem to have been made, during the early history of the Church, to obtain a correct text. One Lucian, a presbyter of Antioch, and Hesychius, an Egyptian bishop, are said by Jerome to have undertaken a recension of the New Testament, and both Origen and Jerome himself were of considerable service in this respect. It is to modern criticism, however, that we owe almost everything in regard to the regulation of the text. Bengel and Semler first started the idea of arranging the MSS. of the New Testament into *families* or *classes*. After these came Griesbach, who, following out the idea, propounded his famous threefold division of the MSS. into Western, Alexandrian, and Byzantine. The first two he considers the oldest; the third, a corrupt mixture of both. Griesbach himself preferred the Alexandrian; he believed that the Byzantine transcribers had taken great liberties with the text, and held that a few Alexandrian MSS. outweighed, in critical value, a large number of the other. The accuracy of Griesbach's division has subsequently been questioned by many eminent German scholars, each of whom has in turn favored the world with a theory of his own in regard to the probable value of the various families of MSS. Recently, Lachmann has applied, with excessive strictness, a principle first hinted by Bentley, viz., that no weight ought to be attached to any MSS. except those written in the old or Uncial (q. v.) character. The exact value of each manuscript is still a matter of dispute; but a great deal has been done to place the knowledge of the various lines of evidence within the reach of all scholars. Tischendorf carefully examined the most important of the uncial MSS., and published them separately somewhat after the fashion of a fac-simile. He also published a fac-simile of the *Codex Sinaiticus*, which he found in a monastery in Mount Sinai. Scrivener has collated a considerable number of cursives, and collated again the *Codex Bezæ*. And great attention is being paid to quotations from the Fathers. Rönsch, for instance, has given all the quotations from the New Testament in Tertullian, and Tischendorf made large use of them in his last or eighth edition.

The whole of the New Testament was first printed in the Complutensian Polyglott, 1514. From 1516 to 1535, five editions appeared at Basel, under the care of Erasmus, but without any great pretensions to critical accuracy. The subsequent numerous editions were, for the most part, either founded on the editions of Erasmus or on the Complutensian, or on a collation of both. Among these editions we may mention those of Simon de Colines or Colinæus (Paris, 1543), of the elder Stephen (1546, 1549, and 1550), of the younger Stephen (1569). Beza was the first who, by several collations founded on the third edition by Stephens, made any considerable progress in the critical treatment of the text, and thus supplied a basis for the present received text (*textus receptus*), which was first printed by Stephens with the Vulgate and critical annotations at Geneva, 1565; afterwards was frequently reprinted by Elzevir (Leyden, 1624) and others. The labors of the English scholar, Walton, in the London Polyglott (1657), of Fell (Oxford, 1675), and especially Mill (Oxford, 1707), were of great importance for the criticism of the New Testament. Bengel exhibited great tact and acumen in his edition of 1734, Wetstein much industry and care in the editions of 1751—1752, as also Semler, 1764. But all these recensions were surpassed in value by the labors of Griesbach (1st ed. 1774; 2d and best ed. 1796—1806). The works of Scholz (1830) and Rinck (1830—1836), the edition by Lachmann (1831), and the labors of Buttmann (1842—1850), are worthy of praise, as are also those of Tregelles (1854—1863), Tischendorf (1841—1873), and Scrivener (1861). The long expected edition of the Greek text of the New Testament by Westcott and Hort, with an elaborate introduction, appeared in 1881 (2 vols.).

Among the MSS. of the New Testament, the oldest are not traced back further than the 4th c., and are written in the so-called *uncial* characters. The modern MSS., dating from the 10th c. downwards, are distinguished by the *cursive* characters in which

they are written. The most important MSS. are the *Codex Sinaiticus* (at St. Petersburg), the *Codex Alexandrinus* (in the British Museum), *C. Vaticanus* (in the Vatican at Rome), *C. Ephræmi* (in the Imperial Library at Paris), and *C. Cantabrigiensis*, or *C. Bezæ* (given by Beza to the university of Cambridge). On the discovery of the *Codex Sinaiticus* by Tischendorf at the monastery of St. Catharine, Mount Sinai, in 1859, some held that it was older than even the *Vaticanus;* now, both are usually referred (as by Westcott and Hort, 1881) to the middle of the 4th c. *C. Ephræmi* and *C. Alexandrinus* are probably of the 5th c., as are two fragments. *C. Bezæ* and numerous fragments date from the 6th c.; the 7th c. furnishes but a few fragments. But the MSS. of the 9th and 10th centuries furnish as many as all the preceding ones put together. The *cursive* MSS., numbering nearly 1000, range from the 9th to the 16th c.

Euthalius (462 A.D.) arranged those words that were related to each other by the sense into *stichoi* or lines. Subsequently, to save space, a colon or point was substituted, until, finally, a complete system of punctuation arose. In the 13th c., as we have already seen, the division into chapters took place, and in the 16th the versicular division was perfected by Stephens. The arguments or contents prefixed to the several chapters are also of modern origin.

B. Versions or Translations.—These may be divided into ancient and modern. The *ancient translations* of the Old Testament from the original Hebrew may be classed as follows: 1. *Greek.*—The earliest of these is the Alexandrine or Septuagint (q. v.), after which come respectively the Translations by Aquila (q. v.), Theodotion, and Symmachus. The whole of these, with fragments of others by unknown authors, were given by Origen in his *Hexapla* (q. v.). The *Versio Veneta*, a Greek translation of several books of the Old Testament, made in the 14th c., and preserved in the St. Mark's Library, Venice, was published by Villoison at Strasburg, in 1784. Several early versions were also based on the Septuagint; but for that reason do not possess an independent value, being for the most part simply translations of a translation. Among these may be mentioned the old Latin version or *Italic*, (q. v.), though the term *Italic* is strictly applicable to the New Testament only, improved by Jerome (382 A.D.): the Syriac, including the *Versio Figurata*, partially preserved and collated by Jacob of Edessa, in the beginning of the 8th c.; and that by Paul, bishop of Tela (617 A.D.): the *Ethiopic*, made by certain Christians in the 4th c.: the threefold *Egyptian* (3d or 4th c.), one being in the language of Lower Egypt, and termed the *Coptic* or *Memphitic;* another in the language of Upper Egypt, and termed the *Sahidic* or *Thebaic;* and a third, the *Basmuric*, whose locality is uncertain; the *Armenian*, by Miesrob and his pupils in the 5th c.: the *Georgian*, of the 6th c.: the *Slavonian*, commonly ascribed, but for unsatisfactory reasons, to the missionaries Methodius and Cyrillus in the 9th c.: the *Gothic*, ascribed to Ulphilas, and executed in the 4th c., only some few fragments of which are extant: *lastly*, several Arabic translations of the 10th and 11th centuries. —2. The *Chaldaic translations* or *Targums*. These had an early origin; but, with the exception of those of Onkelos and Ben Uzziel, are unsatisfactory in a critical point of view. See TARGUM.—3. The remarkably literal translation into the Aramaic dialect of the latter Samaritans, of the ancient copy of the Pentateuch, possessed by the Samaritans (see SAMARITAN PENTATEUCH).—4. The church translation, known as the *Peshito* (q.v.), received by all the Syriac Christians. It was undoubtedly executed from the original Hebrew text, to which it closely adheres. Several Arabic versions were founded on the *Peshito*.—5. The later Arabic versions, executed during the middle ages, partly from the Samaritan Pentateuch.—6. The Persian translation of the Pentateuch, made by a Jew named Jacob, not earlier than the 9th c.—7. The Latin Vulgate (q. v.), from which a considerable number of fragmentary versions were made into that form of English commonly called Anglo-Saxon, the most noted translators being Aldhelm, bishop of Sherborne, and Bede (8th c.); Alfred (9th c.); and Ælfric (10th c.).

Among the ancient versions of the New Testament, we may notice three in Syriac: the first is the *Peshito*, with a twofold secondary translation of the four gospels into Arabic and Persian. It does not, however, contain 2d Peter, 2d and 3d John, Jude, or the Apocalypse, which at a later period, were classed among the *antilegomena*, or disputed books. The second, or *Philoxenian*, prepared in 508, under the direction of Philoxenius, Bishop of Hierapolis. It no longer exists, but a counterpart of it does, in the translation made in the following century (616 A.D.) by Thomas of Harkel or Heraclea, the successor of Philoxenius. The best MS. of this version is one which belonged to Ridley, and is now in the archives of the New College, Oxford. It includes all the books of the New Testament excepting the Apocalypse. The style is slavishly literal. It was edited by White, Oxford 1778. The third, or Jerusalem-Syriac version, preserved in a Vatican MS., and, according to the subscription annexed to it, executed at Antioch in 1031. With the above Syriac version we may class the Ethiopic translation; the Egyptian threefold version, made probably in the latter part of the 3d c., and of considerable critical value; the Armenian, Georgian, Persian, and Coptic-Arabic. Besides these may be mentioned the old Italic; the Vulgate by Jerome; the Gothic translation by Ulphilas (about the middle of the 4th c.), of which the most famous MS. is preserved in the library of Upsal, in Sweden (this has only the four gospels, and not even these in perfect condition), the various Anglo-Saxon versions already mentioned in connection with versions of the Old Testament; and the Slavonic.

Modern Translations.—During the middle ages, when the laity were considered by the priesthood unfit to be intrusted with the B. as a whole, various poetical versions—such as the Gospel History, by Otfried von Weissenburg, and the version of Job and of the Psalms by Notker-Labeo (980 A.D.)—served a very important object, and stimulated the desire for more biblical information. As early as 1170, Petrus Waldrus caused the New Testament to be translated into the Provençal dialect by Etienne d'Anse. This important work was followed by the translations made under Louis the Pious (1227) and Charles the Wise (1380), the B. histories (*Bible ystorieus*) by Guyars of Moulins (1286), the Spanish version under Alfonso V. in the 13th c., the English by Wickliffe, and the Bohemian version of John Huss. After the invention of printing —especially after the latter part of the 15th c.—the harbingers of a new ecclesiastical era appeared in numerous republications of the translated B.—the Bohemian (Prague, 1448); the Italian, by the Benedictine Nic. Malherbi (1471); the French, by Des Moulins (1477—1546); the Dutch (Delf, 1477); the Spanish (1478—1515); but, above all, in the seventeen German translations before Luther, of which five were printed before 1477, and the remainder in the Low-German dialect during 1477—1518.

Luther's translation of the B. is universally esteemed by the best German scholars as a master-piece of genial interpretation. It displays qualities far superior to those ordinarily expected in a translation—deep insight, true sympathy with the tone of the Hebrew Scriptures, and a perfect command of clear, popular language; indeed, every one who can thoroughly appreciate the merits of this great work, will be ready to excuse the boldness of the assertion, that 'it was rather a re-writing than a mere translation of the B.,' a transfusion of the original spirit into a new language, rather than a mere version of the letter. The New Testament was finished by Luther at Wartburg, and appeared in September 1522. In the following year, the five books of Moses appeared; and, in 1534, the remaining part of the Old Testament canon was completed along with the Apocrypha. With wonderful rapidity, this translation was circulated throughout Germany. In forty years, one Wittenberg bookseller sold 100,000 copies. It was reprinted thirty-eight times in Germany before 1559, and meanwhile the New Testament had been printed seventy-two times. Numerous other translations in Dutch, Swedish, &c., were based upon the work of Luther.

English Translations.—As above mentioned, portions of the B. were translated into Anglo-Saxon by Aldhelm, Egbert, Bede, and others between the 8th and 10th centuries. An English version of the Psalms was made in 1290. Wicliffe (q. v.), founding on the labors of predecessors finished his noble version of the New Testament from the Vulgate in 1380, and completed the Old (begun by Nicholas and Hereford) a little later. Revisions of this translation by Purvey and others were widely circulated in MSS. But long after Germany had printed vernacular versions of parts of Scripture, England had none. The seven penitential psalms were apparently printed in 1505. The noble martyr, William Tyndale (q. v.), vowed that 'if God would spare his life, ere many years he would cause the boy who driveth the plough to know more of the Scriptures than did all the priests.' To accomplish his purpose, he passed over to the continent. Before 1526, he had completed an English translation of the New Testament, which appeared both in quarto and duodecimo. In the beginning of 1526, the volumes were secretly conveyed into England, where they were bought up and burned, which, however, only stimulated Tyndale to greater exertions.

Of the admirable character of his translation, we have a sufficient testimony in this fact, that in our present version a very large portion of the New Testament is taken almost *verbatim* from Tyndale's Testament. Tyndale next proceeded to prepare a version of the Old Testament out of the original Hebrew, and in 1530, he published the Pentateuch, and in the following year, the book of Jonah. The first English version of the whole B. was that published by Miles Coverdale, a friend of Tyndale. It is dated 1535, and dedicated to Henry VIII., but where printed, is unknown. It is much inferior to Tyndale's. The next English B. issued was called *Matthew's B.*, from the circumstance that the editor assumed the name of Thomas Matthew, but was simply Tyndale's version revised by his friend John Rogers, who also translated those books in the Old Testament which the martyr had not been able to overtake. It was finished in 1537, and Cranmer obtained for it the patronage of Henry, though that monarch had persecuted

Tyndale some years before. Matthew's B. soon superseded Coverdale's. In April 1539 appeared the *Great B.*, usually called Cranmer's, because he wrote a preface to it. It was a large volume for use in churches. The text was Tyndale's revised. In the same year, Richard Taverner, a learned but eccentric layman belonging to the Inner Temple, published an edition, the text of which is based on that of Matthew's Bible. In 1557 appeared the famous *Geneva B.*, so called because the translation was executed there by several English divines, who had fled from the persecutions of the bloody Mary. Among these may be mentioned Gilby and Whittingham. This edition—the first printed in Roman letter and divided into verses—was accompanied by notes, which showed a strong leaning to the views of Calvin and Beza. It was, in consequence, long the favorite version of the English Puritans and the Scotch Presbyterians. It is, however, best known as the *Breeches B.*, on account of the rendering of Genesis iii. 7: 'Then the eyes of them both were opened, and they knew that they were naked, and they sewed fig-tree leaves together, and made themselves *breeches*.' In 1568, the *Bishops' B.* was published at London. The text of this was compared with the original by eight bishops, and seven other scholars of reputation, who appended their initials to their respective tasks; the whole being under the superintendence of Matthew Parker, Archbishop of Canterbury. In 1582 appeared at Rheims, in France, an English version of the New Testament, prepared by several Roman Catholic exiles; and in 1609—1610, a similar version of the Old Testament at Douay. Both were taken from the Vulgate, and form the standard English Scriptures of the Roman Catholics, being generally known as the *Douay Bible*.

We now come to the version which has been in common use for above 250 years, generally called *King James's Bible*. At the Hampton Court Conference in January 1604, Dr. Rainolds, an eminent Puritan, suggested a new translation as a great national want; and this, though opposed by the Bishop of London, was sanctioned by the king. Arrangements were at once made for carrying out the project. In July, the king wrote a letter, intimating the appointment of 54 scholars for the preparation of the version, and instructing the bishops that whenever 'a living of twenty pounds' became vacant, they should inform his majesty of the circumstance, in order that he might recommend one of the translators to the patron. This w s all that James did on behalf of the translation which bears his name. The expenses seem to have been borne by Barker, the printer and patentee, who paid the sum of £3500. Of the 54 scholars who had been nominated for the work, only 47 undertook it. These were divided into six companies, two of which were to meet at Westminster, two at Cambridge, and two at Oxford. The *first* company at Westminster translated the Pentateuch and the historical books to the end of 2d Kings; the *first* at Cambridge, from the beginning of Chronicles to the end of Canticles; and the *first* at Oxford undertook the remaining books of the Old Testament canon. The second company at Westminster translated the apostolic epistles; the second at Cambridge, the Apocrypha; and the second at Oxford, the gospels, the Acts of the Apostles, and the Apocalypse. According to Selden 'they then met together, and one read the translation, the rest holding in their hands some B., either of the learned tongues, or French, Spanish, Italian, &c. If they found any fault, they spoke; if not, he read on.' When a portion was finished by one of the company, it was sent to all the others in succession for their deliberative examinatton; and whenever a difference of opinion was elicited, reference was made to a committee. The final revision of the whole was conducted in London by two delegates from each of the six companies. These twelve scholars, in the discharge of their critical functions, met daily in the old hall of the Stationers' Company for nine months. The work of translation and revision occupied from 1607 to 1610. The superiority of the authorized version soon proved itself; for though there were several rivals in the field, and no steps were taken to secure for it a preference, it quickly gained the foremost place, and in the course of forty years from its publication, all others had quietly succumbed to it; it became, and has ever since remained *the English Bible*. Its ascendancy, and its exclusive use among all classes in Great Britain, and in her vast colonies, can only be traced to its intrinsic excellence. A new English version has been in preparation for some years; the New Testament was issued in 1881.

The exclusive right to print the present authorized version has been claimed by the Crown, ever since the date of its first publication, and under this royal prerogative, the B. is printed in different forms, and sold wholesale by certain patentees and licensees in England, Scotland, and Ireland. This claim, which does not practically affect Bibles with notes, has lately been much remonstrated against as a monopoly injurious to the free circulation of the Scriptures at a moderate price, and a modification is now looked for (see BOOK TRADE).

The more liberal Catholics—especially the Jansenists De Sacy, Arnauld, and Nicole; the enlightened Richard Simon and Quesnel—also shared in the common zeal for diffusing a knowledge of the Scriptures; but though many versions have been prepared by Catholics, the Romish Church has consistently maintained an opposition to the general circulation of Holy Scripture without ecclesiastical comments.

The numerous recent translations of the Scriptures into languages beyond the pale of Christendom, have beenexecuted chiefly under the auspices of Missionary and Bibles Societies (q. v.).

As to the *contents* of the B., its one grand object, under whatever form it may appear in the various books, is, to give an account of this world, both in its origin and government, as the work of an Almighty Creator, always and everywhere present; and especially to exhibit the relation of man to this Creator, and, in consequence of that relation, in what manner, and with what hopes he ought to live and die—subjects undeniably the most momentous that can occupy human thought. The sacred books of other religions have all an analogous aim; to account, namely, for the origin of all things, and to explain the nature and human relations of that something *divine*, which it is an instinct of the human mind to conceive as actuating and controlling all that moves. But so different—so immeasurably superior to all other sacred books is the B. in the conception it unfolds of the Divine nature as one personal God, exercising towards men the love and care of a parent to his offspring, and in the system of human duties springing therefrom, that on this consideration alone many rest its claim to being received as a direct revelation from heaven. The questions regarding the B., considered in this point of view, fall to be treated under the heads of INSPIRATION and REVELATION. To attempt to analyze or give any detailed account of the contents of the Scriptures, is beyond the scope of this article. The leading features of the doctrines and precepts, as a system, will be briefly sketched under the head of CHRISTIANITY; while the chief individual doctrines receive notice under their respective names, and in the accounts of the controversies to which they have given rise.

BIBLE, PROHIBITION OF. This is one of the main points of opposition between the Roman Catholic and Protestant Church. In the earliest times, we find no evidence of any prohibition of B.-reading by the laity. On the contrary, as the foundation on which the Church was built, and the sole source of religious knowledge, the reading of the B. formed an essential part of the instruction communicated by pastors to their congregations; and the greatest orators of the Church—especially Chrysostom and Augustine—continually reminded their hearers that private reading and study of the Scriptures should follow attendance on public services. This great fact is by no means contradicted by the warnings found, here and there, in the Fathers against abuse or mistake of the meaning of the Scripture; these warnings rather imply that Scripture-reading was common among the laity.

The gradual widening of the distinction, or rather the separation, between the clergy and the laity, was the work of the middle ages; and, among other means of preserving traditions inviolate and maintaining the exclusive character and sacred authority of the hierarchy, the B. was held in the background, even while there was no direct prohibition of its common use. In 1080, Gregory VII. ordained that Latin should be the universal language of Catholic worship, and consequently excluded all vernacular readings of Scripture in public assemblies. Again, with regard to the Waldenses, Innocent III., in 1199, prohibited the private possession and reading of Scripture (excepting the portions contained in the Breviary and the Psalter) without priestly permission and supervision. Similar prohibitions were repeated at Toulouse (1229), at Béziers (1233), and with regard to Wickliffe, at the synod of Oxford (1383). Ultimately the recognized Latin version, or Vulgate, was more and more decidedly made the sole authorized Church version. Indeed, as early as 1234, the synod of Tarragona denounced as a heretic any one who, having a translation of the B., refused to surrender it to be burned within the space of eight days. As, however, it soon appeared plain that little could be effected by such prohibitions, milder measures were employed. The Tridentine Council, being required to pronounce on the question of B. translations, purposely employed a word of ambiguous meaning in styling the Vulgate simply 'authentic;' but nothing was determined on B.-reading among the laity. This was first done in the publication of the first *Index Librorum Prohibitorum* soon after the Tridentine Council. Afterwards, the rules of the Church, placing the use of the Scriptures under the supervision of the bishops, were more and more strictly defined. The publication of the New Testament with practical annotations by Paschasius Quesnel (1687), gave occasion to the Roman Catholic Church to speak more definitely on the reading of the B. by the laity in the bull *Unigenitus Dei Filius*, 1713. New ordinances were issued by Pope Pius VII. in his Brief to the Archbishop of Gnesen and Mohilew (1816) against translations formerly authorized; again, by Leo XII., in his condemnation of B. societies (1824), and by Pius VIII. All these ordinances of the Roman Catholic Church imply that it is dangerous to give the B. freely to the laity,

and that, therefore, no vernacular versions ought to be used without interpretations taken from the Fathers, and an especial papal sanction.

BIBLE SOCIETY, an association having exclusively for its object the diffusion of the sacred Scriptures. Such associations must be regarded as a natural form or expression of Christian benevolence, acting according to the principles of Protestantism, and seeking to take advantage of the facilities afforded by the art of printing: but a long period elapsed after the Reformation before a B. S. was formed; during which, however, an extensive diffusion of the Scriptures took place, and partly by the agency of associations, which included it among other means for the advancement of Christianity.

It necessarily became, along with the translation of the Scriptures, one of the objects to which missionary societies directed their energy. But perhaps the first association ever formed for the sole and specific purpose of providing copies of the Scriptures for those who were destitute of them, was that founded by Baron Hildebrand von Canstein, an intimate friend of Spener, in conjunction with Francke at Halle, and which, down to 1834, when other Bible Societies had begun to be established in Germany, had distributed 2,754,350 copies of the Bible, and about 2,000,000 copies of the New Testament.—The impulse, however, to the formation of the Bible Societies now existing in all parts of Protestant Christendom proceeded from England, where, in 1780, an association was formed for the distribution of Bibles among soldiers and sailors. It was at first simply called *The B. S.*; it exists to the present day, is now known as the *Naval and Military B. S.*, and confining itself to its original specific object, has accomplished much good. It is not an uninteresting circumstance, that the first ship in which Bibles were distributed by this Society was the ill-fated *Royal George*.—In the beginning of 1792, a similar association was formed in London, under the name of the *French B. S.*, with a similar limited and specific object of distributing Bibles in the French tongue. It was probably the attitude assumed by infidelity in France which gave occasion to the formation of this Society, but the greater part of its funds having been remitted to Paris for the printing of the Bible there, were lost and everything belonging to the Society destroyed in the tumult of the Revolution.—It was not till 1802 that the first steps were taken towards the formation of the BRITISH AND FOREIGN B. S., the parent of a multitude of similar institutions, and the establishment of which must be regarded as the great epoch in the history of this branch of Christian beneficence; nor was the Society fully organized and established till March 7, 1804. Its formation took place in consequence of the deep impression made upon the mind of the Rev. Thomas Charles of Bala, in Wales, by the destitution of the sacred Scriptures which he found to exist in the sphere of his labors, and particularly by a circumstance strikingly illustrative of that destitution. Meeting a little girl in one of the streets of the town, he inquired if she could repeat the text from which he had preached on the preceding Sunday. Instead of giving a prompt reply, as she had been accustomed to do, she remained silent, and then weeping told him that the weather had been so bad she could not get to read the Bible. She had been accustomed to travel every week seven miles over the hills to a place where she could obtain access to a Welsh Bible. Mr. Charles, on his next visit to London, brought the subject of the want of Bibles in Wales under the notice of the committee of the *Religious Tract Society* (q. v.), when it was suggested by Mr. Hughes, a member of the committee, that a Society might be formed for the purpose of supplying Bibles not only in Wales, but wherever destitution existed throughout the world.

The Society was constituted on the widest possible basis, churchmen and dissenters being alike included in it; and soon attained a greatness corresponding with that of the other two religious societies, the *London Missionary Society* (see MISSIONS), and the *Religious Tract Society* (q. v.), which had been formed on similar principles, a few years before. It was indeed able to expend only about £619 in the first year of its existence. Its annual income gradually increased to an average of £70,000. But in 1875–6 it amounted to £116,802, derived from donations, legacies, collections, &c., and applicable to the general purposes of the Society, besides £108 for a special object (the 'Roxburgh Fund'), and £105,410 derived from sales of Bibles and Testaments, Abstracts, Monthly Reporters, &c.: showing the total net receipts for that year to be £222,320. Auxiliary and branch societies and dependent associations rapidly sprung up in all parts of Britain, and in the colonies, the number of which at present amounts to between 5000 and 6000. Much more than one-half of the expenditure of the British and Foreign B. S. has been devoted to the diffusion of the authorized English version of the Bible, the only English version with which its fundamental rules permit it to have anything to do; it has also spent large sums in printing and circulating the Scriptures in the different Celtic languages spoken in Great Britain and Ireland, and a very important branch of its operations has been the printing of translations of the Bible prepared by missionaries. The number of translations of the Scripture—in many cases complete, in others extending only to the New Testament, in some only to particular books—which have been printed or distributed by the Society, is close on 250 (some being indirectly distributed). Very many are translations never before printed, and many in languages possessing no previous literature.—The British and Foreign B. S. now issues annually nearly three million copies of the Bible, the New Testament, or such portions of sacred Scripture as have been printed in languages not possessing complete translations.

The whole number issued from the formation of the Society to 31st March 1881, was 91,014,448. This society also employs agents of high education and Christian character, to visit different countries for the promotion of its great object. The names of Dr. Henderson and Dr. Pinkerton, former agents, must be familiar to many readers, and perhaps no instance could be mentioned more happily illustrative of the character of this branch of the Society's operations than the visit of Dr. Henderson to Iceland, an account of which is given in his well-known volume of travels in that country. —A controversy concerning the circulation of the books of the Apocrypha along with the canonical Scriptures by the British and Foreign B. S. (see APOCRYPHA), led to a resolution in 1826, that its funds should be devoted, according to its original design, to the diffusion of the canonical books alone.—The EDINBURGH B. S. existed from that time forward as an entirely separate Society, till 1861, when all the Scotch societies amalgamated to form the NATIONAL BIBLE SOCIETY OF SCOTLAND.

The AMERICAN B. S. is, in the magnitude and importance of its operations, next to the British and Foreign Bible Society. It was founded at New York in 1817, and still has its headquarters in that city, in the '*Bible House*,' a very large and magnificent building, erected by special subscription. It reckons fully 7000 auxiliary societies, in all parts of the United States. Its income now amounts to about 700,000 dollars (£140,000) a year, rather more than one-half being derived from sales of Bibles and Testaments, and the rest from donations, collections, &c. The American B. S. has for some time issued annually more than 1,000,000 Bibles, New Testaments, and other portions of Scripture, and has in all distributed about 31,000,000 copies. The funds of the Society have been chiefly expended in supplying the wants of the inhabitants of the United States, amongst whom the Indian tribes have not been neglected. 'The Bible Association of Friends in America,' founded at Philadelphia in 1829, has also distributed the Bible extensively.

Of the numerous Bible Societies of Germany, the most important and extensively ramified is the Prussian Central B. S. (*Hauptbibelgesellschaft*) in Berlin. It was founded in 1814, has branches in all parts of the Prussian dominions, and distributes annually about 35,000 Bibles and 14,000 New Testaments. There are besides numerous independent Bible societies in other parts of the German Empire. A large number of Bibles are still, however, annually supplied to the people of Germany by the agents of the British and Foreign B. S. Bible societies were prohibited by the Austrian government in 1817, and some which had already been established in Hungary were dissolved. The RUSSIAN B. S., founded at St. Petersburg, in 1813, through the exertions of Dr. Paterson, and under the patronage of the Emperor Alexander I., entered upon a career of great activity and usefulness, co-operating with the British and Foreign B. S. for the printing of the Scriptures in the numerous languages spoken within the Russian dominions; but its operations were suspended in 1826 on the accession of the Emperor Nicholas, its stock of Bibles, and the whole concern being transferred to the *Holy Synod*, under the pretence that the sacred work of supplying the people with the Holy Scriptures belonged to the Church, and not to a secular society. The Bibles and Testaments in stock were indeed sold, and very large editions were thus disposed of, but the activity of a society which had no equal in continental Europe was at an end. A Protestant B. S. was then formed for the purpose providing editions of the Scriptures, and circulating them among the Protestants of all parts of the empire, which now reckons about 300 auxiliary societies. But the action of this Society 'does not touch the members of the Greek Church, or, if at all, only slightly and incidentally, and it makes no provision of the Scriptures in the language spoken by the great mass of the people. It is merely designed to meet the wants of colonists and others, who do not use the Russian language.' Of the translations of the Scriptures published by the original Russian B. S., the greater number have never been reprinted since its suppression.

There can be no doubt that Bible societies have contributed very much to the progress of Christianity and civilization since the beginning of the 19th c., and their influence is continually increasing and extending.

BI'BLIA PAU'PERUM, or Bible of the Poor, was a sort of picture-book of the middle ages, giving, on from forty to fifty leaves, the leading events of human salvation through Christ, each picture being accompanied by an illustrative text or sentence in

Latin. A similar and contemporaneous work on a more extended scale, and with the legend or text in rhyme, was called *Speculum Humanæ Salvationis*, i. e., the 'Mirror of Human Salvation.' Before the Reformation, these two books were the chief text-books used, especially by monks, in preaching, and took the place of the Bible with the laity, and even clergy; and as the lower orders of the regular clergy, such as the Franciscans, Carthusians, &c., took the title of 'Pauperes Christi,' Christ's Poor, hence the name. Many manuscripts of the *B. P.*, and of the *Mirror of Salvation*, several as old as the 13th c., are preserved in different languages. The pictures of this series were copied in sculptures, in wall and glass painting, altar-pieces, &c., and thus become of importance in the art of the middle ages. In the 15th c., the *B. P.* was perhaps the first book that was printed in the Netherlands and Germany, first with blocks, and then with types. The chief proof for the discovery of printing in Haarlem rests on the first impressions of the *Speculum Humanæ Salvationis*. See COSTER.

BIBLICAL ANTIQUITIES, or BIBLICAL ARCHÆOLOGY, is a study which has for its objects the social and political constitution, the manners, customs, geography, &c., of the Jews and other people mentioned in the Scriptures. A knowledge of these is essential to a right understanding of many passages of Scripture. The antiquities of the ancient Jews themselves undoubtedly form the most important part of such a study; but an examination of the laws, customs, &c., of the neighboring Semitic nations is likewise indispensable. The principal sources of such knowledge are the Old and the New Testament; the books of Josephus on *Jewish Antiquities* and the *Wars of the Jews;* the writings of Philo, the Talmud and Rabbinical works; and, lastly, Greek, Roman, and Arabian writers, with medals, monuments, and other works of art, the accounts of travelers, &c. The first work on Hebrew archæology was Thomas Goodwin's *Moses et Aaron, seu Civiles et Ecclesiastici Ritus Antiquorum Hebr.* (Oxford, 1616). German works on the subject are those of the handbooks by Jahn, Bauer, Rosenmüller, De Wette, Ewald, Saalschütz Roscoff, and Keil; and the biblical dictionaries of Winer (1848), Schenkel (1875). Convenient works of reference for English readers are Dr. Kitto's *Cyclopædia of Biblical Literature*, and his *Pictorial Bible;* Smith's *Dictionary of the Bible*, and *Dictionary of Christian Antiquities;* Thompson's *Land and the Book*. See also the large map of Western Palestine, in twenty-six sheets, published by the committe of the Palestine Exploration Fund, with a memoir comaining geographical, topographical, archæological, ethnographical, and geological particulars.

BIBLIO'GRAPHY, a term applied to the description and proper cataloguing of books. It is derived from *bibliographia*, which was employed by the Greeks to signify the transcription of books, while *bibliographos* was merely a copyist. The introduction of the term in the meaning which we now attach to it may be dated from the appearance of the first volume of De Bure's *Bibliographie Instructive* in 1763.

The bare enumeration of the works that have been written on this branch of literature would more than fill an ordinary volume; we shall here confine ourselves to the more important of them.

A favorite dream of bibliographers has been the production of a general catalogue, embracing the whole range of printed literature; and one attempt at least has been made to realize it. In the year 1545, Conrad Gesner published at Zurich, in one folio volume, his *Bibliotheca Universalis*, in which are described, under the names of the authors, arranged alphabetically, all the books in the Hebrew, Greek, and Latin languages about which the compiler could obtain information. This restriction as to language, of course, does away to some extent with the idea of universality indicated by the title-page; still, as the three which are included were in Gesner's time almost the only ones employed by men of learning, his work may be regarded as a nearly complete account of the state of printed literature as it then existed. The only other effort in this direction which we have to record is the *Bibliotheca Britannica* of Dr. Robert Watt, 4 vols. 4to (Edinburgh, 1824). Its object will be best described by the following extract from the preface to it: 'The account given of British writers and their works is universal, embracing every description of authors and every branch of knowledge and literature. What has been admitted of foreign publications, though selective, forms a very considerable and valuable portion of the work, and as none of note have been purposely omitted, the *Bibliotheca Britannica* may be considered as a universal catalogue of all the authors with which this country is acquainted, whether of its own or of the continent.' This great work was compiled under very adverse circumstances, and its author did not live to see it through the press. It thus labors under all the disadvantages of a posthumous publication; but with all its faults both of omission and commission, which are neither few nor small, it deservedly maintains a high character as a work of reference, and is indispensable to the library of every bibliographer.

The other laborers in this field of literature, whose works we are about to notice, have confined themselves within narrower limits. Some, proceeding upon a principal of selection, endeavor to furnish the inquirer with the information he seeks in regard to books which are rare, curious, or valuable; others, again, aiming at greater completeness within certain bounds, restrict themselves to the description of a special class of works—the literature, for example, of a particular country or language; the productions of a celebrated press; the books published within a given period; those of which the authors have withheld their names, or have veiled them under a pseudonyme; the treatises that have been written on a specific subject; and so on, together with a few which hardly admit of classification, but of which some examples will be given.

Bibliographical works on the selective principle form a numerous class; the following are amongst the more important: Vogt, *Catalogus Historicocriticus Librorum Rariorum*, 8vo (Francofurti, 1793). This is the fifth edition; the four preceding appeared successively at Hamburg in 1732, 1738, 1747, and 1753. David Clement, *Bibliothèque Curieuse, ou Catalogue raisonné de Livres difficiles à trouver*, 9 vols. 4to (Göttingen, 1750—1760). The expression *catalogue raisonné* is usually, but erroneously, applied in this country to classified catalogues; yet the work of Clement, who was the son of a Frenchman, and certainly understood the language in which he wrote, is arranged alphabetically. It is simply what it professes to be, a descriptive and methodized account of the books which it includes; but unfortunately it was never completed. It terminates with the article 'Hesiodus,' and the seven or eight volumes required to finish it have not been published. The *Bibliographie Instructive* of De Bure has already been mentioned; it extends to seven volumes 8vo, the last of which appeared in 1768. To these, however, should be added the *Catalogue des Livres de Gaignat*, 2 vols. 8vo (Paris, 1769), and the *Table destinée à faciliter la Recherche des Livres Anonymes*, 8vo (Paris, 1782). Ebert's *Bibliographisches Lexicon*, 2 Bde. 4to (Leip. 1821—1830), is an accurate and useful work. It has been translated into English, 4 vols. 8vo (Oxford, 1837). Lowndes's *Bibliographer's Manual* contains an account of rare, curious, and useful books, published in or relating to Great Britain, from the invention of printing, and may always be consulted with advantage. It appeared originally in 4 vols. 8vo (Lond. 1834); but a new edition, with many improvements, has since been published (1857—1864) in 11 parts or 6 vols., under the editorship of Mr. H. G. Bohn. One of the most interesting and important works in this department of B. is the *Manuel du Libraire et de l'Amateur des Livres* of J. C. Brunet, of which it is hardly possible to speak in terms of too high commendation. It was first published in 1810, in 3 vols. 8vo; and the fifth edition in 6 vols. 8vo (Paris, 1860—1865), is now out of print. The sixth vol. contains a valuable classed catalogue, the only modern effort of this kind. Another work of a similar, but somewhat more extensive character, entitled *Trésor des Livres Rares et Précieux*, by J. G. T. Graesse, was published at Dresden, in 7 vols. 4to (1859—1869). In it more attention has been paid to the northern literatures than in Brunet. To these may be added the amusing and instructive bibliographical works of the Rev. Dr. Dibdin.

Turning to special B., and taking the subjects of which it treats in the order given above, we have to notice first the works which confine themselves to the literature of a particular country or language. As regards Great Britain, we have besides Watt and Lowndes, already mentioned, the *Typographical Antiquities* of Ames and Herbert, 3 vols. 4to (Lond. 1785—1790). A new and improved edition was projected by Dibdin, but was not completed. Volumes 1 to 4 only have appeared, 4to (Lond. 1810—1819). A recent contribution to British B. is the *Critical Dictionary of English Literature and British and American Authors*, by S. A. Allibone, 3 vols. 8vo (Philadelphia, 1859—1871). Of this work we regret that we cannot speak favorably. It faithfully reproduces most of the errors of Watt, with the addition of not a few for which the compiler is himself responsible. Our French neighbors possess a treasure in *La France Littéraire* of J. M. Querard, but it embraces only the 18th and 19th centuries. The continuation, begun by Querard, and afterwards carried on by Louandre and Bourquelot, forms 6 vols. 8vo (Paris, 1846—1857). A further continuation by Lorenz (*Cat. Général de la Librairie Française pendant 25 ans* (1860—1865, 4 vols. 8vo, Paris, 1867—1871) brings the work down to a recent date. For the literature of Italy, we can only notice Gamba's *Serie de' Testi*, 4th ed. (Venice, 1839); and for that of Spain, the *Bibliotheca Hispana Vetus*, and the *Bibliotheca Hispana Nova*, of Antonio, the latest and best editions of which appeared at Madrid (1783—1788) in folio. The authors of the Low Countries are enumerated in the *Bibliotheca Belgica* of Foppens, 2 vols. 4to (Brussels, 1739); and those of Scandinavia in the *Almindeligt Litteraturlexicon for Danmark, Norge, og Island*, of Nyerup and Kraft, 4to (Copenhagen, 1820). For Germany, we have Heinsius, *Allgemeines Bücherlexicon*, with supplements (10 vols. 4to, 1812—1849), and Ebert's *Handbuch der Deutschen Litteratur*, 4 vols. 8vo (Leip. 1822—1840). To this class also belong the *Bibliotheca Græca*, *Bibliotheca Latina*, and *Bibliotheca Latina Mediæ et Infimæ*

Ætatis of Fabricius; Harwood's *View of the various Editions of the Greek and Roman Classics;* and Moss's *Manual of Classical Bibliography*. The Oriental student will find much to interest him in the *Lexicon Bibliographicum* of Haji Khalfa, edited in the original Arabic, with a Latin translation by Fluegel, 7 vols. 4to, 1835—1858.

Of works descriptive of the productions of particular presses, we can only notice Renouard's *Annales de l'Imprimerie des Alde* (3d ed., 8vo, 1834); the *Annales de l'Imprimerie des Estiennes*, by the same author, 8vo (Paris, 1837—1838); and Bandini, *Juntarum Typographiæ Annales*, 2 vols. 8vo (Lucæ, 1791). The student may also consult with advantage the *Notice de la Collection des Auteurs Latins, Français, et Italiens Imprimés en petits Formats par les Elzeviers*, at the end of the 5th volume of Brunet's *Manuel*.

The bibliographers who have confined themselves to books printed within a given period are chiefly Panzer, *Annales Typographici ab Artis Inventæ Origine ad Annum MD* (continued, however, to 1536) 11 vols. 4to (Norimbergæ, 1793—1803); and Hain, *Repertorium Bibliographicum*, 4 vols. 8vo, 1826—1838. The death of the author before the completion of this work, was the cause of the comparative inaccuracy observable in the 3d and 4th volumes. The article 'Virgil,' for example, is omitted altogether.

One of the earliest attempts to reveal the authorship of anonymous works was the *Theatrum Anonymorum et Pseudonymorum* of Vincent Placcius, folio (Hamburg, 1708); to which Mylius added a supplement in 1740. So far as France is concerned, these have both been superseded by the admirable and well-known *Dictionnaire des Ouvrages Anonymes et Pseudonymes* of Barbier, 2d ed., 4 tom. 8vo (Paris, 1822—1827). Italy, too, has the *Dizionario di Opere Anonime e Pseudonime di Scrittori Italiani* of Melzi, 3 vols. 8vo (Milano, 1848—1859). Mr. Ralph Thomas's (Olphar Hamst) *Handbook of Fictitious Names* (1868), is a slight but useful production. A very copious and valuable work is the great *Dictionary of the Anonymous and Pseudonymous Literature of Great Britain* (vol. i., 1881), begun by Mr. Halkett, keeper of the Advocates' Library, Edinburgh, and continued by the Rev. John Laing. To this branch of B. belong Weller's *Maskirte Literatur der älteren und neueren Sprachen;* Toinsot's (G. Heilly) *Dictionnaire des Pseudonymes* (1867); and De Manne's *Nouveau Dictionnaire* (1868). As an index to the articles in periodicals, the best guide is W. F. Poole's *Index to Periodical Literature* (new ed. 1882).

Bibliographies which describe treatises on special subjects are very numerous; we have only space to notice the following: Lipenius, *Bibliotheca Realis Theologica*, 2 vols, folio (Francofurti, 1685); *Bibliotheca Philosophica*, 1682; *Bibliotheca Medica*, 1679; *Bibliotheca Juridica*, 1672—a new edition of the last of these was published at Leipsic in 1757, and supplements have been successively added by Scott, Senkenberg, and Madihn—Marvin's *Legal Bibliography*, 8vo (Philadelphia, 1847); Orme's *Bibliotheca Biblica*, 8vo (Edin. 1824); Fürst's *Bibliotheca Judaica*, 8vo (Leip. 1849—1851); Vater, *Litteratur der Grammatiken, Lexica und Wörtersammlungen aller Sprachen der Erde*, 2te Ausg. von B. Jülg, 8vo (Berlin, 1847); Upcott's *Bibliographical Account of the Principal Works relating to English Topography*, 3 vols. 8vo (Lond. 1818); Oettinger's *Bibliographie Biographique Universelle*, 8vo (Bruxelles, 1854); *The Literature of Political Economy*, by J. R. M'Culloch, 8vo (Lond. 1845); *Arithmetical Books from the Invention of Printing to the Present Time*, by Augustus de Morgan, 12mo (Lond. 1847); the *Biographia Dramatica*, by Baker, Reed, and Jones, 3 vols. 8vo (1812); the *Bibliotheca Anglo-Poetica* (1815). Note also van Praet's *Catalogue des Livres Imprimés sur Vélin*, 9 vols. (1828); Piegnot's *Dictionnaire des Livres condamnés au Feu* (1806); and Martin's *Bibliographical Catalogue of privately printed Books*.

Petzholdt's *Bibliotheca Bibliographica* (1864) is a bibliography of bibliographies. For modern English literature, the most readily available guides are Sampson Low's *English Catalogue* of books from 1835 onwards; Whitaker's *Reference Catalogue of Current Literature;* with the lists in the *Bookseller, Publisher's Circular*, and *Athenæum*.

BIBLIO'MANCY (Gr. *ta biblia*, the Bible, and *manteia*, divination), a mode of divination much practised during many ages, by opening the Bible, and by observing the first passage which occurred, or by entering a place of worship and taking notice of the first words of the Bible heard after entering it. The application was often very fanciful, and depended rather upon the mere sound of the words than upon their proper signification, or the scope of the passage. Prayer and fasting were sometimes used as a preparation for a mode of consulting the divine oracles, than which nothing could be more contrary to their purpose and spirit, and which was in harmony only with the notions and practices of heathenism. B. was prohibited, under pain of excommunication, by the Council of Vannes, 465 A.D., and by the Councils of Agde and Orleans in the next century. It continued, however, to prevail for many centuries thereafter, and is said to have been introduced into England at the Norman Conquest. It was essentially the same as the *Sortes Virgilianæ*, the only difference being in the book employed.

BIBLIOMA'NIA, or book-madness, is a word recently formed from the Greek to express the passion for rare and curious books, which has manifested itself to such an extent during the last century. While the ordinary collector is satisfied with the possession of works which are valuable either on account of their established reputation, or as assisting him in his literary or professional pursuits, the bibliomaniac is actuated by other motives. With him utility is of secondary importance, rarity being the first and great requisite. Thus even a common book becomes valuable in his eyes, if it be one of a few copies thrown off on vellum or on large paper, or if it has been bound by Derome, Bozerian, Lewis, or Payne, and for the same reason he sometimes prefers an inferior to a better article. The fac-simile reprint of the Giunta edition of Boccaccio's *Decameron* (Florence 1527) fetches hardly as many shillings as the original does pounds, yet the great distinguishing difference between them is, that the former is the handsomer, and more correct of the two.

The formation of complete sets of such books as the *Elzevir Republics* (See ELZEVIR), or of the works of a single author, provided they be scarce, is a favorite pursuit with many. The editions of the classics most prized by collectors are those of the Elzevirs and of the Foulises (q. v.). The original editions of Defoe's numerous productions are eargerly sought for at present.

B. seems to have reached its climax at the sale of the library of the Duke of Roxburghe in 1812. Amongst the treasures which that library contained, was the only perfect copy, known to exist, of the first, or at least the first dated edition of Boccaccio's *Decameron* (Venice, Christ, Valdarfer, 1471). After a spirited competition with Lord Spencer, this volume was purchased by the Marquis of Blandford for the sum of £2260, the highest price perhaps ever paid for a single book. When the collection of the marquis came under the hammer in 1819, Lord Spencer secured this precious tome at the large yet more moderate cost of £918, 15s. It is now, we believe, in his lordship's library at Althorp.

One of the results of the Roxburghe sale was the establishment of the Roxburghe Club, the object of which was to reprint, for the use of members only, works hitherto unedited, or of extreme rarity. The example thus set was speedily followed by the Bannatyne and Maitland Clubs in Scotland, and by many more in other parts of the kingdom. Some of these are defunct, and others are in a moribund state. It remains to be seen in what new form the B. of the present day will develop itself.

BICANE'RE, capital of the protected state of the same name (see BIKANIR) in Rajpootana, India, lies in a desolate tract, 1175 miles to the north-west of Calcutta, in lat. 28° N., and long. 73° 22′ E. Pop. about 60,000. It is surrounded by a battlemented wall of 3½ miles in circuit; and from a distance presents a magnificent appearance, but inside the people are found to be extremely filthy. Immediately to the north-east is a detached citadel, of which the rajah's residence occupies the greater part.—The state of which B. is the capital, lies in lat. 27° 30′—29° 55′ N. and long. 72° 30′—75° 40′ E., thus measuring, in its extremes, 160 miles by 200. It contains 17,676 square miles, with an estimated population of 540,000. The Rajpoots are the predominant race; but the Jauts form the great body of the inhabitants. Though the people find their principal resource in pasturage, yet water appears to be remarkably scarce. In the whole territory, there is not one perrenial stream; while wells, as precarious and scanty as they are brackish and unwholesome, average perhaps 250 feet in depth; even the lakes or *sirrs*, which the periodical rains leave behind them, are generally saline, yielding, in fact, at the close of the dry season, a thick crust of salt. In 1868—1869, nearly half of the population was destroyed by drought. The temperature varies greatly: in the beginning of February, ice is formed on the ponds; and in the beginning of May, the thermometer stands at 123° F. in the shade. Again, in the beginning of November, according to Elphinstone's experience, each period of 24 hours, according as the sun was above or below the horizon, presented such extremes of heat and cold as often to be fatal to life.

BICE (Ger. *Beis*, Ital. *Biadetto*), the name of two pigments of a blue and green color respectively, known to artists from the earliest times—blue B. as *mountain blue, ongaro, azzuro di terra*, &c., and green B., as *thrysocolla, Hungarian green, verde de Miniera, verde de Spagna, verdetto*, &c. Green B. is now usually called *malachite green* and *mountain green*. Both are native carbonates of copper, but are also prepared artificially. In its native state, however, B. is more durable, and in the case of mountain green especially, much more brilliant. Artificial blue B. is known as Hambro' blue, mineral blue, &c.; artificial green B., as mountain green, Paul Veronese green, and emerald green.

BI'CEPS (double-headed) is the muscle which gives a full appearance to the front of the arm. Above, it consists of two portions or heads—whence its name—one being attached to the coracoid process of the scapula, the other to the margin of the depression on that bone which lodges the head of the humerus. The former is the short, the latter, the long head of the biceps.

They unite to form a fleshy belly, which terminates in a rounded tendon.

The B. tendon is inserted into the tubercle of the radius (see ARM). Before passing to this insertion, it gives off an expansion, which separates the median basilic vein from the brachial artery in the situation generally selected for venesection. The action of the B. is rapidly to bend the forearm, and also to supinate the hand.

BICETRE, originally the name of a very old castle, situated on a little eminence in the neighborhood of Paris, and commanding one of the finest views of the city, the Seine, and the environs. In 1632, it was destroyed, because it had become a hiding-place of thieves. Afterwards, it was rebuilt by Louis XIII., and made a hospital for old soldiers. When Louis XIV. had built the *Hôtel Royal des Invalides*, the B. was made a civil hospital for septuagenarians. It was for a long time used also as a prison for criminals, mostly those condemned to the galleys, but is now entirely occupied as an hospital for indigent old people and for incurable lunatics. There is a well sunk in the rock to the depth of 183 feet.

BICHAT, MARIE FRANÇ XAVIER, one of the most famous anatomists and physiologists, whose discoveries make an epoch in biology, was born at Thoirette, in the department of Ain, France, November 11, 1771. He studied chiefly in Paris under Desault, who adopted him as his son, and whose surgical works he edited. In 1797, he began giving lectures on anatomy, along with experimental physiology and surgery, and in 1800 was appointed physician in the Hôtel-dieu. Two years after, July 22, 1802, he fell victim to intense and unremitting labor, before he had completed his thirty-first year. He was the first to simplify anatomy and physiology by reducing the complex structures of the organs to the simple or elementary tissues (q. v.) that enter into them in common. This he has done in his *Anatomie Générale* (2 vols., Par. 1801, often reprinted). In his *Recherches Physiologiques sur la Vie et la Mort* (Par. 1800), he develops another luminous idea—the distinction between the organic and the animal life.

BICKERSTAFF, ISAAC, author of numerous comedies and light musical pieces produced under Garrick's management, which had at one time a great popularity, was born in Ireland about the year 1735, and became page to Lord Chesterfield, who was made Lord Lieutenant of Ireland in 1746. B. afterwards became an officer of marines, but was dismissed the service for some discreditable offence. Nothing is certainly known regarding his after-life, nor the time of his death, which would seem to have taken place on the continent. His best known pieces are, *The Maid of the Mills; The Padlock; He would if he could; Love in a Village; The Hypocrite;* and *The Captive.*

BICKERSTETH, REV. EDWARD, an influential clergyman of the Church of England, was born at Kirkby Lonsdale, in Westmoreland, March 19, 1786. He commenced life as a post-office clerk; and afterwards, having served an apprenticeship to a London attorney, established a lucrative solicitor's business in Norwich. Here, he took great interest in all meetings of a religious nature, and soon became so deeply impressed with the importance of religious truth, that he resolved to devote himself to the ministry. Being admitted to orders, he was sent by the Church Missionary Society to re-organize their mission stations in Africa. Having most satisfactorily accomplished his mission, B. was, on his return, appointed secretary to the Church Missionary Society, and continued to discharge the duties of the office with an unwearied energy and devotion that won for himself a high reputation and extensive influence, as well as great prosperity for the institution he represented, until 1830, when he resigned on acceptance of the rectory of Watton, in Hertfordshire. Here, until his death, which took place February 24, 1850, he took an active part in promoting, both by tongue and pen, almost every work having for its object the spread of religious truth whether at home or abroad. B. belonged to what is known as the Evangelical section of the Church of England, and took a decided part against the endowment of Maynooth, and in opposition to the spread of Tractarianism in his own church. He was also one of the founders of the Evangelical Alliance. Of his religious writings—which have been collected in 16 vols. (Lond. 1853)—the most popular are, *A Help to the Study of the Scriptures* (written before he was ordained), *The Christian Student*, and *A Treatise on the Lord's Supper*. B. also edited *The Christian Family Library*, a work consisting of 40 vols.

BI'CYCLE, a form of velocipede or lightly-built wheeled vehicle propelled by the person who occupies it. The bicycle, as its name (from Gr. *bis*, twice, and *kyklos*, wheel) imports, has but two wheels; and as these are placed in line one behind the other, the machine acquires and retains its stability in the erect position only in motion. The front wheel of the bicycle is generally about twice as high as that behind, and may be as much as 60 inches in diameter. The two wheels are connected by a 'backbone' which rests in front on a forked bar rising perpendicularly from the axle of the front wheel. The rider, sitting on a saddle fixed to the backbone, moves the bicycle with his feet by means of cranks attached to the axle of the front or driving wheel, and steers by help of a cross-handle affixed to the erect bar. The bicyclist may without undue exertion, attain a pace of 9, 10, or more miles an hour, and can sustain this pace for many hours. As much as 106 miles have been accomplished in less than eight hours. The whole machine, though now made almost wholly of steel and iron, need not weigh more than 50 pounds. The earliest form of bicycle introduced from France about 1820, had two heavy wooden wheels of the same size, and was driven by the rider striking his feet on the ground.

BIDASSO'A, a river which, rising in Spain, forms the boundary between that country and France, and falls into the Bay of Biscay at Fuenterabia. The treaty of the Pyrénées was concluded on an island in its mouth in 1659. The B. was the scene of several conflicts during the Spanish campaign. In 1793, the Spanish crossed the river, and defeated the French in three successive encounters. In July of the following year, however, the French captured the intrenched camp of the Spaniards. In August 1813, the French under Soult were defeated at San Marcial, on the B., by the allies; and in the October of the same year Wellington surprised and drove the French from their strongly fortified positions on its northern side.

BIDDEFORD, a town of Maine, U. S., six miles from the mouth of the Saco River. The inexhaustible water-power is taken advantage of by many cotton and some woollen mills. Iron is manufactured, and there is trade in lumber. B., which is connected by a bridge with the town of Saco, is named after Bideford in England. Pop. (1880) 12,652.

BIDDING PRAYER is a form of exhortation, always concluding with the Lord's Prayer, enjoined by the 55th canon of the Anglican Church, in 1603, to be used before all sermons and homilies. Except in cathedrals and the university churches, it is now but seldom used. The term 'B.' is from the Saxon 'Bede,' signifying a prayer. The form is of extreme antiquity, and we have a similar one in the Apostolical Constitutions (q. v.), the original of which was probably that used in the Church of Antioch. It was anciently used for the communicants or believers after the dismissal of the catechumens, and was pronounced by the deacon, each petition beginning with the words: 'Let us pray for——,' and the people responding at the end of each with 'Kyrie Eleeisor,' or some such words.

There is another very ancient example in the Ambrosian Liturgy; and St. Chrysostom alludes to such a form in one of his sermons. It must have been, and even now in its abridged shape still is, very impressive, allowing each individual to supply from his own thoughts special cases of necessity under the different heads. There is some resemblance between these B. Prayers and the Litany, and prayer for the church militant, now used in the Anglican Church.

BIDDLE, JOHN, the founder of English Unitarianism, was born in 1615, at Wotton-under-edge, in Gloucestershire, and, in 1632, entered Magdalen College, Oxford, where he took his degree of M.A. In 1641, he was elected master of the free school in the town of Gloucester, the duties of which function he discharged with such zeal, that the character of the institution was greatly improved; but having embraced certain opinions—which he printed for private circulation—in regard to the personality of the Holy Spirit, at variance with those held by the majority of Christians, he was thrown into jail, December 1645. Being at length summoned before the parliament at Westminster, on account of his heresy, he was formally tried, and condemned to imprisonment for five years. The famous Westminster Assembly of Divines undertook to 'settle' B.'s case, but unfortunately their arguments—as is usual in disputation—had only the effect of strengthening his previous convictions. In 1648, while still in prison, he published a *Confession of Faith concerning the Holy Trinity*, &c., which was followed by another tract containing the opinions of the Church Fathers on the same question. In consequence of this attempt to combat the orthodox doctrine, the Westminster Divines called upon the parliament to pass an act declaring the denial of the Trinity a crime punishable by death. The *army*, however, strange to say, proved on this occasion less cruel than the *church*, for it manifested such strong opposition that the act remained a dead-letter. Under the liberal rule of Cromwell, B. was released. He now commenced to gather a congregation of those whom he had converted to his opinions—namely, that there was but one person, as there was but one nature, in the Godhead. The members were first called Bidellians, then Socinians, and finally assumed for themselves the name of Unitarians. Twice, however, after this, during the Commonwealth, B. suffered severely for his creed, and even the iron-willed Protector himself, in order to save his life, was compelled to banish him to one of the Scilly Isles. Three years of imprisonment having elapsed, he was permitted to

return, and continued to preach in London till the death of Cromwell, and also after the restoration, until June 1662, when he was again apprehended and fined in £100, and being unable to pay, was committed to jail, where he died in September of the same year. His personal character was highly esteemed by those who knew him.

BIDDLE, NICHOLAS, an American financier, born at Philadelphia in 1786, graduated at Princeton College, and became an energetic member of the legislature of Pennsylvania. In 1823, he was appointed president of the United States' Bank, and held that post till 1839. He conducted its affairs at first with great skill, integrity, and prudence; but, in 1838, the bank became insolvent, and in October of that year suspended cash-payments. The commercial panic and distress which at that time prevailed in the United States, spread dismay far and wide, and involved multitudes in ruin. In December 1841, the grand-jury for the county of Philadelphia made a presentment against B. and some others for entering into a conspiracy to defraud the stockholders of the bank of 400,000 dollars in 1836, and endeavoring to conceal the same by a fraudulent and illegal entry in 1841; the presentment, however, was never followed up. B. had considerable literary taste, and for some time edited *The Philadelphia Portfolio*, contributing many articles to its pages. By request of the president of the United States, he compiled from the original papers a *History of Lewis and Clarke's Expedition to the Pacific Ocean;* also *The Commercial Digest*, a volume put forth by congress. A number of his essays, speeches, &c., were published. He died in January 1844.

BI'DEFORD, a seaport town of Devonshire, on both sides of the Torridge, near its confluence with the estuary of the Taw, 30 miles north-west of Exeter. A bridge of 24 arches, and 677 feet long, unites the two divisions of B., which has manufactures of ropes, sails, earthenware, and leather. These it exports together with oak-bark, corn, flour, linens, woollens, iron, and naval stores. Pop. (1881) 6512. In 1880, 1052 vessels, of 44,291 tons, entered, and 1064 vessels, of 45,807 tons, cleared the port. Vessels of 500 tons can get up to the quay. Four miles along the coast is the new and popular health resort, *Westward Ho*, named after Kingsley's novel.

BIDPAI, or PILPAI, is the reputed author of a collection of fables and stories which have been widely current both in Asia and Europe for nearly 2000 years, passing as a compendium of practical wisdom. Scarcely any book except the Bible has been translated into so many languages; and its history deserves attention as part of the history of human development. The researches of Colebrooke, Wilson, Sylvestre de Sacy, and Loiseleur des Longchamps (*Essai sur les Fables Indiennes*, 1838), have successfully traced the origin of the collection, its spread, and the alterations it has undergone among different nations. The ultimate source is the old Indian collection in Sanscrit, with the title *Panchatantra* (q.v.), i. e., 'Five Sections' (edited by Kosegarten, Bonn, 1848). An analytical account of the Sanscrit *Panchatantra*, by H. H. Wilson—who determines the date of its production to be subsequent to the 5th c. A.D.—is printed in the *Transactions* of the Royal Asiatic Society, vol. i.; but an abridgement of it, called the *Hitopadesa* (q. v.), is better known than the original. A critical edition of the *Hitopadesa* has been published by A. W. von Schlegel and Lassen (Bonn, 1829), and translations have been made into English by Wilkins and Jones, and into German by M. Müller (Leip. 1844).

Under the Persian king, Nushirvan (531—579), the *Panchatantra* was translated into the Pehlvi tongue by his physician Barsuyeh, under the title of *Calilah and Dimnah* (from two jackals that take a prominent part in the first fable). This Pehlvi version has perished with all the profane literature of ancient Persia; but under the Calif Almansur (754—775), it was translated into Arabic by Abdallah-ibn-Almokaffa (published by De Sacy, Par. 1816). From Almokaffa's Arabic translation—in the introduction to which the author of the collection is called Bidpai, the chief of Indian philosophers—have flowed all the other translations and paraphrases of the East and West. Several Arabic poets worked it up into complete poems; and in the new Persian literature a great variety of versions and paraphrases, some in verse, some in prose, were made. From the Persian of Vaez (about the end of the 15th c.), the work was translated into Turkish about 1540 by Ali Chelebi, under the title of *Homayun-nâmeh*, the Imperial Book. There are also translations into the Malay, Mongol, and Afghan languages.

Towards the end of the 11th c., a translation had appeared, from the Arabic of Almokaffa, into Greek, by Simeon Sethus; and later, a Hebrew translation by Rabbi Joel, which John of Capua, a converted Jew, in the last half of the 13th c., retranslated into Latin with the title of *Directorium Humanæ Vitæ* (published first at Augs. 1480, and repeatedly since). A version from this was made into German by Eberhard I., Duke of Würtemberg (died 1325), which appeared with the title of *Examples of the Ancient Sages* (Ulm, 1483). Under Alfonso X. of Castile (1252—1284), Almokaffa's work was translated into Castilian, and afterwards from that into Latin by Raymond of Veziers, a learned physician. The other European translations follow, some the Latin of John of Capua, some that of Raymond of Veziers; Spanish (Burgos, 1498), Italian (Flor. 1548), English (Lond. 1570), Dutch (Amst. 1623), Danish (Cop. 1618), Swedish (Stock. 1743), German (most recent, Leip. 1802).

BIEL. See BIENNE.

BIE'LEFELD, a busy town of Westphalia, in Prussia, picturesquely situated on the Lutter or Lutterbach, at the foot of the Sparrenberg Mountain, and about 26 miles south-west of Minden. The broad ditch, which formerly surrounded B., is now converted into pleasant walks. The old walls of the town have been put to a similar use. The castle of Sparrenberg, erected in 1545 on the site of an old Guelphic fortress, and which now serves as a prison, is in the immediate neighborhood. B. which is the center of the Westphalian linen-trade, has extensive bleaching-grounds, manufactures of woollen thread, soap, leather, &c., and its meerschaum pipes are celebrated. Pop. (1880) 30,679.

BIELE'V, an ancient town of European Russia, in the government of Tula, situated on the left bank of the Oka, in lat. 53° 45′ N., and long. 36° 5′ E. It has a large trade, and manufactures of soap, hardware, leather, &c. Pop. 8640.

BIE'LITZ, a town of Austrian Silesia, on the left bank of the river Biala, about 18 miles north-east of Teschen. A bridge over the river connects it with the town of Biala, which is situated in Galicia. It has dye-works and print-fields, and carries on a large trade in woollens and kerseymeres with Russia, Poland, Hungary, and Italy. B. belongs to the Princes Sulkowsky, whose castle, now converted into public offices, is situated here. Pop. (1880) 13,060.

BIE'LLA, a town of North Italy, in the province of Novara, about 38 miles north-east of Turin, with which it is connected by railway. It is pleasantly situated on the Cervo, an affluent of the Sesia, and has manufactures of woollens, hats, paper, &c. Pop. with suburbs (1871), 11,814.

BIE'LO-OZ'ERO (the White Lake), a lake in the government of Novgorod, Russia, lat. 60° 10′ N., long. 37° 30′ E. It is elliptical in shape, its length being about 25 miles, and its breadth 20. Its bottom is composed of white clay, which, during stormy weather, gives to the water a milky appearance; hence, doubtless, the name White Lake. B. is fed by numerous small streams, is pretty deep, and abounds with fish. Its surplus waters are conveyed by the Sheksna River into the Volga. Canals unite it with Onega, Sukona, and Dwina.—B.-OZERSK, an old wooden town on the south shore of the lake, formerly capital of an ancient principality of the same name, has a trade in cattle, corn, and pitch, and manufactures of candles. Pop. 6000.

BIELO'POL, a town of Russia, in the government of Kharkov, and distant from the city of that name 106 miles north-west. It has a considerable trade and extensive distilleries. Pop. (1877) 12,178.

BIELSHO'HLE, a singular cavern in one of the Harz Mountains, called Bielstein, on the right bank of the Bode, in the duchy of Brunswick, Germany. It was discovered in 1768. The entrance to it is more than 100 feet above the bed of the stream. The cavern is divided into eleven main compartments, and contains a great deal of that curiously freakish work which nature delights to execute in stalactites, when she sometimes condescends to imitate the inventions of human art, as in the eighth division, where she has contrived to fashion the framework of an organ out of the slow drip of ages. In the ninth, there is also a picture of a sea, as it were, arrested in its motion, its waves silent, but in act to roll.

BIE'LSK, town in Russia, in the government of Grodno. It is situated in a very fertile district, watered by the Narev and Nurzek, was formerly capital of a Polish palatinate, is well built, and has a fine custom-house. Pop. 10,000.

BIE'NNE, or BIEL, a town of Switzerland, in the canton of Bern, 17 miles north-west of the city of Bern, beautifully situated at the foot of the vine-clad Jura, at the mouth of the valley of the Suze, and at the northern extremity of the lake of Bienne. It is surrounded by old walls, and approached by shady avenues. Pop. (1880) 11,623, engaged in the manufacture of watches, leather, cotton, &c. B. is a place of great antiquity. It belonged to the Bishop of Bâle, or Basel; but as early as 1352, it entered into an alliance with Bern for the protection of its liberties, and for this display of independence was burned by its ecclesiastical ruler. The Reformation, however, so weakened the power of the clerical governors of B. that in the beginning of the 17th c. it had become merely nominal; and B. was essentially a free and independent city until 1798, when it was annexed to France. In 1815, it was united to Bern.—B. LAKE OF, extends from the town of B. along the foot of the Jura Mountains in a south-west direction, until within 3 miles of Lake Neuchâtel, its length being about 10 miles, and its greatest breadth, 3. It is situated at an elevation of

1419 feet above the level of the sea, 8 feet lower than Lake Neuchâtel, whose surplus waters it receives at its south extremity by the Thiel, by which river it again discharges its own. Its greatest depth is 280 feet. Towards its southern extremity is situated the island of St. Pierre, crowned with a grove of fine old oaks, to which Rousseau retired for two months after his proscription at Paris in 1765.

BIE'NNIALS, or BIENNIAL PLANTS, are plants which do not flower in the first season of their growth, but flower and bear fruit in the second season, and then die. Many of our cultivated plants are B., as the carrot, turnip, parsnip, parsley, celery, &c., and many of the most esteemed flowers of our gardens, as stock, wallflower, &c. But plants which in ordinary circumstances are B., often become annuals (q. v.), when early sowing, warm weather, or other causes promote the earlier development of a flowering stem, as is continually exemplified in all the kinds already named. If, on the other hand, the flowering of the plant is prevented—or, in many cases, if it is merely prevented from ripening its seed—it will continue to live for a much longer period: the same bed of parsley, if regularly cut over, will remain productive for a number of years.

BIERVLIE'T, a village of the Netherlands, province of Zeeland, 13 miles east-north-east of Sluis. It is deserving of mention as the birthplace of William Beukelzoon (q. v.), who in 1386 invented the method of curing herrings. In 1377, B. was detached from the mainland by an inundation, and still remains insular.

BIES-BO'SCH, a marshy sheet of water of the Netherlands, between the provinces North Brabant and South Holland, formed in November 1421 by an inundation which destroyed 72 villages and 100,000 people, and forming that part of the estuary of the Maas called Holland's Diep. It is interspersed with several islands.

BI'FFIN. See APPLE.

BIG HORN, a navigable river of the United States, rises near Fremont's Peak in the Rocky Mountains, about 42° 20′ N., and 110° W. It has a north-east course of about 400 miles, being the largest affluent of the Yellowstone, which, again, is the largest affluent of the Missouri.

BIG SANDY RIVER, a fine navigable affluent of the Ohio, flows through extensive beds of coal. It is formed by the junction of two branches—the east and west forks—which both rise in Virginia. The latter traverses several counties of Kentucky, and the former is, during the latter part of its course, the boundary between the two states. Their united waters lose themselves in the Ohio, nearly opposite to Burlington, in the state of Ohio.

BI'GA, a Roman term applied in ancient times to vehicles drawn by two horses abreast; and commonly to the Roman chariot used in processions or in the circus. In shape it resembled the Greek war-chariot—a short body on two wheels, low, and open behind, where the charioteer entered, but higher and closed in front.

BI'GAMY. This is an offence which, although perfectly intelligible in itself to the popular and unprofessional understanding, is yet, with a due regard to the strict meaning of the word, extremely difficult, legally to define. Blackstone objects to the use of it as a term descriptive of the offence in view; for he says it is corruptly so called, because B. properly signifies being *twice married*, which a man or a woman may legally be; and he therefore prefers the term *polygamy*. B., however, even according to the literal meaning, was an offence, or rather disqualification, according to the canonists, who explained it to consist in marrying two virgins successively, one after the death of the other, or in once marrying a widow; and persons so offending or disqualified were held to be incapable of holy orders, and therefore B. was anciently considered a good counterplea to the claim of *benefit of clergy* (q. v.), although the law in that respect was afterwards altered by a statute passed in the reign of Edward VI., when, bigamists or no bigamists, the clergy resumed their strange privilege. Different views prevailed in more modern times, and at a period, too, when the restraints of ecclesiastical dogmas had been thrown off. It is known that certain of the leaders of the German Reformation, including Luther, Melanchthon, Bucer and Melander, did not withhold their consent from Philip Landgrave, of Hesse, champion of the Reformation, who, having lost conceit of his wife, had applied to the Protestant doctors for license to have another, and which license was not withheld, for the marriage took place, and was performed by Melander in presence of Melanchthon, Bucer, and others; and *privately*, as the marriage-contract bears, 'to avoid scandal, seeing that, in modern times, it has not been usual to have two wives at once, although *in this case it be Christian and lawful.*' Whether Luther and the other Protestant doctors actually held views favorable to polygamy has been the subject of warm controversy (see Sir William Hamilton's *Discussions on Philosophy and Literature*, 1852, 2d ed., 1853; and Archdeacon Hare's *Vindication of Luther*, 1855). Sir William Hamilton asserts that Luther believed in 'the religious legality' of polygamy, and wished it to be sanctioned by the civil authorities—an assertion, however, of which the promised proof never appeared. Archdeacon Hare, on the other hand, maintains that Luther and Melanchthon only held that in certain extraordinary emergencies dispensations from the usual law of marriage might be granted. Be that as it may, the conduct of the Reformation leaders in this matter has been universally condemned, even by Protestants. The ideas referred to never gained ground in Germany; while in Great Britain 'monogamy' not only continued an institution, but its violation was regarded as a serious offense, which continues to be treated in statutes, law-books, and in the practice of the criminal courts in the three kingdoms, under the name of *bigamy*. Nor indeed, have the ideas referred to been followed by the Germans as a nation.

The first statute which distinctly treated this offence as a felony was the 1 James I. c. 11, which enacted that a person so convicted should suffer death. What now constitutes the English law regarding the crime of bigamy, is the 22d section of 9 Geo. IV. c. 31, passed in 1828. B. is there declared to be committed by 'any person who, being married shall marry any other person during the life of the former husband or wife, whether the second marriage shall have taken place in England or elsewhere'—a definition that appears to be adopted by the recent Divorce Act, the 20 and 21 Vict. c. 85, where for the purpose of that act, B. is to be taken to mean 'marriage of any person being married, to any other person during the life of the former husband or wife, whether the second marriage shall have taken place within the dominions of her Majesty, or elsewhere.' More correctly, however, the offence of B. may be said to consist in going through the *form* or *appearance* of a second marriage, while a first subsists, with a man or woman, against whom the most odious deceit and fraud is thus practised, and upon whom, especially in case of a woman, the deepest injury is inflicted; for the second marriage is merely a marriage in form—no real marriage at all, because a man cannot have two wives, or a woman two husbands, at one and the same time. In prosecutions under his act, the first wife is not admissible as a witness against her husband, because she is the true wife; but the second may, because she is not only no wife at all, but because she stands in the position of being the party peculiarly injured by the bigamy. The same is the procedure in the case of a second husband. The act following the 1 James I. makes B. a felony, and prescribes as the punishment, upon conviction, transportation for seven years; now changed (by the 16 and 17 Vict. c. 99, amended by the 20 and 21 Vict. c. 3) to penal servitude for the same period, or not less than three years; or to be imprisoned, with or without hard labor, in the common jail or house of correction for any term not exceeding two years.

The act, however, excepts from its provisions the following four cases: 1. That of a second marriage contracted out of England, by any other than a subject of the realm. 2. That of any person marrying a second time, whose husband or wife shall have been continually absent from such person for the space of seven years then last past; and shall not have been known by such person to be living within that time. 3. That of a person, who at the time of such second marriage, shall have been delivered from the bond of the first marriage. 4. That of a person whose former marriage shall have been declared void by the sentence of any court of competent jurisdiction. The third of these exceptions deserves notice, in consequence of its bearing on a curious question that arose before the passing of the act, and which showed a serious conflict which then existed, if it does not still exist, between the laws of England and Scotland. The case referred to is known among lawyers as *Lolley's case;* it occurred in 1812, and may be shortly stated as follows: Lolley and his wife, two English persons, being tired of each other's conjugal society, and unable to bear the expense of the then English ordeal, went to Scotland, where after acquiring a domicile, they applied to the Scotch Consistorial Court for a divorce, which was speedily (although it is said collusively) obtained, on the ground of the husband's adultery. Relying on such sentence of the Scotch court, Lolley returned to England, where he married again. He was immediately indicted for B., tried, convicted, and sentenced to seven years' transportation, and that in the face of the Scotch decree of divorce, which he reasonably pleaded by way of defence. The point, however, was reserved for further consideration before the full court (Court of Exchequer), who, however, shortly after gave a unanimous judgment, holding that Lolley had been rightly convicted; or, in other words, that the Scotch court had no authority to dissolve an English marriage, and that the decree of divorce which Lolley had obtained, although good in Scotland, was of no force whatever in England. Many distinguished English lawyers were of opinion that the judgment of the English court was wrong, and that the Scotch divorce afforded him a complete defence. But it is to be observed that the prosecution was founded on the 1 James I. c. 11, to which we have referred, the 3d section of which only excepts from its provision

persons divorced by 'any sentence had in the Ecclesiastical Court;' meaning, of course, the English Ecclesiastical Court; and thus some color at least is given to the view taken of Lolley's case by the Court of Exchequer. But it may well be doubted whether such a conviction could take place in the face of the above third exception in the 9 Geo. IV., which excepts persons who shall have been divorced, not by any particular court or jurisdiction, but simply divorced from the bonds of the first marriage.

It remains to be added that under the 9 George IV., not only the actual bigamist, but every person counselling, aiding, or abetting the offender, is held equally guilty, and may be sentenced to the same punishment; and by section 31, accessories before and after the fact are also severely punishable.

The 9 Geo. IV. does not extend to Scotland, but the law there on the subject of this particular offence is very much the same in principle, although the punishment there is not so severe as in England. There is an old Scotch statute, passed in 1551, which declares the punishment of B. to be the same as that of perjury; but the offence is also indictable at common law in Scotland, and in modern practice, it is usual so to deal with it, and to limit the punishment to imprisonment. See MARRIAGE, DIVORCE, POLYGAMY.

BIGG. See BARLEY.

BIGHT (from the same root as the verb 'to bow') is a sailor's name for the bent or doubled part of a rope. Thus, one anchor may 'hook the B.' of the cable of another, and thereby cause entanglement. In Geography, B. has much the same sense as 'bay.'

BIGNONIA'CEÆ, a natural order of exogenous plants, containing trees, shrubs, and herbaceous plants, generally with compound leaves. The flowers are generally showy, and are among the most striking ornaments of tropical forests. The corolla is of one petal, generally more or less trumpet-shaped and irregular; the stamens are five in number, or four, with the rudiment of a fifth, and unequal. The ovary is free, seated on a disk, 1—2-celled; the fruit sometimes capsular, sometimes drupaceous; with few or many seeds. There are about 500 known species; which, however, are often regarded as forming three distinct orders—*Bignoniaceæ*, *Crescentiaceæ*, and *Pedaliaceæ*. Of these the *Bignoniaceæ* are by far the most numerous, and are almost tropical or subtropical, although a few are found in the United States of North America. See TRUMPET-FLOWER. They are in many cases noble trees, and some of them afford valuable timber, among which are *Bignonia leucoxylon*, a tree of Jamaica, the green or yellow wood of which is sometimes brought into the market under the name of Ebony; and the Ipe-tobacco and Ipe-una of Brazil, species of the same genus, the former of which is used for ship-building, and the latter is accounted the hardest timber in Brazil. Not a few of them are climbing shrubs, and the tough shoots of *Bignonia Chercre* are used for wicker-work in Guiana. *Bignonia alliacea*, a native of the West Indies, is remarkable for its strong alliaceous smell; the leaves of *Bignonia Chica* afford the red coloring matter called Chica (q. v.).—The *Crescentiaceæ* chiefly abound in Mauritius and Madagascar. The Calabash Tree (q. v.) is the best known example.—The *Pedaliaceæ* are tropical or subtropical; many of them herbaceous plants. The most important is SESAMUM (q. v.). The fleshy sweet root of *Craniolaria annua* is preserved in sugar as a delicacy by the Creoles.

Bignonia picta.

BIHA'CH, or BICHA'CZ, one of the strongest fortress-towns of Turkish Croatia, in Bosnia, is situated on an island in the Una, in lat. 44° 43′ N., and long. 15° 53′ E., near the frontier of Dalmatia. It has been the scene of frequent contests, during the Turkish wars. Formerly, it was possessed of a Christian church, but that has been completely destroyed by fanatic Mussulmans. Pop. 3000.

BIJANAGHU'R, meaning, it is said, *the City of Triumph*, is a ruined city within the presidency of Madras, being in lat. 15° 19′ N., and long. 76° 32′ E. It stands about 40 miles to the north-west of Bellary, in a plain encumbered with granite rocks, many of which have been rudely sculptured into a variety of forms. After having been for two centuries the metropolis of a powerful Hindu kingdom, B. was sacked and ruined by the Mohammedans of the Deccan in 1564. Even now it presents traces of its grandeur, being 8 miles in circuit, and containing many edifices, both temples and palaces, of granite.

BIJAPO'RE, a town of India, in Guzerat, in the Guicowar's territory, on the route from Mhow to Deesa, 200 miles north-west from Mhow, and 60 miles south-east from Deesa. Pop. 12,000.

BIJAWUR, a petty native state in the Bundelcund Agency, with an area of 920 sq. miles, and a pop. of 102,000.

BIJBAHA'R, one of the best known towns in Cashmere, though not one of the most populous. It is situated on the banks of the Jhelum, about 25 miles to the south-east of the metropolis, being in lat. 33° 47′ N., and long. 75° 13′ E. The only particular worthy of notice is a wooden bridge across the Jhelum, which, notwithstanding its simplicity, has endured for centuries, in consequence of the tranquil and equable weather of the valley. Pop. 2262.

BIJNO'UR, a town of India, the chief town of the British district of the same name, North-west Provinces, in 29° 22′ N. lat. 78° 11′ E. long. It is on the route from Moradabad to Mozuffurnuggur, 31 miles east from Mozuffurnuggur. Pop. (1871) 12,566. —The district of Bijnour has an area of 1884 sq. m., and a pop. (1871) of 737,152.

BIKANI'R, or BEEKANEER, a town of India, the capital of a Rajpoot state of the same name, in N. lat. 28°, E. long. 73° 22′. It is situated in a singularly desolate tract, hard, stony, and utterly unfit for cultivation. The town is surrounded with a battlemented wall, and has a very imposing appearance. The pop. is estimated at 60,000.—The state of Bikanir extends from north to south about 160 miles, and from east to west about 200 miles. Its area is 24,000 sq. miles. The climate is remarkable for extreme changes of temperature, the temperature during the night being often very cold, whilst the day is very hot. Ice is often formed on ponds in winter during the night, whilst the summer heat during the day sometimes reaches 123° Fahr. The majority of the population are by descent Jauts, a people inhabiting from a very remote period a great extent of country between the Himalaya and the Indian Ocean. The rajah and dominant race are Rajpoots. Brahmans are numerous, but if they do not eat, they trade in oxen. There are many Jains. The burning of widows was in former times extremely prevalent in Bikanir. One corpse is said to have been burnt with 84 victims. The annual revenue of the state is about £65,000. The military force amounts to about 5000. The pop. is about 300,000.

BIKH. See ACONITE.

BI'LANDER, or BI'LANDRE, is a small two-masted merchant-vessel, distinguished from others chiefly by a peculiar shape and arrangement of the main-sail. Of these vessels, which were probably French in origin, there are not many now remaining.

BILBA'O, a seaport town of Spain, capital of the province of Vizcaya (Biscay), is situated in a mountain gorge on the Nervion, about 6 miles from its mouth at Portugalete, in lat. 43° 14′ N., long. 2° 56′ W. B. is well built; the principal streets are straight, and the houses substantial. Four bridges, one of iron, opened in 1868, and a stone bridge of the 14th c., cross the river, which divides the old town from the new. There are several fine public walks, numerous fountains, but no public buildings of any note. The city is purely commercial. It has many extensive rope-walks and manufactures of hardware, leather, hats, tobacco, and earthenware. There are also docks for building merchant-vessels, and in the vicinity are iron and copper mines. Pop. (1878) 32,734. In 1864, a railway was opened to Tudela. Small vessels can navigate the river quite up to the town, but large vessels have to anchor at Portugalete. The total tonnage of the ships entering B. in a year is about 170,000 tons. The imports consist chiefly of cotton and woollen manufactures, colonial produce, fish, jute, spirits, hardwares, machinery, railway materials, &c.; and the exports consist of wool, iron, fruits, oil, flour and grains, wines, madder, minerals, liquorice, &c. There are more than 200 commercial houses in Bilbao. The women here do almost all of the heavy porterage. B. was founded in the year 1300 by Diego Lopez de Haro, under the name of Belvao, i. e., 'the fine fort,' and being well situated, and little disturbed by the civil wars of Spain, it soon attained great prosperity. In the 15th c., it was the seat of the most authoritative commercial tribunal in Spain. It suffered severely in the wars with France, first in 1795, and again in 1808, when 1200 of its inhabitants were slaughtered in cold blood. During the Carlist struggles, B. was often besieged, last in 1874.

BI'LBERRY. See WHORTLEBERRY.

BI'LBILIS, an old Iberian city of Spain, about two miles east from the modern town of Calatayud, in the province of Saragossa, chiefly celebrated as the birthplace of the poet Martial, but also

famed for its highly tempered steel blades. Quintus Metellus won a victory over Sertorius here; and B., under the Romans, was a municipal town with the surname of Augusta. Several of its coins, struck off during the reigns of Augustus, Tiberius, and Caligula, are still in in existence—some in the British Museum.

BI'LBOES are long bars or bolts of iron, with shackles sliding on them, and a lock at one end. When an offendor on shipboard is 'put in irons,' it implies that B. are fastened to him, more or less ponderous according to the degree of his offence. The B. clasp the ankles in some such way as handcuffs clasp the wrist.

BI'LCOCK. See RAIL.

BILDERDIJK, WILLEM, a Dutch poet and philologist of much repute in his day, was born at Amsterdam, 7th September 1756. While studying law at Leyden, and afterwards, when practising at the Hague, he devoted himself assiduously to literature and poetry. On the invasion of Holland by the French, he repaired to Brunswick, and afterwards visited London, where he supported himself by lecturing and teaching. In the year 1806, he returned to Holland, where he was received as one who had done his country honor; and the newly elected king of Holland (Louis Bonaparte) appointed him president of the Institute at Amsterdam, just then organized after the fashion of the one at Paris, and also made him his own instructor in the Dutch language. B. afterwards resided at Leyden, and then at Haarlem, where he died 18th December 1831. His contributions to poetical literature were very numerous; but though they contain many beauties, yet, with one or two exceptions, none of his poems display any remarkable originality, or any great wealth of imagination. With his poetical pursuits he combined the theoretical study of his native language; and his writings on this subject are valuable contributions to the exposition of older monuments of Dutch literature.

BILE is a fluid secreted from the blood by the liver. One part of it is destined to serve in the process of digestion; the other to be eliminated from the system. It is colored yellow in man; that of graminivorous animals seems colored by the leaves they feed upon. The primary cells of the liver (the hepatic cells) separate the B. from the blood of the portal vein, and discharge into small ducts, which unite to form larger ones, and eventually the right and left hepatic ducts. The latter unite to form the common hepatic duct, which is soon joined by that of the gall-bladder (the cystic duct). This junction forms the common B. duct which pierces the second part of the duodenum, and running obliquely in its wall for a short distance, opens on its mucous surface.

The secretion of B. is constantly going on, and if there is food in the intestine, the bile mingles with it, and dissolves the fatty portions, preparatory to their absorption, the excrementitious portion of the B passing out of the body with the other indigestible materials. When the bowel is empty, the B. ascends the cystic duct, and is stored for future use in a small flask-like bag (the gall-bladder) situated under the liver.

Should, from any cause, the elements of the B. be in excess in the blood, or should the liver suspend the function of secreting it, not only is digestion imperfectly performed, but the general health suffers from the impure condition of the blood, and the patient is said to be *bilious*. On the other hand, the B. may be secreted, but its escape interfered with, and then its reabsorption will produce jaundice (q. v.). Its solid portions, again, especially the cholesterine, may be in excess, solidify, and produce biliary calculi or gall-stones. See CALCULUS.

In *chemical composition*, B. is essentially a soap analogous to resin-soap, and as obtained from the ox, contains in 100 parts.

Water	90·44
Biliary and fatty bodies, including resinoid acids	8·00
Mucus	0·30
Watery extract, chlorides, phosphates, and lactates	0·85
Soda	0·41

The soap is formed from the union of the resinoid acids (*Glycocholic and Taurocholic Acids*) with the soda. Human B. has the specific gravity of about 1026 (water = 1000), is of a ropy consistence, with a yellowish-green color; does not readily mix with water, but sinks therein, and only after repeated agitation becomes diffused through the water, which then assumes a frothy appearance resembling soap-suds. B. has a bitter taste, and a very sickening musky odor. It is interesting to observe that the B. of salt-water fishes contains potash in place of soda; although, from their being surrounded by much common salt (chloride of sodium) in the sea-water, we should naturally expect to find soda in abundance; and the B. of land and fresh-water animals contains soda, while, considering diet and habitat, potash might more naturally be looked for in largest quantity. B. performs several important functions in the animal economy, which will be found treated of under the article DIGESTION; see also the articles LIVER, and JAUNDICE.

BILGE, sometimes spelled BULGE, is the part of the bottom of a ship nearest to the keel, and always more nearly horizontal than vertical. A ship usually rests on the keel and one B. when aground. The name of *bilge-water* is given to any rain or sea water which trickles down to the B. or lowest part of a ship, and which, being difficult of access, becomes dirty and offensive.

BI'LGEWAYS are timbers which assist in the launching of a ship; for which, see LAUNCH.

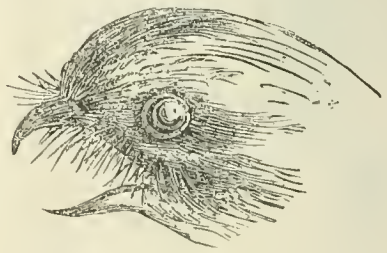
BI'LIARY CA'LCULI. See CALCULUS.

BILI'MBI. See CARAMBOLA.

BILI'N, a town of Bohemia, beautifully situated in the valley of the Bila, 17 miles west of Leitmeritz, and famous for its mineral springs, the waters of which it exports to the extent of 500,000 jars annually. It has a manufactory of cotton yarn, and two castles, an old and a new one. In its vicinity there is a remarkable isolated clinkstone rock, called Borzenberg, or Biliner Stein; and the Tripoli earth found at B. has been shown by Professor Ehrenberg to be the remains of infusoria. Pop. about 4000.

BILIOUS FEVER. See LIVER.

BILL, in Natural History, the hard, horny mouth of birds (q. v.). It consists of two *mandibles*, an upper and a lower, into which the upper and lower jaws are respectively produced, all appearance of lips being lost. It is not furnished with proper teeth, although rudiments of them have been observed in some of the parrot tribe in the fœtal state, and the marginal laminæ with which the bills of many water-fowl are furnished, partake of the same character, being secreted by distinct pulps. The resemblance of these marginal laminæ to teeth is particularly marked in the Goosander (q. v.). The bills of birds differ much, according to their different habits, and particularly according to the kind of food on which they are destined to live, and the manner in which they are to seek it. In birds of prey, the B. is strong; the upper mandible arched or hooked, and very sharp; the edges sharp, often notched, and the whole B., or *beak*, adapted for seizing animals, and tearing and cutting to pieces their flesh. A powerful, short, hooked beak, sharp edged and notched, indicates the greatest courage and adaption to prey on living animals. The beak of the vulture is longer and weaker than that of the eagle or falcon. In birds which feed on insects and vegetable substances, the hooked form of the B. is not found, or it is in a very inferior degree; those birds which catch insects on the wing, such as the Goat-suckers, are remarkable for the deep division of the B., and



Bill of Goat-sucker (Insect-eating bird). Bill of Bunting (Seed-eating bird).

consequently wide gape, and an analogous provision to facilitate the taking of prey is to be observed in herons, kingfishers, and other fishing-birds; but the object is attained in their case by the elongation of the B., whereas birds which catch insects on the wing have the B. very short. Birds which feed chiefly on seeds have the B. short and strong, for bruising them; whilst the B. of insectivorous birds is comparatively slender. Many aquatic birds have broad and comparatively soft and sensitive bills, with laminæ on the inner margin for straining the mud from which much of their food is to be extracted; other birds, as snipes, avocets, &c., seeking their food also in mud, have slender bills of remarkable sensibility. The modifications of form are very numerous, and the peculiarities of the bills of toucans, hornbills, spoonbills, crossbills, parrots, humming-birds, &c., are very interesting, and intimately connected with the habits of the different creatures. (See these articles.) At the base of the upper mandible, a portion of the B. is covered with a membrane, called the *cere* (Lat. *cera*, wax, from the waxy appearance which it presents in some falcons, &c.), which in many birds is naked, in others is feathered, and in many is covered with hairs or bristles. The nostrils are situated in the upper mandible, usually in the cere, but in some birds they are comparatively far forward, and in some, as puffins, they are very small, and placed so near the edge of the mandible, as not to be easily detected. They are more or less opened, or covered with membrane, or protected by hairs or feathers. Besides their principal use for seizing and dividing or triturating food, the bills of birds are employed in a variety of functions, as dressing or preening the feathers, constructing nests &c. They are also the principal instruments used by birds in their combats.

The mouths of some fishes and reptiles assume a character somewhat analogous to that of the B. of birds.

BILL, in its general acceptation, means a formal written paper or statement of any kind; originally, it was applied to any sealed document, being derived from Lat. *bulla*, a seal. It has a number of technical applications, for which see the articles that immediately follow.

BILL OF ADVENTURE is a writing by a merchant, stating that goods shipped by him, and in his name, are the property of another, whose *adventure* or chance the transaction is—the shipping merchant, on the other hand, undertaking to account to the adventurer for the produce. Generally, in commercial law, an adventure may be said to be a speculation in goods shipped under the care of a *supercargo*, to be disposed of by him to the best advantage, for the benefit of his employers.

BILL OF ATTAINDER, and BILL OF PAINS AND PENALTIES, are bills in parliament, introduced for penally enacting the attaint and punishment of persons who have criminally offended against the state and public peace. Such a legislative proceeding was had recourse to generally in times of turbulence, when, either from the peculiar nature of the offence, or in consequence of difficulties in the application of the ordinary laws, it became necessary to resort to parliament. During the reign of Henry VIII., persons of the highest rank were frequently brought to the scaffold by such means; among whom may be mentioned the Earl of Surrey, the Earl of Essex, and others, who suffered for denying the king's supremacy; and during other reigns, both before and after that of Henry VIII., these bills were more or less had recourse to. There were greater facilities for conviction by this penal legislation than by the ordinary judicial procedure at law; because, while in the latter the strict rules of legal evidence must have been observed, the inquiry under a bill of attainder, or of pains and penalties, was entirely in the hands of parliament, who might dispense at their pleasure with such rules and forms of law as appeared inconvenient or unsuitable to the purpose in hand. Accordingly, in most of the cases to which we have referred, the bills were passed upon evidence which could never have been received as sufficient, or even admissible in a court of law; and there are even instances where parties were attainted, and punished, without there being any evidence against them at all, and even without their being heard in their defence. Under the Stuarts, this extraordinary mode of proceeding in parliament was seldom had recourse to in England, and it has been still seldomer used since the accession of the House of Hanover. The Jacobite movement in Scotland, after the union with that country, was productive of several instances of parliamentary attainder, which, however, resulted merely in the forfeiture of the estates of the attainted parties, and these attainders were likewise unattended with the harsh, and in too many instances, capital consequences, which were formerly the inevitable results of treason so discovered. In regard to bills of pains and penalties, perhaps the two most remarkable instances are those of Bishop Atterbury, in 1722 (see ATTERBURY), and of Queen Caroline, wife of George IV., in 1820.

The proceedings of parliament in passing bills of attainder, and of pains and penalties, do not vary from those adopted in regard to other bills. But the parties who are subjected to these proceedings are admitted to defend themselves by council and witnesses before both Houses. In the best of times, this summary power of parliament to punish criminals by statute, should be regarded with jealousy; but whenever a fitting occasion arises for its exercise, it is undoubtedly the highest form of parliamentary judicature. In impeachments, the Commons are but accusers and advocates; while the Lords alone are judges of the crime. On the other hand, in passing bills of attainder, the Commons commit themselves by no accusation, nor are their powers directed against the offender; but they are judges of equal jurisdiction, and with the same responsibilities as the Lords; and the accused can only be condemned by the unanimous judgment of the Crown, the Lords, and the Commons.—May's *Proceedings of Parliament*, 3d edition, p. 509. In passing bills of attainder, the bishops, contrary to the practice in capital impeachments, take part in the proceedings, and vote.

In such parliamentary attainders, the bill sets out, by way of preamble, the facts and evidence on which it is founded, and concludes, by way of enactment, that the accused 'is hereby convicted and attainted of high treason, and shall suffer the pains of death, and incur all forfeitures as a person attainted of high treason.' In the case of pains and penalties, again, the preamble generally assumes the facts as proved, and proceeds to enact the pains and penalties; that is, the deprivations, indignities, and other punishment awarded. See PAINS AND PENALTIES, PARLIAMENT (BILL IN).

BILL, or BILL OF COMPLAINT, IN CHANCERY, was a formal statement in writing or pleading, by which a plaintiff in the Court of Chancery asked its equitable redress or relief. It was in the style of a petition addressed to the Lord Chancellor, Lord Keeper, or Lords Commissioners for the Custody of the Great Seal, unless the seals were at the time in the Queen's hands, or the chancellor himself were the suitor, in which case the bill addressed the Queen herself; for, according to the theory of the Court of Chancery, it was the conscience of the sovereign that was there addressed. The crown itself, however, was also the suitor, either on behalf of its own prerogatives, or of those rights which are under its particular protection, such as the objects of a public charity; and then the matter of complaint was laid before the court not by way of bill or petition, but of *information*. But since 1874 all suits begin by writ.

In stating the plaintiff's case, the bill was formerly exceedingly prolix and tedious, but now the statement of claim of plaintiff contains merely a full and distinct account of the case, the material facts and circumstances relied on; and it should ask specifically for the particular relief which the plaintiff conceives himself entitled to, and also for general relief, or, as the bill once usually stated, 'for such further and other relief as the court may think proper;' the object and advantage of which general prayer was, to decree equity and justice without regard to the particular equity sought for. It is unnecessary that the claim be signed by counsel, in order to guard against irrelevant and improper matter. It is indeed in nearly all cases drawn by counsel, from instructions laid before him by the plaintiff's solicitor.

Where the object is the administration of the estate of a deceased person, the procedure is by *summons*, and is of a simple and very summary nature. In cases of this description, without either formal pleading or any direct application to the court itself, a summons may at once be obtained, and the estate thereupon put in a course of administration. There are also cases where the chancellor's aid is sought for in the form of a *petition*.

Generally speaking, the modern English claim in Chancery very much resembles the Scotch summons and condescendence. See on the subject of this article, CHANCERY; CHANCELLOR, LORD; PLEADING; SUMMONS; CONDESCENDENCE.

BILL OF COSTS is an account stating articulately and in detail the charges and disbursements of an attorney or solicitor in the conduct of his client's business; and which costs may be recovered under the regulations of the Attorney's and Solicitors' Act, 6 and 7 Vict. c. 73. See COSTS.

BILL IN CRIMINAL CASES is the formal name of an indictment for a crime or misdemeanor, when preferred before a grand jury. If that body finds 'a true bill,' the prisoner or party accused is thereupon tried before a petty jury, whose verdict determines his guilt or his innocence; but if the grand jury 'ignore the bill,' the accused is at once set at liberty. In the latter event, however, other bills may be sent up against him, with or without the same result. See ARRAIGNMENT, GRAND JURY, INDICTMENT, PROSECUTION, TRIAL.

BILL OF EXCEPTIONS is a statement of objections, by way of appeal, against the ruling or charge of a judge in a civil cause. See TRIAL.

BILL OF EXCHANGE, a document purporting to be an instrument of pecuniary obligation for value received, and which is employed for the purpose of settling a debt in a manner convenient to the parties concerned. The original and simple idea of a bill is this: Two parties residing at a distance from each other can settle their transactions without trouble or risk of sending money direct from the debtor to the creditor. Thus, A and B are two parties in business in London; and C and D are merchants in Cadiz. A owes C £1000; and D owes B a like sum. Instead of A sending cash to C, and D to B, A pays B and receives B's bill on D, which he sends to C, who receives the amount from D; so that the transaction throughout is settled, without a farthing in money being sent from Cadiz to London, or from London to Cadiz. Another simple idea of a bill is this: One person owes another £100 for goods, for which he is to have credit for three months. The creditor, however, not being able conveniently to be without the money for that length of time, gets from the debtor an obligation or bill bearing that the £100 is to be paid in three months. This bill, being a negotiable instrument, will be discounted by a banker, or other capitalist, who now stands in the position of the creditor, and receives payment when the bill is due. Thus, a bill of exchange performs two kinds of office in commerce—it saves the transmission of coined money, and it enables creditors not only to fix down debtors to a day of payment, but to get the use of a sum equivalent to the debt (less a small discount) before it is properly due.

The origin of this important mercantile instrument is attributed by Montesquieu and others to the Jews and Lombards, when banished from France and England in the 13th c., for their usury and other alleged vices. It is certain that hitherto no trace of them has been discovered either in the Roman code, or in any other system of ancient jurisprudence. The first notice of them in modern times occurs about the middle of the 12th. c., and by the end of the 14th they had got into general use in all the com-

mercial states of Europe. In England, from about the middle of the 14th c. down to the time of James I., and for many years after, bills of exchange were restricted to the purpose of foreign commerce. What are called inland bills—that is, bills drawn by and upon persons resident in this country—were not employed much earlier than the reign of Charles II., and even then they were regarded with distrust and jealousy by the English judges. Another restriction upon bills of exchange was, that the privilege of their use was confined to parties that were merchants. But all restraints on such instruments gradually yielded to the wants and conveniences of society, and now any one capable of making a contract can be a party to a bill transaction, without regard to position, calling, or occupation. In Scotland, inland bills were put on the same footing with foreign bills, by an act of the Scottish parliament passed in 1696. The Bills of Exchange Act, 1882 (45 and 46 Vict. c. 61), was an attempt to codify the law relating to bills of exchange, cheques, and promissory-notes. Under its provisions, a bill may now contain words prohibiting transfer, and be only valid between the two orignal parties. The drawer or indorser has it in his power to give the name of a referee or party to whom the holder may resort, in case it may be dishonored. When a note is required regarding a protested bill, a respectable householder may, in the presence of two witnesses, give a certificate attesting the dishonor. Presentment is excused where the drawee is dead, or a bankrupt, or a fictitious or incapacitated person.

A bill of exchange, as distinguished from a *promissory-note* (q. v.) is defined in law-books to be a written and open letter of request, addressed by a person who is called the drawer, to another person called the drawee, desiring him to pay a certain sum of money, either to the drawer himself, or to a third party called the payee, within a certain time after its date, or after it is presented for payment, or on demand. If the drawee signs the bill in token of his agreeing to this request, he is called the *acceptor*. For the constitution of the bill itself, no particular form of words is necessary, provided its characteristic qualities clearly appear on the face of it, as an essentially pecuniary instrument; a bill of exchange is only good for a certain sum in money: such an instrument for the delivery of *goods* or property other than money, would be invalid. But although no particular words are required in a bill or note, it is always advisable to adhere, as much as possible to their customary form. To this general rule, however, there are exceptions: thus, by the 48 Geo. III. c. 88, negotiable bills or notes for less than 20*s*. are void; and by the 17 Geo. III. c. 30, s. 1—made perpetual by the 27 Geo. III. c. 16, and 7 Geo. IV. c. 6—such bills and notes under 20*s*. are illegal, and above this amount and less than £5, are also void, unless they specify the name and place of abode of the person to whom, or to whose order they are made payable, and are attested by one subscribed witness at the least, and bear date at or before the time when they are issued, and are made payable within twenty-one days after the date, and are in the form prescribed by the act. There are also certain forms prescribed with respect to cheques, and with respect to bills and notes issued and reissuable by bankers at certain distances.

In regard to foreign bills, the risk of miscarriage to which they are liable in their transmission to distant countries has given rise to the custom of drawing them *in sets*; that is, writing out two or three of the same form and tenor, and transmitting them to the payee by different channels, so that if one or two of the individuals of any set are lost, the other might reach its destination. The first of the set that is presented and accepted is alone entitled to payment, and payment of it discharges the acceptor; but foreign bills, of course, may also be drawn singly.

Besides the other requisites mentioned, bills of exchange must be duly *stamped*. The regulations on this subject are contained in the 17 and 18 Vict. c. 83, and are to be found in almanacs and other publications in common use. By sections 3 and 5 of the Act, it is provided that the duties on bills drawn out of the United Kingdom shall be denoted by adhesive stamps, to be affixed by the holder of the bill before negotiating it, under a penalty of £50.

The following are the usual forms of the bills of exchange.

FORM OF A FOREIGN BILL.

£1000. JAMAICA, 1*st January* 1878.

Fifty days after sight of this First of Exchange (second and third unpaid) pay to the order of A. B. One Thousand Pounds sterling, value received. C. D.

To E. F., London.

FORM OF AN INLAND BILL.

£100. LONDON, 1*st January* 1878.

(Stamp.) Two months after date [or 'at sight,' or 'on demand,' or 'at —— days after sight'], pay to Mr. ——, or order, One Hundred Pounds, for value received. C. D.

To MR. ——, Merchant,
Bristol, payable at ——.

FORM OF A BILL ABOVE ONE AND UNDER FIVE POUNDS.

As prescribed by Stat. 17 Geo. III. c. 30. [Insert the place, day, month, and year, when and where made.]

Twenty-one days after date, pay to A. B. of ——, or his order, the sum of ——, value received. E. D.

To E. F. of ——
Witness, G. H.

From the first form it will be seen that there are usually three parties to a Bill of Exchange, these three being: 1st, The *drawer* (C. D.); 2d, The *payee*, or party in whose favor the bill is drawn, and who is entitled to receive the contents (A. B.); and 3d, The *acceptor* or *drawee* (E. F.). The transaction, however, may be simply between the drawer and acceptor, without the interposition of a third party; and there are other modifications and changes of form, according to the circumstances of the case, and the mode in which it is desired to have the bill negotiated. The bill being thus in proper form, and duly authenticated, is then presented for acceptance, which may be defined to be the act by which the drawee evinces his consent to comply with, and be bound by, the request contained in the Bill of Exchange directed to him; or, in other words, it is an engagement to pay in money the bill when due. While the bill is in the possession of A. B. he is the holder, but if he pass it to G. H., A. B. is the indorser and G. H. the indorsee or ultimate holder. Acceptance in the case both of inland and foreign Bills of Exchange must now be in writing on the bill, and signed by the acceptor, or some person duly authorized by him.

In England, the mode of acceptance is by the acceptor simply signing his name across the bill, or with the word 'accepted' before his name; but in Scotland acceptance is usually made by the acceptor signing his name immediately under the drawer. There are certain precautions to be observed before accepting. The drawee should, upon presentment for acceptance, and before he accepts, assure himself that the signature of the drawer is genuine, and that there has not been a fraudulent substitution of a larger sum than that originally inserted in the bill by the drawer. And if the drawee accept a forged bill, or a bill for a larger amount than that originally named by the drawer, he will nevertheless be liable to pay a *bona-fide* holder; nor will he have any right to recover against the drawer for the larger amount. There is also acceptance *supra protest*, which takes place where, after a foreign bill has been protested for non-acceptance, but not before the drawee or any other person may accept it *supra protest*, which acceptance is so called from the manner in which it is made. And where the drawee of a foreign bill cannot be found, or is not capable of making a contract, or refuses to accept, this description of acceptance is frequently made in order to save the credit of all or some of the parties to the bill, and prevent legal proceedings. In this country it is called an acceptance for the honor of the person or persons for whose use it is made, and in France an acceptance *par intervention*. It had been a question in England what amounted to a qualified acceptance, but that was set at rest by the 1 and 2 Geo. IV. c. 78 for England, and 9 Geo. IV. c. 24 for Ireland, which required an acceptance, in order to be a qualified acceptance, to express that the bill is 'payable at a banker's house or other place only, and not otherwise or elsewhere.' And now, as against the acceptor, the absence of these words from the acceptance leaves it at large, an unqualified acceptance, not requiring presentment at a particular place, notwithstanding that, in the body of the instrument, a particular place of payment is expressly specified by the drawer. There may likewise be conditional acceptance—that is, acceptance in such a form as will subject the acceptor to payment of the bill on a contingency only, of which there are numerous examples in the law reports; for instance, to pay 'as remitted for,' or on account of the ship *Thetis*, when in cash, for the said 'vessel's cargo,' or on condition of getting a certain house by a given term, or when certain goods are sold, or when certain funds come to hand.

The bill as a negotiable instrument being thus complete in all its parts, may either be held by the drawer or other payee till due, when it may be presented for payment to the acceptor, or it may at once be transferred by *indorsement* (q. v.), the indorsee taking it for its value at maturity, and in the meantime cashing or discounting it to the holder. There may be a succession of indorsees, the last of whom is entitled to payment; and to him all the other indorsees, as well as the drawee and drawer, are bound.

When the bill comes to maturity—that is, when the period arrives for its presentment—it must either be at once paid, or the parties must arrange for its *renewal* (q. v.). If the latter course is not agreed on, and the necessary funds are not forthcoming, the holder can only then proceed to recover at law; and this is now done in a very speedy form under a recent act, the 18 and 19 Vict. c. 67. This act, however, does not extend to Ireland, where the old form of action still prevails. But in Scotland payment of bills may be enforced even more summarily without any action, under the severe provision of two old Scotch acts passed in

1681 and 1696. See INDORSEMENT, PROMISSORY-NOTE, RENEWAL. Bills are sometimes drawn 'at sight,' 'on demand,' or at 'one day's date;' and in these cases it is doubtful whether the three days of grace allowed for payment beyond the literal time specified in the document are applicable. Unless in special cases, bills, by the Statute of Limitations (see LIMITATION) in England, and by Prescription (q. v.) in Scotland, do not cease to be valid documents for six years.

In the United States there has sprung up a method of dealing with bills of exchange which is not much known in England. This consists in selling bills without a concurrent obligation by indorsement to make them good. Instead of discounting his bills in the usual form through a banker, a merchant in New York will sells his bills to a broker or dealer in this kind of instrument, the price paid being according to the state of the money-market and the creditworthiness of the acceptor. In such cases, the purchaser stands in the place of the drawer, undertakes all risks, and as custodian of the bill, has the power of legally exacting payment. This method of transacting with bills is called discounting *without recourse*.

ACCOMMODATION BILL. A bill in its legitimate sense is a document constituting a debt, and as such is beneficial to all parties connected with its negotiation. A owes B £100. A cannot conveniently pay the amount, while B. is in need of it; B. draws on A, and C (a banker) discounts, i.e., for a consideration pays the amount to B. B thus gets his money at once, A obtains time, while C makes a profit for advancing. These facilities have had the effect of inducing bills to be resorted to for raising money where no value is given, and in which one party gives the use of his name for the *accommodation* of another. In the above case, for example, let us suppose that A does not owe B, but yet accepts B's draft. If C discounts the bill, it is immaterial whether he knows that A has got value or not—as an onerous holder, he can compel payment from A if B cannot pay the bill. But if merely in B's hands, the amount is not recoverable from A if the latter can prove that no value was received by him. Accommodation bills give rise to much fraud and rash speculation, and many attempts have been made to suppress the system; but it is difficult to do so without unduly interfering with the negotiation of *bona-fide* bills.

BILL, EXCHEQUER. See EXCHEQUER BILLS.

BILL OF HEALTH, a certificate or instrument signed by consuls or other proper authorities, delivered to the masters of ships at the time of their clearing out from all ports or places suspected of being particularly subject to infectious disorders, certifying the state of health at the time such ship sailed. A *clean* bill imports that at the time the ship sailed no infectious disorder was known to exist. A *suspected* bill, commonly called a *touched* patent or bill, imports that there were rumors of an infectious disorder, but it had not actually appeared. A *foul* bill, or the absence of a clean bill, imports that the place was infected when the vessel sailed. See M'Culloch's *Commercial Dictionary*.

BILL OF INDEMNITY, an act of parliament, passed every session, for the relief of those who have unwittingly or unavoidably neglected to take the necessary oaths, &c., required for the purpose of qualifying them to hold their respective offices. See ACT OF INDEMNITY, and ABJURATION.

BILL OF LADING is a receipt from the captain of the vessel to the shipper (usually termed the *consignor*), undertaking to deliver the goods—on payment of freight—to some person whose name is therein expressed, or endorsed thereon by the consignor; and the delivery of this instrument—independently of the actual delivery of the goods—will suffice to pass and transfer to the party so named (usually termed the *consignee*), or to any other person whose name he may think fit to indorse thereon, the property in such goods; and by a recent statute, 18 and 19 Vict. c. 111, it is now expressly provided that every consignee and every indorsee of a B. of L. shall also have transferred to him all rights of suit, and be subject to the same liabilities in respect of the goods as if the contract in the B. of L. had been made with himself. It is also provided that every B. of L. shall be conclusive evidence of the shipment made. The act, however, declares that nothing contained in it shall prejudice or affect any right *in transitu*, or any right to claim freight against the original shipper or owner, or any liability of the consignee or indorsee, by reason or in consequence of his being such consignee or indorsee, or of his receipt of the goods, by reason or in consequence of such consignment or indorsement. See STOPPAGE IN TRANSITU.

BILLS OF MORTALITY are accounts of the births and deaths within a certain district; and they were an expedient, with the view of communicating to the inhabitants of London, to the court, and to the constituted authorities of the city, accurate information respecting the increase or decrease in the number of deaths. These bills were commenced in 1592, during a time when the plague was busy with its ravages; but they were not continued uninterruptedly until the occurrences of another plague in 1603, from which period, up to the present time, they have been continued from week to week, excepting during the great fire, when the deaths of two or three weeks were given in one bill. In 1605, the parishes comprised within the B. of M. included the 97 parishes within the walls, 16 parishes without the walls, and six contiguous out-parishes in Middlesex and Surrey. In 1662, the city of Westminster was included in the bills; in 1636, the parishes of Islington, Lambeth, Stepney, Newington, Hackney, and Redriff. Other additions were made from time to time. At present, the weekly B. of M. include the 97 parishes within the walls, 17 parishes without the walls, 24 out-parishes in Middlesex and Surrey, including the district churches, and 10 parishes in the city and liberties of Westminster. The parishes of Marylebone and St. Pancras, with some others, which, at the beginning of last century, had only 9150 inhabitants, but now contain a rapidly increasing population, were never included in the bills.

But these bills are now, from want of proper machinery, of little or no value, and the only true bill is now that prepared at the Registrar-general's office, under the new Registration Act. The first of these weekly bills was commenced January 11, 1840, and the series has been continued from that time without interruption. See Wharton's *Law Dictionary*, and Knight's *London*.

BILL IN PARLIAMENT. See ACT OF PARLIAMENT and PARLIAMENT.

BILL OF RIGHTS. See RIGHTS.

BILL OF SALE is a writing under seal, evidencing a grant or assignment of chattels personal. The occasions to which these instruments are commonly made applicable are sales of fixtures and furniture in a house, of the stock of a shop, of the good-will of a business, of an office or the like. But their most important use is in the transfer of property in ships, which being held in shares, cannot, in general, be delivered over on each change of part-ownership. Such B. of S. may be either absolute or conditional; in the former case, operating as a conveyance, and in the latter, as a security. By the 17 and 18 Vict. c. 36, passed to prevent frauds upon creditors by secret bills of S., it is provided that every B. of S. must be filed in the Court of Queen's Bench within 21 days after its execution, together with an affidavit of the time of such B. of S. being given, and a description of the residence and occupation of the deponent, and of every attesting witness of such B. of S., otherwise it will be void, as against assignees in bunkruptcy and insolvency, and creditors. The residence and occupaiion of each attesting witness should appear in the B. of S., and also in the affidavit.

By the Act of 1882 (45 and 46 Vict. c. 43), every B. of S. must henceforward have a schedule containing an inventory of the personal chattels assigned. Bills of sale must be registered, and attested by witnesses, else they become void; those given for any sum under £30 are void; and when goods are seized, they are not to be removed or sold until the expiration of five clear days. This act does not apply to Scotland or Ireland.

BILL OF SIGHT. The law on this subject is regulated by the Customs Regulation Act, 3 and 4 Will. IV. c. 52, s. 24 and 25, and is to the effect that when a merchant is ignorant of the real quantities or qualities of any goods assigned to him, so that he is unable to make a perfect entry of them, he must acquaint the collector or comptroller of the circumstance; and the collector is authorized, upon the importer or his agent making oath that he cannot, for want of full information, make a perfect entry, to receive an entry by B. of S. for the packages, by the best description which can be given, and to grant warrant that the same may be landed and examined by the importer, in presence of the officers; and within three days after any goods shall have been so landed, the importer shall make a perfect entry, and shall either pay down the duties, or shall duly warehouse the same. In default of perfect entry within three days, such goods are to be taken to the Queen's warehouse; and if the importer shall not within one month make perfect entry, and pay the duties thereon, or on such parts as can be entered for home-use, together with charges of moving and warehouse rents, such goods shall be sold for payment of the duties.

BILL OF STORE, a license under the Customs Regulation Act, the 3 and 4 Will. IV. c. 52, granted by the Custom-house to merchants to carry such stores and provisions as are necessary for a voyage, custom-free.

BILL OF VICTUALLING, or VICTUALLING BILL, is a document relating to the stores put on board a ship when leaving a British port; it is a safeguard in reference to customs duties, and is regulated by a clause in an act passed in 1853. The master of a ship, on leaving a British port, for a voyage which (out and home) will not occupy less than 40 days, receives from the customs authorities an order or permission for the shipment of such stores and victuals as may be required—the data being the number of crew and passengers, and the probable duration of the voyage. When these are shipped, the master prepares a correct account of

them, and of any other stores at that time in the vessel; and this account, when approved and countersigned by the customs officers, constitutes the victualling bill. No stores are allowed to be taken on board the ship, nor any articles taken on board to be deemed as stores, unless they be specified in this document.

BILL-BROKERS are persons who, being skilled in the money-market, the state of mercantile and personal credit, and the rates of exchange, engage, either for their own profitable adventure, or that of their employers, in the purchase and sale of foreign and inland bills of exchange, and promissory-notes. They are to be distinguished from discount-brokers, or bill-discounters, whose business consists in discounting bills of exchange and notes which have some time to run before they come due, by means of the funds, or on the faith of the credit of capitalists or other persons having the command of money. See BROKER, BILL OF EXCHANGE, PROMISSORY-NOTE.

BILL-CHAMBER is a particular department of the Court of Session in Scotland (coeval with the establishment of that court itself in 1532), the business of which corresponds, in many respects, to the practice of the Judges' Chambers in England. It is called the B., because, formerly in Scotland, judicial proceedings were for the most part commenced by a writ called a bill, which was the skeleton or draft of the legal process which it was sought to have issued, and which bill was obtained in this particular department of the court. For such purpose, as well as for other matters which do not admit of delay, the B. accordingly sat, as it continues to sit, all the year round, and as in England, it is presided over by a single judge. This judge, to whom for the time are delegated the whole powers of the court, is called the Lord Ordinary on the bills, and during the sittings of the Court of Session, the duty is taken by the junior or last appointed judge of the court; but in vacation-time, the business of the B. is performed in rotation by the six judges of the court who are not justiciary or criminal judges. In case of the indisposition or absence of any of these six judges, any judge of the Court of Session may act for him. A recent act, the 20 and 21 Vict. c. 18, now regulates many of the details of the procedure.

The business of the B. consists of all matters of a summary nature; and generally all cases requiring the immediate interposition of judicial authority are proceeded with, in the first instance, in the Bill-chamber. Applications for interdict or injunction, and for warrants necessary for the execution of process, are there at once made. The preliminary procedure by way of appeal from inferior courts, and in order to stay execution on the judgments of these tribunals, also takes place, in the first instance, in the Bill-chamber. Matters of bankruptcy or sequestration are also adjudicated on in this department. But the decision of the judge or lord ordinary officiating in the B., may, with some exceptions, be brought under review of the court; and the judgment of the court itself thus sitting on B. cases, may be brought before the House of Lords by appeal, as in ordinary cases. See COURT OF SESSION, JUDGE'S CHAMBERS.

BILLARDIE'RA, or A'PPLEBERRY, a genus of twining Australian shrubs of the natural order *Pittosporaceæ* (q. v.) They have simple alternate evergreen leaves, and axillary pendulous flowers. The flowers have a calyx of five sepals, and a bell-shaped corolla of five petals. The fruit is a soft, spongy pericarp, with inflated cells, and many seeds which lie loose in the cells, terminated by the style, and generally bluish when ripe. It is eatable, although not destitute of a resinous character, which prevails in the order. *B. longiflora* and *B. ovalis*, the former with nearly globose, the latter with oval fruit, are frequent ornaments of British greenhouses. The fruit of *B. mutabilis* is larger, cylindrical, and of a pleasant subacid taste.

BILLAUD-VARENNE, JEAN NICOLAS, a leader in the Reign of Terror in the French Revolution; took an active part in the September massacres; entered the Convention, where he distinguished himself for his violence against the king and the royal family, and his general unfeeling cruelty. He was the author of the Revolutionary Tribunal, and it was on his proposal that the Duke of Orleans, the queen, and a host of others became its victims. He joined in the end in bringing about the fall of Robespierre, but could not ward off his own accusation as one of the Terrorists, and was transported to Cayenne, where he lived about twenty years, rejecting the pardon offered by the First Consul. In 1816, he came to New York, but was coldly received, and then sought an asylum in Hayti, where he died, 1819.

BILLET, in Architecture, an ornament belonging to the Norman style. It was formed by cutting a moulding—generally a round moulding—into notches, so that the parts left resembled billets of wood. When used in several rows, the billet and empty spaces are placed interchangeably, as in the accompanying illustration.

Billet.

BILLET, in Heraldry. Billets are small oblong figures, sometimes taken to represent bricks, but more commonly *billets doux*. The latter interpretation, which is that of Guillim, is generally adopted by English heralds, and is supported by the authority of Colombiere. The former, again, which has the *Trésor Héraldique* and Sir George Mackenzie on its side, is further strengthened by the fact that in German they are called *Schindeln*, shingles.

BI'LLETING is a mode of provisioning and lodging soldiers when not in camp or barrack. It is one of the many vexed questions connected with the organization and administration of the British army. When in camp or barrack, the soldier is supplied with hot food daily by the commissariat officers; or rather, with undressed food, and the means for cooking it. But when it is necessary to keep soldiers for one or more days in a town unprovided with barracks, a difficulty occurs which has never yet been properly surmounted; a burden is sure to rest on some one who is unwilling to bear it. In the early times of our history, monarchs were often wont to quarter their troops on the monasteries. In later times, the soldiers often compelled the inhabitants of towns to receive and support them; and the authorities were either unable or unwilling to prevent this. The Mutiny Act, passed for the first time in 1689, put a stop to this pernicious practice, by declaring that no housekeepers should be compelled to accommodate soldiers except on some recognized and fairly administered system. The chief civil magistrate of a town, on requisition from the military authorities, quartered the soldiers on the inhabitants as fairly as he could. This continued in England until 1745, when all kinds of persons were exempted from this burden except certain traders; and the new system has been maintained with minor alterations ever since. The alteration was not made in Scotland until 1857.

At present the persons liable to have soldiers billeted on them, are the keepers of public houses, hotels, inns, ale-houses, beer-shops, wine-shops, spirit-vaults, livery-stables, and such-like licensed houses. There are certain exceptional cases provided for; and in and near London there are special regulations concerning the B. of the Guards; but the general rule is as here stated. The persons liable are bound to accommodate soldiers, under a system that may be described in a few words. When troops are on the march from one barrack or station to another, and cannot cover the distance in one day's railway or foot traveling; or when they are to remain for a few days in a town unprovided with barrack accommodation, or where the barracks are already occupied—the commanding officer sends previously to the chief civil magistrate, and demands *billets* for a certain number of men for a certain time. The magistrate has a list of all the houses subjected to the B. system, and he quarters the men on those houses as fairly as he can. Rules are laid down to prevent the magistrate from B. too many soldiers on one house; any excess in this way is remediable at the hands of a justice of the peace. The billets are pieces of paper prepared under these rules. On the evening before the arrival of the troops, two or three non-commissioned officers enter the town, and present an order for the delivery of the billets to them, in order that no delay may arise when the main body enter. After the arrival, the soldiers go to the houses on which they are billeted: all those belonging to one company being quartered as near together as may be, for convenience of muster; and the sick are billeted near headquarters. The licensed victualler, or other person, is bound to provide each billet-holder with food, drink, bed, and accommodation, either in his own house or somewhere near at hand. A specified sum of 10*d.* per day is allowed for this; or under other circumstances, a trifling sum per day is allowed for fire, candles, cooking-utensils, salt and vinegar.

The sum per day allowed for hay and straw for a horse varies with the price of forage. The officers visit the houses, to see that the men really have one hot meal per day, instead of taking the value of it in money. The soldier may demand facilities for cleaning his arms and accoutrements. The financial officer of the regiment makes the payments. There are often unpleasant disputes between the innkeeper or others, on the one side, and the officers of the regiment on the other, concerning the occupancy of the 'best room,' and on minor details. The militia are frequently billeted like the regulars.

There being many untoward circumstances connected with this system, a committee of the House of Commons, in 1858, sought how best to remove them. In their report, the committee could not recommend the cessation of the B. system altogether, but they pointed out certain possible ameliorations; and since that, by camping out the troops and other means, great efforts have been made to reduce B. to a minimum.

BI'LLIARDS (in Fr. *billard*, which meant originally the stick or staff with which the ball is struck, and is allied to Fr. *billot*, a block or billet of wood). It seems doubtful whether we are indebted for the discovery of this elegant game to France or Italy; but it is certain that it was imported hither from the former country. It must have been known, at all events by name, to Englishmen as early as the 16th c., since Shakspeare speaks of it; although, when he

represents Cleopatra as amusing herself with B. in Egypt, it is probable that he commits an anachronism. It is certain that the rectangular slate-table, with its resilient sides, covered with green cloth, and furnished with the six brass-bound pockets, the three ivory balls, and that long array of cues with leathern tops, so familiar now-a-days to almost every eye, are paraphernalia of quite modern production. For two centuries, B. was played with only two balls; and when the third or red ball was imported from France, the red-winning hazard—that is to say, the holing of the red ball—was almost the sole object of the performers. The cushions also, now universally constructed of india-rubber, up to a recent date were lined with felt. In no game are knowledge and manual dexterity so combined as in B., nor can the spectacle of first-rate play be appreciated, or the difficulties which it overcomes be understood, except by those who have a scientific as well as practical acquaintance with the game.

A billiard-table varies in size, but it is generally about 12 feet long and 6 feet wide. It is covered with fine green cloth, and set round with cushions, to keep the balls upon the table and make them rebound. The six holes or pockets are placed at the four corners and in the middle, opposite to each other, to hold the balls, which, when played into them are called 'hazards.' The cues are long smooth sticks, with one end thick, and the other pointed; and the small end is covered with leather. The maces—slender sticks with a club at one end, adapted for pushing—are rarely taken in hand except by tyros and ladies, the butt-end of the cue, when the point cannot conveniently be used, being commonly employed instead. The three balls are of ivory, ranging from an inch to an inch and a half in diameter, and two of them are white, and one is red. One of the former has a spot upon it; and when two persons are playing, he who uses the spot ball is called Spot, and he who uses the plain ball, Plain. The cue is held in the right hand, and supported, in playing, by the forefinger and thumb of the left so placed as to form a 'bridge;' and the ball is struck with the point of the cue, which is chalked, to prevent its slipping. On a certain mark on the cloth, at the distance of about a foot from one end of the table, and exactly in its center, the red ball is placed before commencing the game. At the other or lower end, and at the distance of about two feet from it, a line is drawn across the table; and from the center of this line a semicircle is described between it and the lower end, of about 20 inches diameter. The space within this semicircle is called *baulk*. The object of the player is, by striking his own ball against the red ball or his adversary's, to drive either it or them into the pockets, or else to make 'a cannon'—that is to say, to strike both balls with his own. The score is usually recorded by a third person, by means of a marking-board. The game of B. can be played by two, three, or four persons, and in a great many different fashions; but it is most commonly played by two, and the ordinary game is that called the *Cannon*, or more properly *Carambole*, introduced from France at the same time with the third or red ball. The technical term 'cannoning' may perhaps have arisen from 'caramboling,' which was the old word for striking both balls with your own. The method of play is as follows:

Bridge.

1. The limit of the game is properly 21, though it is sometimes made 24, 50, 63, 100, or more, as may be agreed upon before commencing. The shorter games were probably used when billiard-tables were probably rarer, so that persons waiting for the use of them might sooner have their turn; 50, or '50 up,' as it is called, is now the most usual limit.

2. For the lead and choice of balls, the players *string*—that is to say, placing their balls within a semicircle, they strike them against the furthermost cushion, in order to see which will return nearest the cushion next to them: the owner of the ball so placed, provided it does not strike the other ball, has then the option; but after the first match, the winner of each game leads.

3. The red ball on the spot at the upper end is replaced there on being put into a pocket, knocked off the table, or when the balls are 'broken' (see 19) after a foul stroke; but should any ball be on the spot, or so near to it as to prevent the red being placed there without touching the ball, the red must be placed in the center of the table.

4. The points of the game are these: 1 for a miss, 2 for a cannon, 2 for a white hazard, 3 for a red hazard, and 3 for 'running a coo;' but the miss and the coo count for the adversary.

5. A white winning hazard is made when you play at the white ball and pocket it; a white losing hazard, when you pocket your own ball off the white. These names of 'winning' and 'losing,' were used in the old game of B. with two balls, but their meaning is now reversed, it now being commonly a *dis*advantage to make a winning hazard; and *vice versâ*.

6. A red winning hazard is when you pocket the red; a red losing hazard, when you pocket your own ball off the red.

7. A cannon is when your ball strikes the other two.

8. A miss is when your ball strikes no other.

9. A coo is when your ball goes into a pocket, or jumps off the table without striking another.

10. A four-stroke is made by playing at the white, making a cannon, and pocketing your own or adversary's ball; or by pocketing his and your own without the cannon, or by playing at the red, making a cannon, and pocketing your opponent's ball.

11. A five-stroke is made by playing at the red, making a cannon, and pocketing your own or the red; or by pocketing the red and your adversary's ball without the cannon; or by pocketing your own and your adversary's ball of the red; or by playing at the white, making a cannon, and pocketing the red; or by playing at the white, and pocketing your own and the red.

12. A six-stroke is made by playing at the red, and pocketing it and your own; or by striking the white first, making a cannon, and pocketing your own and adversary's ball.

13. A seven-stroke is made by playing at the red, making a cannon, and pocketing your own and adversary's ball; or by playing at the white first, making a cannon, and pocketing your own or adversary's and the red; or by striking the white, and pocketing all the balls without a cannon.

14. An eight-stroke is made by playing at the red ball, making a cannon, and pocketing your own and the red; or by striking the red, and pocketing all the balls without the cannon.

15. A nine-stroke is made when you cannon by striking the white first, and pocket all the balls.

16. A ten-stroke is made when you cannon by playing at the red first, and pocket all the balls. This is the greatest number that can be made.

17. If the striker, in making a cannon or hazard, should by accident touch either of the balls with his cue, hand, or otherwise, the adversary can, if he thinks proper, claim the stroke as foul, and have the balls broken; in which case, the points made by such stroke are not scored, and the person claiming the foul stroke leads off.

18. Foul strokes are made as follows—namely, by the striker's ball touching either of the others; by touching any ball while rolling; by moving another ball in any way while taking aim or in the act of striking; by pushing the balls together when playing with the *butt* of the cue; by playing with both feet off the floor; by playing at a ball before it has done rolling; or by playing with the wrong ball: in this last case, should a hazard or cannon be made the adversary can have the balls broken and lead off; or should no score be made by such stroke, he can take his choice of balls and play.

19. In 'breaking' the balls, you take them all off the table, place the red on the spot, and both parties play from the baulk as at commencing.

20. If the balls have been changed, and it cannot be ascertained by whom, the game must be played out with them as they then are; or even if two strokes have been made before the mistake is discovered, it must still be played out in the same way.

21. Should the striker, in making a cannon or hazard, knock his own or either of the balls off the table, he cannot score the points made by such stroke, and the opponent plays, but the balls are not broken.

22. If a ball stops on the edge of a pocket, and afterwards falls in, either through the shaking of the room, or table, or by any other accident, it must be replaced as near the original place as possible.

23. Should the striker, when in hand (i. e., when his ball is off the table), play at a ball in baulk, his adversary has the option of scoring a miss, or of having the balls replaced, and the stroke played again, or of breaking the balls.

24. If the striker's ball touch another, he must play, and should he make a cannon or hazard, the adversary can claim it as foul, or he can allow points to be scored and the person to play on; but should the striker not score, it is at the option of the opponent to break them or not.

25. Should the marker, whilst marking for the players, by accident touch either of the balls, while rolling or not, it must be put as near as possible to the place it would have otherwise occupied.

26. If the last player should alter the direction of the balls while rolling, with cue, hand, or otherwise, the striker may place it where he thinks proper.

27. A line-ball is when either the white or red is exactly on the line of the baulk, in which case it cannot be played at by a person whose ball is in hand, it being considered in baulk.

28. If the striker's ball is over the pocket, and he should, in the act of striking, miss it, but in drawing his cue back knock it into the pocket, he will lose three points, it being a coo.

29. If the red ball has been put into a pocket, it must not be placed on the spot till the other balls have done rolling, should there be a probability of either of them touching it again, as the stroke is not finished till the balls stop.

30. If the striker should touch his ball by accident when taking aim, it is not a stroke, and the ball is to be replaced; but should he touch it in the act of striking, then it is a stroke.

31. If either of the balls lodge on a cushion, it is off the table, and should a cannon or hazard be made, it does not score, and the ball must be placed on the spot, or played from the baulk, according to whether it is white or red.

32. Any person refusing to play the game out after he has played one stroke, loses it.

33. In a match of four, each person is at liberty to offer his partner advice.

34. All disputes in the game to be decided by the marker or majority of the company, but no person has a right to interfere until appealed to by one or both players.

35. It is called a love-game when no hazard has been made by the loser.

With first-class players such as Cook, Roberts, and others, the 'spot stroke' is a favorite and telling one. It consists of holing the red ball (from its spot at the upper end of the table), stroke after stroke consecutively, in either of the bottom pockets. So great is the skill now displayed in this stroke, that breaks of 150 and more are frequently made. With its aid the proficient will occasionally score seven hundred points before letting his adversary 'in.' Scores of about 700 or 800 have been achieved.

The only other game played upon a billard-table which it seems necessary for us to notice, is that called Pool. It is quite different from that above described, nor is it necessary that a good player at the one should greatly distinguish himself at the other. Pool is the game pursued at all the public billiard-rooms, and is the sole profession of many persons who might otherwise employ themselves to more advantage, if not to greater profit, since the requisites for forming a first-rate player are really high—namely, steadiness of hand and eye, imperturbable temper, and exact dynamical calculation. Pool is played by any number of persons—when between two only, it is called 'single pool,' and is nothing else than the old game at B. before the introduction of the red ball—and after various methods, such as playing at the last player, playing at the nearest ball, and playing at any ball whatever. The most common is that of playing at the last player, the rules of which game are to be found, by those whom they concern, upon the walls of every room where it is played. The best billiard-tables, furnished with slate bed and India-rubber cushions, cost from £70 to £80, and upwards.

BI'LLINGSGATE, a gate, wharf, and fish-market, a little below London Bridge, to the west of the Custom-house. It was opened in 1558 as a landing-place for provisions; and in 1699 was made 'a free and open market for all sorts of fish.' The present handsome stone building was finished in 1874. Fish of every kind, fresh or cured, is admitted free of duty, if taken by British subjects and imported in British vessels. Lobsters and turbot, also, are admitted free, though in foreign vessels. All fish are sold by tale, except salmon and eels, which are sold by weight; and oysters and other small shell-fish which are sold by measure. The influx of salmon about the beginning of autumn is sometimes above 1000 boxes per day. The market opens daily at 5 A.M.; no fish is sold on Sunday, except mackerel. The fishermen consign their cargoes to the dealer, or 'salesmen,' who occupy stalls in the market; and these supply the retail-dealers. An officer called the clerk has the general superintendence of the market, and the quality of all fish offered for sale is tested by inspectors. The unpolished phraseology native, though not peculiar, to this quarter of London, has given rise to the proverbial use of the name.

BILLINGTON, ELIZABETH, the most celebrated English female singer of her day, was the daughter of a German musician named Weichsel, and born in London, 1769. She early came forward as a performer on the piano and as a composer; and having married her music-master, Thomas B., appeared with brilliant success on the Opera stage in Dublin in 1786. Returning to London, she was engaged at Covent Garden at the then unheard-of salary of £1000 for the season. She perfected her musical education under Sacchini in Paris, who wrote for her his opera, *Inez de Castro*, while she was singing in Naples 1794. She appeared subsequently in Venice and Rome with the greatest applause. In 1799, her first husband being dead, not without suspicion of poison, she married a Frenchman of the name of Florissant, and returned to London, 1801, where she received £4000 for six months, playing alternately at Covent Garden and Drury Lane. She retired from the stage in 1809, and died (1818) at her villa, near Venice. Her character as a wife was the reverse of exemplary; but as a singer she was unrivalled. To a voice of the largest compass and richest tone, trained in all the art of the Italian school, she added a fascinating personal beauty and grace. In illustration of her spirit, it is told that Catherine II. proposing, through her London ambassador, to engage Mrs. B. for the theater of St. Petersburg, the vocalist demanded a sum that seemed to the ambassador exorbitant. 'The Empress of all the Russias does not give more to her ministers.' 'Then let her make her ministers sing,' was the reply.

BILLITO'N, an island in the Dutch East Indies, between the south-east of Banca and the south-west of Borneo. It is separated from the former by Clement's Strait, and from the latter by the Caremata or B. passage. Its north-west point is in lat. 3° 13′ S., and long. 108° 7′ E. It is said to contain 2500 square miles and 20,000 inhabitants. It is rich in iron and timber, and imports rice, trepang, edible birds' nests, sea-weed, tortoise-shell, and wax. Its coasts are beset with rocks and islets.

BILLOM, a town of France, in the department of Puy-de-Dôme, situated on a hill 1¼ miles east-south-east of Clermont. It is one of the most ancient towns of Auvergne, and was formerly surrounded by walls, which have now disappeared; its commerce and manufactures have also declined. So early as 1455, a university was founded at B., which a century later passed into the hands of the Jesuits, and was governed by them until the suppression of their order. Pop. (1876) 3737, chiefly engaged in the manufacture of earthenware.

BI'LLON, (see BULLION) is an alloy of copper and silver, in which the copper predominates, and which is used in some countries for the smaller denominations of money. The *Groschen* of North Germany—e. g., corresponding nearly to an English penny—is of B., and is about the size of an English fourpenny silver piece. The object to avoid the bulkiness of copper coin; but B., besides affording facilities for counterfeits, is dirty and inelegant.

BI'LMA, a town of the Sahara, Central Africa situated in lat. 18° 40′ N., long. 14° E., on an oasis called the Wady Kawas, on the route between Murzuk and Lake Tsad. It is the capital of the Tibu country, and important as a resting-place of caravans crossing the desert. Dates grow abundantly here; and large quantities of salt are collected from lakes in the vicinity for export to Bornu and Sudan.

BI'LSA, or BHILSA, a town of India, in Malwa, in the territory of Gwalior, Scindia's dominions, on the right bank of the Betwa, 188 miles south from Gwalior, and 32 miles north-east from Bhopal. It is situated on an elevated mass of trap rock, and has a fort enclosed by a stone wall, and furnished with square towers and a ditch. Outside the walls, are some spacious streets, and many good houses. B. was taken from the Hindus by Samsuddin Altamsh, sovereign of Delhi, 1230; and after several times changing hands between Hindu and Mussulman masters, was finally incorporated with the empire of Delhi by Akbar in 1570. The pop. is about 30,000. B. and the pergunnah of which it is the capital, are said to yield a revenue of 325,000 rupees. The finest tobacco produced in India is from a small piece of land, about three acres, near Bilsa. Its superiority is said to be entirely owing to careful cultivation. There is at B. a brass cannon, of beautiful workmanship, said to have been made by order of Jehangir, 19½ feet in length, with a bore of 10 inches.

BI'LSTON, a town in South Staffordshire, situated on a rising-ground about 3 miles south-east of Wolverhampton. Pop. (1881) 22,730. It forms a part of the parliamentary borough of Wolverhampton. It has extensive iron and coal mines, iron smelting-works, iron-foundries for making machinery, besides works for manufacturing tinplate goods, japanned and enamelled wares, nails, wire, screws, and coarse pottery. It is the center, indeed, of the hardware trade, and consequently a very busy place. Fine sand, adapted for metal-casting, is found here Upwards of 700 persons died of cholera here both in 1832 and 1849.

BI'MA, a seaport in Sumbawa, one of the Sunda Isles, and capital of a state of the same name, in lat. 8° 30′ S., and long. 119° E. It is on a bay of the north coast, being 100 miles to the east of Sumbawa, a town feudally dependent on its sultan. Its chief exports are horses and timber.

BI'MAH, a river of India, a branch of the Kistnah (q. v.), rises in the table-land of the district of Poona, in the presidency of Bombay, at an elevation of 3090 feet above the level of the sea, and following in a south-eastward direction, falls into the Kistna, in N. lat. 16° 24′, E. long. 77° 20′, after a course of more than 500 miles.

BI'MANA (Lat. two-handed), in some zoological systems, the first order of *Mammalia* (q. v.), an order containing the human species alone. See MAN. Others reject the order altogether, reclaiming against this classification of man with brutes, and maintaining that the distance between him and them is too great to be represented as that between two orders in one class, or even between two classes of a zoological system. In assigning a place in this manner to man among animals, naturalists of course consider exclusively or chiefly his animal nature and bodily frame. The name B. has reference to the hands (q. v.) which terminate

his anterior limbs; monkeys and lemurs, which, having opposable thumbs in all the four extremities, may be regarded as having four hands, although much less perfect than the human, are called *Quadrumana* (q. v.); but none of the inferior animals are *two-handed*, as man is.

BINA'B, a town of Persia, in the province of Azerbijan, charmingly situated on the banks of the Sofi Chai (a feeder of Lake Urumiyah), in the midst of orchards and vineyards, about 55 miles south-south-west of Tabriz. B. contains about 1500 houses; the streets are very clean, many of them having a stream of pure water, which is here very plentiful flowing down the center. B. forms a dependency of Marághah, paying 4000 tómáns of revenue, and furnishing a quota of 400 men to the Azerbijan army.

BI'NARY COMPOUND. See BINARY THEORY.

BI'NARY THEORY, in Chemistry, takes cognizance of the mode of construction of salts. It assumes that all salts contain merely two substances, which either are both simple, or of which one is simple, and the other a compound playing the part of a simple body. The best and most familiar illustration of the B. T. is common salt or chloride of sodium (NaCl), which is constructed of the metal sodium (Na) and the non-metal chlorine (Cl), and is at a glance seen to be a *binary compound* (a compound of two). In like manner, fluor-spar, or the fluoride of calcium (CaF), consists of the metal calcium (Ca) and the non-metal fluorine (F); iodide of potassium (KI), largely employed in photography, of potassium (K), and iodine (I). and bromide of silver (AgBr), also useful in photography, of silver (Ag), and bromine (Br). Considerable difficulty is experienced in including all salts under the B. T., but in many cases the apparent difficulty may be got over. Thus, saltpetre, or the nitrate of potash (KO,NO_5), according to the ordinary mode of representing its composition in symbols, naturally breaks up into potash (KO) and nitric acid (NO_5); but in this form it cannot be included in the binary theory. If, however, the same elements be arranged differently, as when the nitrate of potash (KNO_6) is represented as containing the metal potassium (K) and the compound non-metal nitrationide (NO_6) the latter playing the part of chlorine or other simple substance, the apparent barrier to the introduction of such salts into the list of those comprehended under the B. T. to a great extent disappears. The following table will represent this more clearly:

	SYMBOLS.	
	Ordinary Way.	Binary Theory.
Chloride of Sodium	NaCl	Na,Cl
Nitrate of Potash	KO,NO_5	K,NO_6
Sulphate of Soda	NaO,SO_3	Na,SO_4
Carbonate of Lime	CaO,CO_2	$CaCO_3$

Much, however, remains to be cleared up, and in very many cases the B. T. does not answer the purpose of including all salts under one class. See SALTS; see also CHEMISTRY.

BINA'SCO, a town of Lombardy, about 11 miles north-west of Pavia. It is defended by a castle, where, in September 1418, Beatrice di Tenda, wife of the Duke Filippo Maria, was beheaded by order of her husband, who unjustly suspected her of infidelity. Pop. about 1000.

BIN-BIR-KILISA' (One Thousand and One Churches), the name of extensive ruins in the pashalic of Karamania, Asia Minor, and 20 miles north-north-west of the town of Karaman. The ruins consist chiefly of the remains of Byzantine churches, evidently of great antiquity, and some of very considerable size. B. is supposed to be the ancient Lystra, where the cripple was healed by St. Paul.

BI'NCHÉ, a town of Belgium, province of Hainaut, on the Haine, about 10 miles east-south-east of Mons. It is well built and walled, with a fine square, ornamented with a fountain, and has manufactures of leather, cutlery, pottery, glass, &c., and a considerable trade in lace, paper, marble, and coal. Pop. (1870) about 7000.

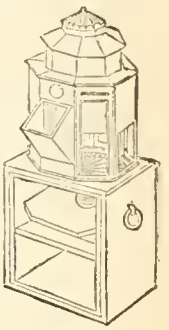
BINDRABA'N, a town on the right bank of the Jumna, is situated in the district of Muttra and lieutenant-governorship of the North-west Provinces. It is in lat. 27° 34' N., and long. 77° 45' E., being 823 miles to the north-west of Calcutta, and 92 to the south of Delhi. The population of B., almost exclusively Hindu, was, in 1871, 21,500. The performance of religious rites appears to be the principal business of the place. Crowds of pilgrims come from all parts of India, more particularly in honor of Krishna; and, through the munificence of wealthy devotees, sacred edifices are constantly becoming more numerous and costly. Here, as at Benares, the immediate margin of the river is occupied by flights of steps, or ghauts, as they are called. These extend for about a mile along the bank, being constructed of red stone, which is brought from Jeypore, nearly 150 miles distant.

BI'NDWEED. See CONVOLVULUS.

BI'NGEN (the ancient *Vincum* or *Bingium*), a town in the grand-duchy of Hesse-Darmstadt, Germany, is situated in a charming country on the left bank of the Rhine, and on the right of the Nahe, here crossed by a bridge, generally supposed to have been built by the Romans, and called the Bridge of Drusus. Pop. (1880) 7050, who are chiefly engaged in the manufacture of fustian, leather, flannel, and tobacco. The vine is extensively cultivated in the surrounding country. The celebrated Scharlachberger wine is produced in the vineyard of the same name, near the village of Rüdesheim. In the vicinity of the town is the Rochusberg, with a chapel, to which annual pilgrimages are made. On the declivity of the hill are still to be seen the ruins of the old castle (blown up by the French in 1689), in which the Emperor Henry IV. was detained a prisoner by his son in the year 1105. On the other side of the Nahe is the Rupertsberg, with the ruins of a monastery, in which St. Hildegarde resided in the 12th c. Below the town is the celebrated *Bingerloch*, formerly a very dangerous point in the navigation of the Rhine, on account of the sunk rocks which, with the exception of a narrow passage through which the waters rushed loud and furious, stretched across the river; but in the year 1834, these rocks were blown up. In the middle of the river stands the tower in which Bishop Hatto (q. v.) was said to have been devoured by rats.

BINGHAMTON, a city of New York, U.S., at the junction of the Chenango and Susquehanna rivers, 118 miles W.S.W. of Albany. It is an important railway center, and has a large trade in flour and timber. Pop. (1870) 12,962; (1880) 17,315.

BINGLEY, a town and township in the West Riding of Yorkshire, 15 miles west-north-west of Leeds, situated on an eminence in a well-wooded district. It chiefly consists of one long street. It has worsted, cotton, and paper manufactures. Pop. (1881), town, 9465; improvement district, 8972.



Usual form of Binnacle.

BI'NNACLE, formerly called *Bittacle* (Fr. *habitacle*), is a wooden box or case for containing a ship's compass, together with other apparatus (especially a lamp) essential to its use. In large ships, there are generally two binnacles, one for the steersman, and one for the officer or seaman who 'cons' or superintends the steering. Sometimes a lamp is so placed as to illuminate two compasses at night, sometimes only one. Many improvements have recently been made in binnacles. See COMPASS, MARINER'S.

BINNEY, REV. THOMAS, D.D., LL.D., one of the most distinguished modern preachers of the Independents in England, was born at Newcastle in 1798. After officiating as clergyman in Newport, Isle of Wight, he in 1829, removed to London, where he soon acquired extensive popularity. The hall in which he preached becoming too small for his congregation, Weigh-house Chapel, near London Bridge, was erected for him by his hearers in 1833. Here he continued to labor with great success for nearly forty years, attracting around him a large number of the more intelligent class of young men in the metropolis. An address delivered at the opening of the new chapel, containing animadversions on the English Church, brought B. into notoriety from the replies it called forth from many English clergymen. He afterwards took the more liberal side in the *Rivulet* controversy regarding the orthodoxy of certain hymns of high poetic merit, written by the Rev. T. Lynch of London. In 1845 he visited Canada and the United States; and in 1857–9 made a successful preaching and lecturing tour in Australia. He resigned in 1871 the pastorate of Weigh-house Chapel. As a preacher, B. was remarkable less as an orator than for breadth of view, originality of thought, and force of expression. Among the most popular of his religious works are: *Conscientious Clerical Nonconformity*, *The Practical Power of Faith*, *Service of Song in the House of the Lord*, *Money, and Is it Possible to make the Best of Both Worlds?* He died in 1874—See *Memorial of B.*, edited by John Stoughton, D.D., 1875.

BINO'MIAL, in Algebra, is a quantity consisting of two terms or parts—e. g., $a+b$, or $9-5$; a *trinomial* consists of three terms, as $a+b+c$, or $10+5-8$. The BINOMIAL THEOREM is that remarkable series or analytical formula by which any power of a B. can be expressed and developed. Thus, the 8th or any other power of $a+b$ can be at once written down without going through the actual multiplication of $a+b$ by itself for the given number of times. The older mathematicians were acquainted with this theorem in the case of integral exponents, though the actual discoverer is unknown. Newton was the first to demonstrate its truth for all exponents—fractional and negative, as well as integral. It is one of the finest of his discoveries, and is engraved on his tomb. Among its many applications, it affords the means of finding any

root of any number much more conveniently than by the usual method of extraction.

BINO'NDO, a town of the island of Luzon, Philippines, on the right bank of the Pasig, opposite to Manila, with which it is connected by a magnificent stone bridge, 411 feet in length. This bridge is regarded as the greatest structure erected by Europeans in the East. B. is chiefly inhabited by natives of the Philippines, but is also the residence of some Europeans. It is the seat of government of the province of Tondo. Pop. 26,458.

BINTA'NG, an island of the Dutch East Indies, about 40 miles south-east of Singapore, and in lat. 1° 5′ N., long. 104° 29′ E. Area, 600 square miles. Pop., including that of small adjacent isles, 13,000. It is calculated that not less than 400 tons of the astringent gum called gambir are obtained here annually. This, along with rice and pepper, forms its chief exports.

BI'NTURONG (*Ictides*), a genus of quadrupeds nearly allied to Raccoons (q. v.), from which the chief distinction is in the smaller and less tuberculated back molar (grinder) teeth. Only two species are known, natives of Malacca, Java, Sumatra, &c.

BI'OBI'O, the largest river of Chili, has a west-north-west course from the Andes to Concepcion on the Pacific, being 2 miles wide at its mouth, and navigable for boats from the sea to the mountains. Its lower stream separates the province of Concepcion on the north from independent Araucania on the south.

BIO'GRAPHY (from the Gr. *bios*, life, and *graphe*, writing) is the term applied to that department of literature which treats of the lives of individuals. The mode of treatment, especially in modern times, is far from uniform. In some cases, B. approaches the sphere of philosophy; in others, that of history; while in the majority it assumes, to a large extent, the character of analytic or descriptive criticism. To none of these modes, theoretically considered, can there be any valid objection; everything depends on the judiciousness of the biographer. The great points which he must keep perpetually in view are the personality and characteristics of his subject. If these are buried under a load of digressive dissertations, his book, however valuable or interesting, ceases to be a B., except in name. Anciently, B. was more of a mere *curriculum vitæ* than it is now; that is to say, the leading incidents of a man's life were narrated in their historical sequence, without any elaborate attempt to analyze the character from which they emanated. Like ancient history, it was possessed of a simple greatness, a stately dignity of narrative, colored here and there but sparingly with grave eulogy or censure. Modern B., on the other hand, like modern history, is full of elucidations, criticism, and disquisition; and if wanting in the severe grace of its classic predecessor, it is much more lively, acute, and expansive.

Biographical literature appears to have existed from a very early period. The oldest historical books of the Jews abound with beautiful examples of it, such as the lives of the patriarchs and the story of Ruth. But what, indeed, are the mythologies of all ancient nations, except a chaos of heroic or divine biographies written not on walls of stone or rolls of parchment, or leaves of papyrus, but on the tablets of the memory? Of purely biographical works, the most valuable that has come down to us from the Greeks is the *Parallel Lives* of Plutarch, a composition of the 2d c. after Christ. Roman literature also possesses an admirable specimen in the *Life of Agricola* by his son-in-law, Tacitus. Besides these may be mentioned the *Life of Alexander the Great* (in Latin) by Curtius, and of *Apollonius of Tyana* (in Greek) by Philostratus, *Lives of the Sophists* (in Greek) by Philostratus, and a *Life of Plato* (in Greek) by Olympiodorus of Alexandria.

Coming later down ,we encounter St. Jerome's *Lives of the Fathers;* while biographies, more or less complete, of saints, martyrs, bishops, &c., are scattered profusely through primitive ecclesiastical literature. The monks of the middle ages also worked hard at the manufacture of absurd and superstitious legendary biographies. Modern biographical literature may be said to date from the 17th c., and has since developed itself to an extraordinary extent. Among biographical works, some are universal, as Michaud's *Biographie Universelle* (1811—1828; new ed. 45 vols. 1842—1866); Bayle's *Dictionnaire Historique et Critique* (1697); Chalmers's *Biographical Dictionary* (32 vols.; new ed. 1812—1817); the *English Cyclopædia*, biographical section (1856—1857). Others discuss the lives of certain classes of men, as Vasari's *Lives of the Painters* (Florence, 1550); the *Acta Sanctorum* (q. v.). Johnson's *Lives of the Poets* (1781). Some are for certain countries only: thus Fuller's *Worthies of England* (1662); *Biographia Brittanica* (1747); *British Plutarch;* Lodge's *Portraits of Illustrious Personages of Great Britain;* Chambers's *Dictionary of Eminent Scotsmen;* Spark's *American Biography*

Individual biographies are of course innumerable, and may be remarkable for their literary charm, for the eminent character of their subject or the interesting events of his life, or mainly for the fullness of the light they throw on the man and his surroundings. Some biographies combine these excellencies in various degrees. Of English biographies, Boswell's *Johnson* and Carlyle's *John Sterling* are generally admitted to rank foremost. Other important works are Southey's *Nelson*, Moore's *Byron*, Lockhart's *Scott;* and more recently, Lewes's *Goethe*, Morley's *Diderot*, Trevelyan's *Macaulay*, Martin's *Life of the Prince Consort*, Froude's *Carlyle*, Stanley's *Arnold*, Stopford Brooke's *Robertson* (of Brighton), contain elements of theological controversy, as Morley's *Cobden* inevitably does of political argument. Carlyle's *Cromwell* and *Frederick*, and Masson's *Milton*, are largely historical of the times of their subjects. America has Washington Irving's *Columbus*, Spark's *Washington*, Parton's *Franklin and his Times*, not to mention others as name-worthy. In France there are famous biographies by Fontenelle, Burigny, Voltaire, Mallet, Boissy d'Anglas, Villemain, Cousin; and in Germany; by Herder, Garve, Heeren, Varnhagen von Ense, Döring, Pertz, Haym, Otto Jahn, Droysen, and many others.

Autobiographies have also become superabundant in this self-conscious age; but many of them are of perennial charm and value. Gibbon's is one of the more notable English autobiographies; others are those of Hume and Cobbett. Of American works of the kind, probably Franklin's is the foremost. In England, more or less complete autobiographical books of recent date are those of Harriet Martineau and of John Stuart Mill, Col. Meadows Taylor's *Story of My Life*, and Carlyle's *Reminiscences*. Goethe's *Dichtung und Wahrheit*, possibly the most delightful work that can be referred to this class, is unique; but its defect as an autobiography is, that it remains impossible to tell how much is *truth* and how much *poetry*, to use the author's own antitheses.

BIO'LOGY, or the science of life, embraces knowledge regarding the phenomena of organized beings as distinguished from the inorganic world. It may be divided into four main divisions: 1. Morphology, (including Anatomy and Histology); 2. Distribution, geographical and geological; 3. Physiology, animal and vegetable; 4. Ætiology, or the discussion of the problems as to the causes and origin of life. Thus a large proportion of the several articles in this work on Zoology, Botany, Physiology of vegetables, animals, and the human subject, including such articles as Animal and Animal Kingdom, Animal Heat, Reproduction, Vegetable Physiology, belong to the wide subject of B., which also borders on the provinces of Psychology and Sociology. By B. is sometimes meant Physiology merely. See DARWINIAN THEORY.

BIO'RNEBORG, a seaport town of Finland, on the Gulf of Bothnia, at the mouth of the Kumo, 76 miles north-north-west from Abo. Pop. (1880) 8718. Shipbuilding is carried on. Timber, pitch, and tar are the principal exports.

BIOT, JEAN BAPTISTE, a distinguished French physicist and astronomer; was born at Paris, 21st April 1774. He at first entered the artillery, but forsook the service for science; and in 1800 became Professor of Physics in the Collége de France. He was made a member of the Institute in 1803. Along with Arago, he was (1806) sent to Spain to carry out the measuring of a degree of the meridian. In 1815, the Royal Society of London elected him one of their 50 foreign members. In 1817, he visited England, and went as far north as the Shetland Islands, in order to make observations along the line of the English arc of meridian. His most valuable contributions to science are on the polarization of light; and his researches connected with ancient astronomy are also very valuable. Of his numerous writings may be mentioned *Traité Elémentaire d' Astronomie Physique*, 3 vols. (Paris, 1805; 3d ed., considerably augmented (1850), 6 vols., with vol. of plates—translated into English. *Traité de Physique*, 4 vols. (1816); *Précise de Physique*, an abridgment of the former in 2 vols. (1817), often republished; *Recueil d'Observations Géodésiques*, &c. (1821). B. also contributed many excellent biographies of scientific men to the *Biographie Universelle*. Among the most important of his later works are *Recherches sur l'ancienne Astronomie Chinoise* (1840); *Mémoire sur la Constitution de l'Atmosphere Terrestre*, in the *Connaissance des Temps* (1841); and *Etudes sur l'Astronomie Indienne* (1862). In 1849, B. was made a commander of the Legion of Honor, and he was also a member of most of the learned societies in Europe. He died Feb. 3, 1862.

BIOT, EDUARD CONSTANT, son of the former, a distinguished Chinese scholar, was born at Paris 2d July 1803. He was one of the first to promote the introduction of railways in France; but his health failing he retired from public service, and devoted his leisure to the study of Chinese and the history of the social organization of the Celestial Empire. He died March 1850. He wrote a *Dictionnaire des Villes*, &c., *de l'Empire Chinois* (1842), and a multitude of *Mémoires* on Chinese subjects of scientific and social interest, printed in the *Journal Asiatique*, &c. His interesting work, *De l'Abolition de l'Esclavage Ancienne en Occident* (1840), was awarded a gold medal by the Institute.

BI'PED (Lat.), *two-footed*, a term sometimes applied, as descriptive, to man, more frequently to birds, and which scarcely admits of application to any other animal except a very few species of reptiles, some of which are batrachian (see BATRACHIA and SIREN), and some saurian (see SAURIA). The two-footed saurians may be regarded as forming a link between that order and serpents, the two-footed batrachians as connecting batrachians with fishes, other characters of resemblance being in both instances associated with this.

BIPE'NNIS, a double-headed axe, the weapon which, according to ancient historians and artists, particularly distinguished those fabulous female warriors, the Amazons.

BIQUADRA'TIC. See EQUATIONS.

BIR (ancient *Birtha*, Turkish *Birch-jik*), a town of from 1800 to 2000 houses of Asiatic Turkey, in the pashalic of Diarbekir. It is situated on the east bank of the Euphrates, in lat. 37° 3′ N., long. 38° E., on a steep hill above the river, the passage of which is here commanded by a castle. B. is surrounded by a strong wall flanked with towers; its streets are narrow, but clean; it has several mosques with tall minarets, a caravansary, a bazaar, and a ruined citadel and castle. Travelers and caravans from Aleppo to Diarbekir, Bagdad, Persia, &c., cross the Euphrates at this point. From B. Col. Chesney proposed to navigate the Euphrates by small steamers to its mouth in the Persian Gulf, a distance of 1143 miles. *B.*, which signifies 'well,' is the prefix of several other small towns in Arabia.

BIRCH, SAMUEL, keeper of the Oriental Antiquities in the British Museum, is a son of the late Rev. S. Birch, rector of St. Mary Woolnoth, in the city of London, and was born in London, in the year 1813. B. was educated at Merchant Taylors' School. In 1834, he entered the public service under the Commissioners of Public Records; and in 1836, he obtained the appointment of assistant in the department of Antiquities, British Museum. In this capacity, B. acquired an extensive acquaintance with archæology in all its branches. He studied not only Greek and Roman antiquities, including numismatics, but applied himself with untiring zeal to Egyptian hieroglyphics. In process of time, he so distinguished himself in this difficult branch of learning, that he gained the notice of the celebrated Chevalier Bunsen, who gladly availed himself of B.'s knowledge in the philological portion of *Egypt's Place in Universal History*. The chevalier, in his preface, thankfully acknowledged this assistance in the following terms: 'This English edition owes many valuable remarks and additions to my learned friend, Mr. Samuel Birch, particularly in the grammatical, lexicographic, and mythological part. That I have been able to make out of the collection of Egyptian roots, printed in the German edition, a complete hieroglyphical dictionary, is owing to him. To him also belong the references to the monumental evidence for the signification of an Egyptian word, wherever the proof exhibited in Champollion's dictionary or grammar is not clear or satisfactory. . . . . The work may now be said to contain the only complete Egyptian grammar and dictionary, as well as the only existing collection and interpretation of all the hieroglyphical signs; in short, all that a general scholar wants, to make himself master of the hieroglyphic system, by studying the monuments.' After Bunsen's decease, B. was engaged to prepare for the press and edit the fifth and concluding volume of *Egypt's Place*, a task which he has performed in an admirable manner, giving the results of all the discoveries made by Egyptologists, since the publication of the first volume, in 1848, down to the year 1867. B. has also prepared a second edition of the first volume of *Egypt's Place*, published at the same time as vol. 5, and in which the same care has been taken to make the work correspond with the most recent investigations of hieroglyphic scholars. It was by the particular desire of Bunsen, as expressed on his death-bed, that B. undertook the revision of his work on Egypt. B. is now universally recognized as the foremost Egyptologist in this country. In 1844, upon the retirement of Mr. Barnwell from the office of assistant-keeper in the department of Antiquities, B. was appointed his successor.

In 1861, upon the retirement of Mr. Hawkins from the post of keeper of the Antiquities, that department was divided into three separate and independent departments, viz., the department of Oriental, Medieval, and British Antiquities, and Ethnography; the department of Greek and Roman Antiquities; and the department of Coins and Medals. B. was appointed keeper of the first-named collections; but afterwards a fourth department was constituted out of these collections, viz., that of British and Medieval Antiquities and Ethnography, so that B. is now the keeper only of the Egyptian and Oriental Antiquities. In 1862, B. received the honorary degree of LL.D. from the university of St. Andrews and from Cambridge in 1874, in which year B. was president of the great London Congress of Orientalists. He is a corresponding member of the Institute of France (Académie des Inscriptions et des Belles-Lettres); also of the Academy of Berlin, of the Academy of Herculaneum, and of the Archæological Institute of Rome. B.'s principal publications are as follows: *Gallery of Antiquities selected from the British Museum by F. Arundale and J. Bonomi, with Descriptions by S. Birch* (1842); *Views on the Nile, from Cairo to the Second Cataract, drawn on Stone, from Sketches taken by Owen Jones and J. Goury, with Historical Notices of the Monuments by S. Birch* (1843); *Catalogue of Greek and Etruscan Vases in the British Museum* (1851), drawn up in conjunction with Mr. Newton; *An Introduction to the Study of the Egyptian Hieroglyphs*, for Gardner Wilkinson's *Egyptians* (1857) and a new edition of Wilkinson's work (1879); *History of Ancient Pottery* (2 vols. 1858); *Description of the Papyrus of Nas-khem, Priest of Amen-ra, discovered in an excavation made by direction of H.R.H. the Prince of Wales in a Tomb near Gournah at Thebes* (1863); and the *Rhind Papyri* (1866). Besides his Egyptian and classic labors, B. has also studied Chinese, and in that direction is author of the following brief contributions, viz., *Analecta Sinensia*, short stories from the Chinese (1841); *The Friends till Death*, a tale translated from the Chinese (1845); and *Chinese Romance—The Elfin Foxes* (1863). B. has likewise contributed papers to the *Archæologia*, to the *Transactions of the Royal Society of Literature*, the *Revue Archéologique* the *Archäologische Zeitung*, and *the Zeitschrift für Aegyptische Sprache und Alterthumskunde*. He has also written many articles for the *English Encyclopædia*, principally on subjects connected with Egyptian antiquities and hieroglyphics. In the same class of subjects he has been a much valued contributor to Chambers's *Encyclopædia*.

BIRCH (*Bétula*), a genus of plants of the natural order *Amentaceæ* (q. v.), sub-order *Betulineæ*, the natural order *Betulaceæ* of some botanists. In this order, or sub-order—which contains only the two Genera, Birch and Alder (q. v.)—the flowers have merely small scales for their perianth; the ovary is two-celled, but the fruit—a small achenium (q. v.)—is by abortion one-celled; the fruits and scales united form a sort of cone; and the leaves have stipules which soon fall off. They are all trees or shrubs, natives of temperate and cold regions.—The genus *Betula* is distinguished by 10—12 stamens, and winged achenia.—The COMMON B. (*Betula alba*) has small ovato-triangular doubly-serrated leaves. It is a very beautiful forest-tree, abounding in the North of Europe and of Asia, often forming large groves by itself. In the south of Europe, it is found only upon mountains of considerable elevation. It is a tree of rapid growth. In favorable situations, it attains the height of 60 or even 70 feet, with a diameter, of 1½ or two feet; whilst on the northern, or utmost alpine limits of vegetation, it only appears as a stunted bush. The bark is smooth and silvery white, and its outermost layers are thrown off as the tree advances in age. The smaller branches are very slender and flexible, and in a particular graceful variety called the WEEPING B. (*B. pendula* of some botanists), they are still more slender, elongated, and pendulous. Some of the finest Weeping Birches in Britain stand on the banks of the river Findhorn, near Forres, in Morayshire; they are 60 feet high, and exhibit pendent masses of spray 10 feet in length.

The bark and leaves of the B. are, in some northern countries, used medicinally in cases of fever and eruptions. They are also used for dyeing yellow. The bark is sometimes used for tanning, and is preferred to every other kind of bark for steeping nets, sails, and cordage. See BARK FOR TANNING. It is in some countries made into shoes, hats, drinking-cups, &c., and it is even twisted into a coarse kind of ropes. Portable boats made of it are used on the Volga. It is remarkable for durability. In many parts of the north of Europe, it is used instead of slates or shingles by the peasantry; and in Russia—the outer or white layers being subjected to distillation—there is obtained a reddish empyreumatic oil called B. OIL; it yields also the B. TAR, or *Degutt*, which is employed in the preparation of Russia leather. Dried, ground, and mixed with meal, B. bark is used in Norway for feeding swine; and, in times of scarcity, has even served for human food. The wood is in universal use in northern countries for the most various purposes. It is white, firm, and tough, and is employed by wheel-wrights, coopers, turners, &c. It is very much employed in the manufacture of barrels for fish. It is much employed for smoking hams, herrings, &c., because of the flavor which it imparts. Much of it is made into charcoal for forges. The twigs are in general use for besoms. In the Highlands of Scotland, and in many other countries, the sap is not only used as a beverage in a fresh state, but is converted by fermentation into a kind of wine. To obtain it, a hole is bored in the stem, in spring, in an oblique direction, one or two inches deep, and a small tube is introduced to carry the sap into a vessel. From a strong stem, there often flows as much as from four to six quarts in a day. If the hole is again closed up each time with a wooden plug, covered over with clay or rosin, and the tapping is annually renewed in the same place, the tree sustains very little injury. B. sap is very beneficial in diseases of the kidneys and in cases of urinary calculus. It contains more than 2 per cent. of sugar.

The WHITE B. of North America (*B. populifolia*) very nearly

resembles the common B., but is of much less value. It is found as far south as Pennsylvania. The wood is scarcely used.—The BLACK B. of the same country (*B. nigra*), also sometimes called RED B., and very similar to the common B., produces very hard and valuable timber. It attains the height of 70 feet. It is not found further north than New Jersey. The bark is of a dark color, the epidermis in the younger trees reddish.—But the name BLACK B. is also given to another species found in the more

Common Birch (*Betula alba*).

Common Birch: Showing catkin and leaves.

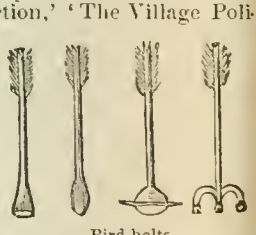
northern parts of North America, and sometimes called the SWEET B. or CHERRY B. (*B. lenta*), also a tree of 70 feet or upwards in height, and of which the timber is fine-grained, and valuable for making furniture, and for other purposes. Its leaves, when bruised, diffuse a sweet odor, and when carefully dried, make an agreeable tea. It is remarkable that this tree has been little planted in Britain.—The YELLOW B. of North America (*B. excelsa*) is a tree of 70—80 feet high, destitute of branches for 30—40 feet, remarkable for its large leaves, which are 3¾ inches long, and for the brilliant golden yellow color of the epidermis. It is found in Nova Scotia, New Brunswick, Maine, &c. Its timber is used in ship-building. The young saplings of all these American species are much employed for making hoops for casks.—The PAPER B. (*B. papyracea*) is found in the northern parts of North America. It attains the height of 70 feet. The bark of the young trees is of a brilliant whiteness. The bark is capable of division into very thin sheets, which have been used as a substitute for paper. It is used by the Indians for canoes, boxes, buckets, baskets, &c. Large plates of it are curiously stitched together withe fibrous roots of the White Spruce, and coated with the resin of the Balm of Gilead Fir. The wood is used for the same purposes with that of the common B.—The mountainous district of India produce several species of this genus. Thin, delicate plates of the bark of *B. Bhojputtra*, a native of the mountains of Kumaon, are used for lining the tubes of hookahs, and are carried in great quantities to the plains of India for this purpose. They were formerly used instead of paper for writing. *B. acuminata*, a native of the mountains of Nepaul, is a tree of 50—60 feet high, covered with branches from the base, and of an oval form. Its wood is strong and durable.—The DWARF B. (*B. nana*) is a mere bushy shrub, seldom more than two or three feet high, and generally much less. It has orbicular crenate leaves. It is a native of the whole of the most northern regions of the globe, and is found in some parts of the Highlands of Scotland. It is interesting because of its uses to the Laplanders and other inhabitants of very northern regions, to whom it supplies their chief fuel, and the material with which they stuff their beds. Its seeds are the food of the ptarmigan, on which the Laplanders in a considerable degree depend. A similar shrubby species (*B. antarctica*) occurs in Tierra del Fuego.

BIRCH, THOMAS, D.D., an industrious historical writer, son of a coffee-mill maker, a Quaker, born at Clerkenwell, November 23, 1705, was at first an usher in different schools. Having taken priests' orders in 1731, he was presented in 1732 to a living in Essex, and in 1734 became chaplain to the Earl of Kilmarnock, who was beheaded in 1746. Appointed in the latter year Rector of St. Margaret Pattens with St. Gabriel, Fenchurch Street, London, B. was elected in 1752 one of the secretaries of the Royal Society, a history which he published in 4 vols., 4to, in 1756—1757. In 1761, he was preferred to the Rectory of Deepdene, Surrey. His first literary undertaking, in which he was assisted by others, was *The General Dictionary, Historical and Critical*, 10 vols., 1734—1741, founded on Bayle's celebrated work. He next edited the collection of state-papers of Thurloe, secretary to Oliver Cromwell, 7 vols., folio, 1742. His other works are *Life of the Hon. Robert Boyle*, 1744; *Lives and Characters of the Illustrious Persons of Great Britain*, the engravings by Houbraken, Gravelot, and Vertue (London, 1743—1752); *Inquiry into the Share which King Charles I. had in the Transactions of the Earl of Glamorgan*, 1747; *Historical View of the Negotiations between the Courts of England, France, and Brussels, 1592 to 1617*, 1749; *Life of Tillotson*, 1752; *Memoirs of the Reign of Queen Elizabeth*, 2 vols., 1754; *Life of Henry Prince of Wales*, 1760; &c. He likewise edited the works of Sir Walter Raleigh, Bacon's works, and various others. He was killed by a fall from his horse in the Hampstead Road, 9th January 1766. He left an extensive MS. collection with his library, to the British Museum, of which he was a trustee. From these MSS. were compiled *The Courts and Times of James I. and Charles I.*, 4 vols. 8vo, (London, 1848).

BIRCH-PFEIFFER, CHARLOTTE, a German actress and writer of plays, was born at Stuttgart in the year 1800. Her passion for the stage displayed itself so strongly, that after encountering much opposition on the part of her parents, she made her début at Munich at the age of thirteen, and afterwards played with great success at Berlin, Vienna, and Hamburg. In 1825, she married Dr. Christian Birch of Copenhagen, and afterwards performed at Petersburg, Pesth, Amsterdam, and other places. In 1837, she undertook the direction of the theater at Zurich. At a later period, she acquired even greater renown as a writer for the stage than as an actress. Her principal theatrical pieces are *Pfefferrösel; Hinko; Die Günstlinge*, perhaps her best piece; *Der Glöckner von Notre Dame;* &c. In 1843, Madame B. resigned the direction of the Zurich theater, and after visiting professionally most of the cities in Germany, made an engagement with the theater-royal at Berlin, The chief productions of what may be termed her later manner are—*Die Marquise von Villette* (1845), *Dorf und Stadt* (1848), *Eine Fumille* (1849), *Anna von Ostreich* (1850), *Ein Billet* (1851). In 1862, was published a complete edition of her dramatic works, which are about 70 in number, and a collection of her novels and tales. She died at Berlin August 25, 1868.

BIRD, EDWARD, an English 'genre' painter of considerable celebrity, was born at Wolverhampton in 1772. He having early displayed a strong inclination for drawing, his father thought he was consulting his son's taste when he apprenticed him to a Birmingham tea-board manufacturer, his duty there being to paint flowers, shepherds, &c., on the boards. On the expiration of his apprenticeship, B. established himself as a drawing-master in Bristol; and two of his pictures, the 'Choristers Rehearsing,' and 'The Will,' having been bought by the Duke of Clarence, afterwards William IV., and the Marquis of Hastings, his reputation was secure. He was elected a Royal Academician, and soon obtained some good commissions. The 'Field of Chevy Chase the Day after the Battle' is generally considered his master-piece. His 'Death of Eli' obtained the British Institution prize of 300 guineas. In 1813, B. was appointed painter to the Princess Charlotte. He now became ambitious to excel in Scripture subjects, and painted several, none of which, however, added to his fame. His last picture, the 'Embarkation of Louis XVIII. for France,' which was never finished, was the least satisfactory of all his works. He died in 1819. His most popular works are—'The Blacksmith's Shop,' 'The Country Auction,' 'The Village Politicians,' 'The Young Recruit,' &c.

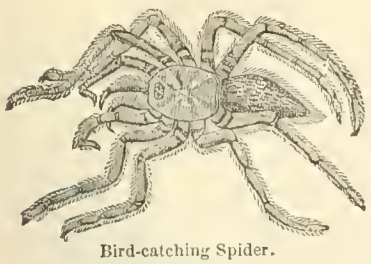
BIRD-BOLT. Stevens, in his note on *Much Ado about Nothing*, says the B. is 'a short, thick arrow, without point spreading at the extremity so much as to leave a broad flat surface, about the breadth of a shilling. Such are to this day in use, to kill rooks with, and are shot from a cross-bow.' The annexed illustration is copied from Douce's *Illustrations of Shakspeare*.



Bird-bolts.

BIRD-CATCHING SPIDER, a name originally given to a large spider, *Mygale avicularia*, a native of Cayenne and Surinam; but which is now more extensively applied, being equally appropriate to a number of large species of *Mygale* (q. v.) and *Epeira* (q. v.), perhaps also of other genera. It has, indeed, been denied by some observers that the name is truly appropriate, but the postive evidence is too strong to be set aside by evidence merely negative. The *Mygale avicularia* is nearly two inches long, very hairy, and almost entirely black; its feet when stretched out, occupy a surface of nearly a foot in diameter. The hooks of its mandibles are strong, conical, and very black. This great spider forms a tube-shaped cell, widening towards the mouth, of a fine white semi-

transparent tissue, like muslin, in clefts of trees or hollows among rocks and stones. From this it issues only at night, to prey upon insects, and, it is said, upon humming-birds. It does not construct a net for the capture of its prey, but takes it by hunting, as do other large species of *Mygale*, natives of the warm parts of America, the East Indies, and Africa. It is probably a species of this genus that Dampier mentions as found in Campeachy, the fangs of which, 'black as jet, smooth as glass, and, at their small end as sharp as a thorn,' are said by him to be worn by some persons in their tobacco-pouches, to pick their pipes with; and to be by others used as tooth-picks, in the belief of their having power to expel the toothache. The bite of the large species of this genus is said to be dangerous.



Bird-catching Spider.

It appears that spiders of the genus *Epeira* feed upon small birds caught in their webs, which have even been described as in some cases large enough to arrest the flight of a bird the size of a thrush, and to impede the traveler in tropical forests.

BIRD-CHERRY (*Padus*), a subdivision of the genus *Cerasus* (see CHERRY), itself very generally regarded as a sub-genus of *Prunus* (see PLUM). The Bird-cherries are distinguished by racemes of small flowers and deciduous leaves.—The COMMON B. (*Prunus* or *Cerasus Padus*), called in Scotland *Hagberry*, is a tall shrub or small tree, sometimes reaching the height of 40 feet, growing wild in most woods in Britain, and in most parts of Europe and the north of Asia. Its younger branches are of a very dark or reddish-brown color. The drupes are small, of a sweetish subacid taste, combined with a degree of what many regard as nauseous bitterness; but to some palates they are not disagreeable. A well-flavored spirituous liquor is prepared from them in the north of Europe. In Siberia, the juice expressed from their ripe fruit is drunk either alone or mixed with milk, and the remaining mass is kneaded into cakes, and used as food.—Very nearly allied to this species is the VIRGINIAN B. (*P.* or *C. Virginiana*), a tree of 80—100 feet in height, found from Tennessee to Upper Canada, and now frequent in Britain as an ornamental tree, although never attaining the size which it does in the United States. The wood is compact, fine-grained, takes a fine polish, and is much used in America by cabinet-makers. The bark is used in the United States as a febrifuge. The fruit is not agreeable; but a cordial is made from it by infusion in spirits with sugar, and, when dried and bruised, it forms an esteemed addition to *pemmican* (q. v.).

BIRD ISLAND, the north-west island of the Sandwich Archipelago, in lat. 22° 20′ N., and long. 160° W. It is, as its name implies, a mere haunt of sea-fowl—the links of the chain increasing pretty regularly in size and elevation from B. I. on the north-west to Hawaii on the south-east.

BIRD-LIME is a viscid and adhesive substance, which is placed on twigs of trees or wire-netting, for the purpose of catching the birds which may alight thereon. A common practice is to place a decoy or tame bird in a cage near where the B. is spread; the wild birds, attracted to the spot by the song of the tame bird, get entangled with the bird-lime. The substance is generally prepared from the middle bark of the holly, mistletoe, or distaff-thistle, by chopping up the bark, treating it with water, boiling for several hours, then straining; and lastly, concentrating the liquid by evaporation, when the B. assumes a gelatinous consistence resembling that of moist putty. It mainly consists of a substance named by the chemist *viscin*. A second mode of preparing B., is to employ ordinary wheat-flour; place it in a piece of cotton cloth; tie up the ends, so as to form a bag; immerse the whole in a basin of water, or allow a stream of water to flow upon it; and repeatedly squeeze the bag and its contents. The result is, that the starch of the wheat-flour is pressed out of the cloth bag, and an adhesive substance named *gluten* is left on the cloth. This substance resembles that prepared by the previous process in its properties; but the former mode of preparing B. is a much cheaper plan, and is that generally followed.

BIRD OF PARADISE, the common name of a family of birds *Paradiseidæ* of ornithologists, found chiefly in New Guinea and neighboring islands, and remarkable for splendor of plumage. In all other respects, however, they are very closely allied to the crow-family, *Corvidæ* (q. v.), to which they exhibit a great similarity, not only in the characters of the bill, feet, &c., and in general form, but also in their habits, and even in their voice. They have been the subject of many fables. The state in which their skins are usually exported from their native islands, gave rise to the notion that they were destitute of feet; and free scope being allowed to fancy, it became the prevalent belief that they spent their whole lives floating in the air, except when perhaps they suspended themselves for a little by their long tail-filaments from the uppermost branches of trees. As for food, it was supposed to be either mere dew and vapors, or nectar obtained from the flowers of trees, climbers, and plants growing on the branches of trees, in the high regions of bright sunshine above the shade of the tropical forest. Antony Pigafetta, indeed, who accompanied Magellan in his voyage round the world, described them as having legs, and stated that these were cut off as useless in the preparation of the skins; but his statement was not credited, and Aldrovandus went the length of accusing him of an audacious falsehood. It would seem that the fables concerning the Birds of P. are in part to be ascribed to the desire of the inhabitants of those islands in which they are found to increase the value of their skins as an article of merchandise; and a sort of sacred character being attached to them, they were employed not merely for ornament, but as a charm to secure the life of the wearer against the dangers of battle. The people of Ternate call them *Manuco-Dewata*, or Birds of God; which name Buffon modified into *Manucode*. In different languages they are known by names signifying Birds of the Air, Birds of the Sun, &c.

The males alone are birds of splendid plumage, that of the females possessing neither brilliancy of colors nor remarkable development. The plumage of the males is not only characterized by great brightness of tints, but by a glossy velvety appearance, a metallic lustre, and a singularly beautiful play of colors. Tufts of feathers generally grow from the shoulders, and these, in some of the kinds, are prolonged so as to cover the wings; in the species sometimes called the Common B. of P., and sometimes the Great Emerald B. of P. (*Paradisea apoda*), the prolongation of these shoulder tufts is so great, that they extend far beyond the body, and even far beyond the tail. They constitute the most magnificent part of the well-known B. of P. plumes. They are exquisitely light and delicate. It has been supposed that they may be of use to the creature in enabling it, with less exertion of wing, to float in the air, but this notion is perhaps sufficiently confuted by the total absence of them in the female.—In other species, there are elongated feathers on the back of the neck, which the bird can erect, and even in some measure throw forward at pleasure; and these, in the genus *Lophorina*, assume a form resembling that of a pair of outspread wings, and rise far above the head. The tail is, in general, not unlike that of a crow in its shape; but in many species there arise, from the rump, at the sides of the tail, two very long feathers, or rather filaments, covered with a sort of velvety down: of these the Common B. of P. affords an example. In the King B. of P. (*Cincinnurus regius*), these long tail-filaments terminate in a sort of disk, as the tail-feathers of the peacock do.

Bird of Paradise (*Paradisea apoda*)—male.

Birds of P. are, in general, more or less gregarious. They sometimes pass in flocks from one island to another, according to the change of seasons, from the dry to the wet monsoon. Owing to their plumage, they fly more easily against than with the wind, and by high winds they are sometimes thrown to the ground. They are lively and active, and in confinement pert and bold. They bestow great care upon their plumage, and sit always on the perches of the cage, so that no part of it may reach the floor, or get in the least degree soiled. It has seldom been found possible to bring them alive to Europe, and they seem very incapable of enduring any other than a tropical climate. In confinement, they are easily fed on rice, insects, &c. In a wild state, their food consists in great part of the fruit of the teak-tree, and of different species of fig, and also of the large buttertlies which abound in their native islands.

The Papuans kill Birds of P. by shooting them with arrows, and employ various other means of taking them for the sake of their skins. The skins are dried in smoke, and fumigated with sulphur, to preserve them from insects; and in this way the brilliancy of the color is impaired, so that the most gorgeous plumes which are ever seen in Europe are inferior, in this respect, to those of the living bird. The skin, to which great part of the flesh is allowed to remain attached, is always much contracted by this drying process, and a very erroneous notion is therefore often formed of the size of the bird. The common B. of P. is as large as a jay. It is of a cinnamon color, the upper part of the head and neck yellow, the front and throat emerald green, the shoulder-tufts

yellow. The whole length to the extremity of these is not less than two feet. Another nearly allied species (*Paradisea rubra*) has these long feathers of a brilliant carmine color.

BIRDE, WILLIAM, a distinguished ecclesiastical composer, was born about the year 1540, and educated at Edward VI.'s Chapel. In 1563, he was appointed organist in Lincoln Cathedral, and twelve years afterward organist to Queen Elizabeth. He published numerous compositions exhibiting great musical learning, and contributed many pieces to Queen Elizabeth's *Virginal Book*; but his fame rests on the canon, *Non Nobis Domine*, which amid all changes in musical taste, has retained its popularity, and still continues to challenge admiration. B. died in 1623.

BIRDS (*Aves*), the second class of Vertebrated (q. v.) Animals, and the first of oviparous vertebrated animals, including all the oviparous animals which have warm blood. B. exhibit great similarity in their general structure, and are sharply distinguished from all other classes of animals. To this class belong all animals, except Bats (q. v.) alone, which have an internal skeleton, and are capable of true flight. The anterior extremities of B. serve them only as wings or organs of flight, and never in any degree as arms or legs; those few birds in which the wings are too small to raise the body in the air, generally employ them toaid their swift running upon land, as the ostrich, or for swimming under water, as the great auk and the penguins. The body is covered with feathers (q. v.), and this is one of the characters in which all birds agree, and by which they are distinguished from all other animals. The general form is adapted to motion through the air, and the trunk is compact, and somewhat boat-shaped.

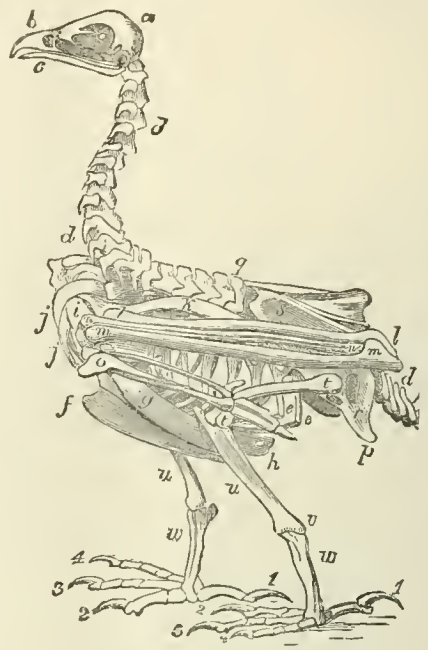
The vertebral column possesses little flexibility; indeed, the vertebræ of the back generally become ankylosed or firmly united together by cementing bone, the solidity which is thus acquired being of evident use for the support of the ribs, and these also are proportionately stronger than is usual in quadrupeds; each of them is provided in the middle with a flattened bony process, directed obliquely backwards to the next rib, so that they support one another, whilst instead of being united to the sternum, or breast-bone, by cartilages, as in quadrupeds, they are continued to it in the form of bone; all these things combining to give strength to that part of the body in which it is particularly needed, both in order to the powerful action of the wings, and the perfect freedom of respiration during flight. In those birds, however, which do not fly, the vertebræ of the back retain some power of motion. The hinder part of the vertebral column exhibits a solidity even greater than the anterior part of it, the lumbar vertebræ (q. v.) being consolidated into one piece with the pelvis (q. v.), which furnishes attachment to strong muscles for the support of the trunk upon the legs, and for the motion of these organs. The vertebral column, however, terminates in a number of small movable (*coccygeal*) vertebræ, the flexibility of this part being necessary to the motion of the tail, which is itself supported by a short and generally much elevated bone, regarded as consisting of ankylosed vertebræ, called the rump-bone, or, from its peculiar form, the ploughshare-bone.

In contrast to the general stiffness of the vertebral column in the trunk, it is remarkable for great flexibility in the neck, enabling a bird to make ready use of its bill, or to bring its head into such positions as suit the adjustment of the center of gravity in flying, standing, &c.

The number of vertebræ in the neck varies from ten to twenty-three, the smallest number being greater than is found in any quadruped. The head, also, is so articulated to the neck by a single *condyle*, or pivot, that a bird can turn its head round in a manner impossible to the mammalia. The skull itself is formed of bones corresponding with those of man and quadrupeds; but they can only be distinguished when the bird is very young, soon becoming consolidated together. The jaws are much elongated, so as to form the bill, the organ chiefly employed in seizing food, as well as for fighting, nest-building, dressing or preening the feathers, and instead of a *hand* for every purpose which bird-life requires. The upper mandible of the bill is so connected, however, with the bone of the skull, by elastic plates, that it possesses some power of motion, and any shock which it may receive is much deadened before reaching the skull. The bill affords many of the most important distinctive characters of B., differing very much according to the mode of life of different orders and tribes. See BILL.

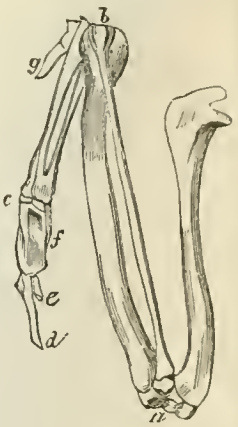
The following illustration will serve to indicate the principal bones of a bird's skeleton; we borrow it from M'Gillivray's *British Birds*.

The sternum or breast-bone in B. is remarkably large and strong, serving for the attachment of the powerful muscles which depress the wings, and receives great attention from naturalists, because its variations correspond with the differences in some of the most important characters and habits of birds. It generally exhibits a projecting ridge along the middle, which is proportionately largest in birds of most powerful flight, and is wanting only in ostriches and a few other birds of allied genera which do not fly. The clavicles or collar-bones, also, are generally united to form the fourchette (*furcula*) or merry-thought bone, serving, along with two bones called the coracoid bones, to keep the shoulders separated, and to resist the compressing tendency of the action of the wings. The bones of the wing itself are regarded



Skeleton of Golden Eagle.

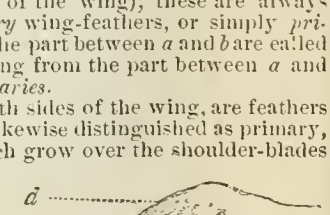
a, cranium; *b*, upper mandible; *c*, lower mandible; *d*, *d*, vertebræ; *e*, *e*, ribs; *fgh*, sternum; *i*, coracoid bone; *jj*, furculla; *k*, scapula; *ll*, humeral bone; *mm*, ulnæ; *nn*, radius; *o*, metacarpal bones; *p*, *q*, united sacrum and pelvis; *r*, ischium; *s*, ilium; *tt*, thigh-bone; *uu*, tibia; *v*, ankle-joint; *ww*, tarsus; 1, first or hind toe; 2, second or inner toe; 3, third or middle toe; 4, fourth or outer toe.



Skeleton of Bird's Wing.

as corresponding to those of the anterior extremities in man and quadrupeds; the bones of the hand, however, being much disguised, and some of them wanting or rudimentary. In the accompanying cut of the bones of a bird's wing, *a*, is regarded as the elbow-joint, *b* as the wrist-joint, *c* as the knuckle-joint, *d* being the representative of a finger, *e* and *f* the rudimentary representatives of two others, whilst the *winglet*, *g*, formerly regarded as representing the thumb, is now rather supposed to be homologous to the forefinger. The wings, therefore, exhibit a structure entirely different from those of bats, in which the fingers are extremely elongated. The surface necessary for striking the air is provided by feathers larger and stronger than those of other parts of the body, called *wing-feathers*, *quill-feathers*, or *quills*. Of these, which exhibit an admirable combination of strength with lightness and elasticity, some spring from the part of the wing between *b* and *d* (in the figure of the bones of the wing); these are always largest, and are called the *primary* wing-feathers, or simply *primaries*; those which spring from the part between *a* and *b* are called *secondaries*; and those which spring from the part between *a* and the shoulder-joint, are called *tertiaries*.

At the base of the quills, on both sides of the wing, are feathers called *wing-coverts*, and these are likewise distinguished as primary, secondary, &c. The feathers which grow over the shoulder-blades are called *scapulars*. The feathers of the wings vary in length and strength, according to the mode of life and power of flight in different B.; narrow, sharp, and stiff wings being indicative of swift and enduring flight. The tail-feathers serve the purpose of a rudder to guide the bird, and also that of balancing it in the air; they resemble in character the quills of the wings. They are also furnished with *coverts* above and below. Some B. have the tail rounded at the extremity; in some, it is square; in others, notched or forked. In many land B., the tail exhibits ornamental plumes, and remarkable developments of the plumage take place also in other parts of the body, in the form of crests, ruffs, shoulder-tufts, &c.



Bird's Wing, showing Quills.

a, primaries; *b*, secondaries; *c*, tertiaries; *d*, winglet.

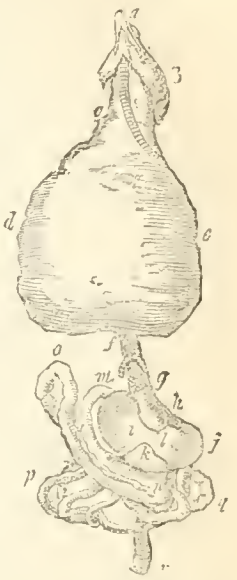
The legs of B. consist of parts corresponding to those found in

man and quadrupeds; but the thigh is short, and so concealed within the body, that it is not apparent as an external portion of the limb; the next division, often mistaken for the thigh, being the leg strictly so called, or *tibia*, which ends at what is really the heel-joint, although popularly regarded as the knee; and beneath this is the shank, or *tarsus*, which in some B. is very long, serving as a part not of the foot but of the leg, and formed by a single bone which represents both the tarsus and metatarsus. The feet are divided into toes, which are generally four in number, three before and one behind, differing from each other in length and in the number of joints or phalanges of which they are composed, the toe, which is directed backward, being in general comparatively short, and consisting only of two joints. A fifth toe or tarsal spur is found in some of the gallinaceous B.; and in some B., as Bustards, the hind-toe is wanting; the ostrich has only two toes, both directed forward, with the obscure rudiment of a third; and numerous B. classed together in the order of Climbers (q. v.) or Yoke-footed B., including Parrots, Cuckoos, Woodpeckers, &c., have two toes before, opposed by two toes behind, the foot being thus particularly adapted for grasping, so that parrots, as is well known, even use it as a hand.—The feet of B. vary considerably according to their mode of life; and naturalists therefore depend very much upon them in classification. In some the claws are strong and hooked; in others short, straight, and weak; in some the toes are all separate, in others more or less connected; in B. specially adapted for swimming, they are generally *webbed* or united by a membrane; in other swimming-B., however, a membrane only extends along the sides of each toe. In most B. the tarsus is feathered to the heel-joint; in some, however, and particularly in *waders*, the lower part of it is bare; the shank and toes are generally, although not always, destitute of feathers, and are covered with a scaly skin. Almost the only other parts of a bird often destitute of feathers, are the *cere* at the base of the bill, and the combs and wattles of gallinaceous birds.

In order to flight, it is indispensable that the center of gravity of a bird should be under the shoulders; and when a bird stands, the feet are brought forward, and the head thrown back, so that the claws project beyond a verticle line passing through the center of gravity of the whole body. This is generally accomplished so that the trunk is in an almost horizontal position, the fore-part only a little elevated; but in some B., which have a short neck and short legs, an erect attitude is necessarily assumed, so that the penguins of the southern seas present to navigators a somewhat ludicrous resemblance to regiments of soldiers on the beach. B., when they sleep, very generally place their head under their wing, and some of them also stand upon one foot, their equilibrium being thus more easily maintained. A remarkable contrivance, particularly to be observed in storks and other long-legged B., renders this posture unfatiguing; a locking of the bone of one part of the limb into a sort of socket in the bone of the part above it, so that it retains its place without muscular exertion; whilst a similar purpose is served by the tendons of the muscles which bend the claws passing over the joints of the leg in such a manner as to be stretched by the mere pressure there when the weight of the bird rests upon the legs, so that without any effort the claws retain a firm hold of the branch upon which it is perched.—Flying is accomplished by the action of the wings upon the elastic and resisting air; the muscles by which the stroke of the wing is given are powerful, those by which it is retracted are comparatively weak. Owing to the manner in which the first strokes of the wing must be given, few B. rise with facility from a level surface; and some of them, as swallows, and particularly swifts, rise from a perfectly level surface with great difficulty, and comparatively seldom alight where they cannot find an elevation from which, as it were, to throw themselves.

The digestive apparatus of B. resembles that of mammalia; exhibiting, however, various modifications according to the different kinds of food—some B. feeding on flesh, others on fish, others exclusively on insects, others on seeds, others more indiscriminately on a variety of animal and vegetable substances. Few B. masticate their food in any degree, although parrots do; upon being swallowed, it enters the *crop* or *craw*, sometimes called the first stomach, an enlargement of the œsophagus or gullet, situated just before the breast-bone, and here it is moistened by a secretion, which is also by some B.—particularly by pigeons—employed as the first food for their young, the glands of the crop enlarging very much, so as to produce it in large quantity at the time when it is wanted for that purpose. The crop is wanting in the ostrich, and also generally in B. that feed on fish; and is of greatest size in those of which the food consists of seeds or grain. It is generally single, and on one side of the gullet, sometimes, as in pigeons, it is double. A second stomach, or dilatation of the œsophagus, called the *proventriculus*, or *ventriculus succenturiatus*, is generally largest in those B. in which the crop is wanting or small; and in this the food is further softened and changed by a secretion which is mixed with it. The third and principal stomach is the *gizzard*, which in B. of prey, fish-eating B., &c., is a mere membranous sac; but in B. which feed on grain or seeds is very thick and muscular, so that it acts as a sort of mill, and with extraordinary power.

In these B., also, a remarkable provision is made for the perfect grinding down of the contents of the gizzard, by the instinct which leads them to swallow small rough pebbles or grains of sand, an instinct well exemplified in the common domestic fowl. —The liver of B. is, in general very large. The kidneys are large, but there is no urinary bladder, and the urine is at once poured into the *cloaca*, an enlargement of the intestine, at its termination, with which also the organs of generation communicate in both sexes. We are again indebted to M'Gillivray's excellent work for the following cut.



Digestive Organs of Domestic Pigeon:
a, bill; *b*, head; *c*, œsophagus; *de*, crop of extreme size; *f*, continuation of œsophagus; *g*, proventriculus; *hijkl*, gizzard; *h*, upper muscle; *i, j*, lateral muscles; *k*, lower muscle; *l*, tendon; *mnopqr*, intestine; *s*, trachea.

The respiration of B. is very perfect, and their blood is from 12° to 16° warmer than that of mammalia; its circulation more rapid, and the energy of all the vital processes proportionally great. B., consequently, exhibit great liveliness; and upon the admirable provision for the aëration of their blood they depend also for their powers of flight, which enable some of them to travel hundreds of miles with great rapidity and without exhaustion, whilst others soar to a prodigious height in the air. The heart resembles that of the mammalia in its form and structure; but the right ventricle, instead of a mere membranous valve, is furnished with a strong muscle, to impel the blood with greater force into the lungs. The lungs are small, and communicate with large air-cells (q. v.) in the cavities of the body, and even in the bones, so that the aëration of the blood takes place not only in the lungs but during its circulation through the body. An extraordinary proof of the use of these air-cells in respiration was afforded in a recorded instance of a large sea-fowl, which, when an attempt was made to strangle it, was kept alive by the air entering in a forcible current through a broken wing-bone. (Gosse, *The Ocean*, quoting Bennett's *Whaling Voyage*.) B. consume much more oxygen in proportion to their size than quadrupeds.

The organs of these senses are similar to those of mammalia. In the senses of touch and taste, it is generally supposed that there is an inferior development, although parrots appear to possess the sense of taste in considerable perfection; and the bills of some B., which search among the mud for their food, are certainly very delicate organs of touch. But the sight is remarkably keen, and the eye possesses great powers of accommodation to different distances. B. perceive even small objects distinctly, at distances at which they would be quite indistinguishable to the human eye, and thus are enabled to seek their food. B. of prey also appear to possess in great perfection the sense of smell. The nostrils of all B. open on the upper surface of the bill. Hearing is acute in B., and particularly in nocturnal B., although the organs of this sense are less complicated than in mammalia, and there is seldom any vestige of an external ear. Singing-B. are extremely sensitive to differences of pitch. The voice and musical powers depend upon the conformation of the windpipe and syrynx, which differs very much in different birds.

Reproduction takes place by eggs (see REPRODUCTION and EGG), which are hatched after they have passed from the body of the mother. B. generally sit upon their eggs, their bodies supplying the warmth necessary to hatch them (see INCUBATION); and this office is usually undertaken by the female alone, but sometimes is shared by the male. In very warm climates, the ostrich leaves her eggs to be hatched by the heat of the sun, but in colder climates sits upon them. A very few B., as the cuckoo, deposit their eggs in the nests of other B., to be hatched by them. Some B. construct no nest, but lay their eggs on the bare rock, as many sea-fowl do, or in holes rudely scratched in the earth or sand; many, however, show in the construction of their nests the most admirable instincts. See NESTS. The number of eggs varies, in a state of nature, from one to about twenty, being generally smallest in the larger B., and particularly in B. of prey. B. generally breed only once a year, but some B. twice. The care which B. take of their young is as admirable as the ingenuity which they display in nest-building, and more universal. Some B. are able to run about, and pick up food as soon as they leave the shell; others remain in the nest for days, or even weeks, and must be supplied with food by their parents. Many species are social, particularly

at the breeding-season, and form large settlements, which they guard in common; and some even unite in the construction of large nests, which belong to a whole community. The rapacious B. and particularly the larger ones, are very solitary in their manner of life.

B. change their feathers (*moult*), in general, once a year, and the colors of the plumage in many cases vary much in summer and winter. The change of color, however, often takes place without change of feathers, and in B. which moult both in spring and autumn, the autumn moulting is much more complete than that of spring. The gayest plumage of many B. is assumed at the breeding-season, with which, also, the song of B. is connected. See SONG OF BIRDS. The plumage of the male is, in general, more gay than that of the female, all the young at first resembling the female in plumage. The plumage usually characteristic of the male is occasionally assumed by the female, and most frequently by females which have become unfit for the ordinary functions of their sex.

The brain in B. differs in some important respects from that of mammalia (see BRAIN), presenting resemblances to the brain of reptiles and fishes; but it is of large size, often larger than even in quadrupeds. The manifestation of intelligence is not, however, usually so great in B. as in quadrupeds. Their nest-building, their migrations (see BIRDS OF PASSAGE), and many other things of greatest interest, must be ascribed to instinct.

In the geographical distribution of B., the limits of species are not so exactly circumscribed by mountains, seas, and rivers, as in other classes of animals, their powers of flight enabling them to pass over these obstacles. Yet some species, and even groups, are found exclusively in certain regions: thus humming-birds are all American, penguins are found only in the southern seas, and B. of paradise are confined to New Guinea and the neigboring islands. See SPECIES.

The free movements of B. through seemingly boundless space, the joyous song of many, and the characteristic tones of all—their brilliant colors, their lively manners, and their wonderful instincts—have from the earliest ages made a strong impression on men's minds, and in the infancy of intellect gave rise to many peculiar and mysterious associations with this class of creatures. Hence the flight of B. was made the foundation of a particular art of divination. See AUGURIES AND AUSPICES. Religion borrowed many of its symbols from them, and poetry many of its ornaments.

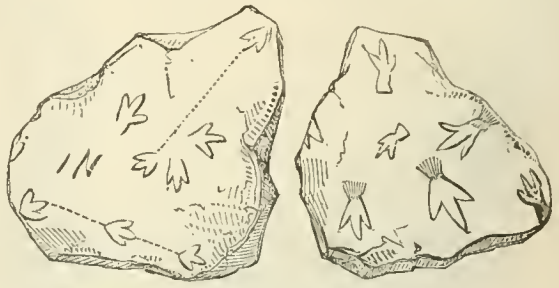
In an economical point of view, B. are very important. The flesh and eggs of almost all B. may be eaten, although those of B. of prey and of fish-eating B. are generally reckoned unpleasant. Their feathers are employed for various purposes of use and ornament; their dung is valuable for manure, and guano (q. v.) is nothing else than the accumulated dung of sea-fowls. Many B. are extremely useful in preventing the multiplication of insects and worms, and compensate in this way for the mischief which they occasionally do in fields and gardens. Domestic poultry are a source of considerable profit, upon account of their eggs, flesh, and feathers. See POULTRY. Some kinds of B. of prey have been tamed, and trained to the use of the sportsman. See FALCONRY.

About 5000 existing species of B. are known. As to their systematic arrangement, see ORNITHOLOGY.

The order of B. presents in the Dodo (q. v.) a remarkable and well-ascertained instance of the recent extinction of a species, and even of a genus. It is also a remarkable and interesting fact, that the greater part of the remains of extinct B. hitherto discovered are those of land-B. destitute of the power of flight, like the dodo, and the still existing ostrich, cassowary, emu, and apteryx. A particular interest is attached to those of the gigantic *Dinornis* (q. v.) of New Zealand. See next article.

BIRDS, FOSSIL. While the animal and vegetable kingdoms of the palæontologist extend to as wide, or rather a wider, range than those of the historian of modern life, yet several divisions are scantily represented in the petrified remains preserved in the stony records of the earth's crust. This was to be expected from the conditions under which these fossiliferous strata were deposited. As these rocks are aqueous, chiefly marine, the relics of plants and animals whose natural habitats were in or near the water, must be common in a fossil state, whilst the remains of others with different habits will be comparatively rare, if present at all. Birds belong to this latter class. Their power of flight would save them from numerous casualities which would prove fatal to quadrupeds; and even if they did perish in water, the lightness of their bodies, produced by their internal cavities and the quantity of their feathers, would keep them floating until they decomposed, or became the food of predaceous animals.

The earliest traces of birds consist of footprints on red argillaceous sandstones in the valley of Connecticut river, North America. These sandstones, though long considered of a much older date, have been, on the best evidence, referred by the brothers Rogers to the oolitic period. The beds had formed an ancient sea-beach, and over it, during the recession of the tide, had marched the animals, which have left on them their footsteps. Before the return of the tide, the inequalities had been filled up with dry air-drifted sand and mud, and on this was deposited a new layer of silt. The beds often exhibit ripple-marks, and occasionally small circular depressions, which have been formed by drops of rain. The traces of thirty-three species of B. have been distinguished; with



Footprints of Birds.

them are associated the impressions of various lizards, chelonians, and batrachians. The size of the Ornithichnites (Gr. *ornis*, a bird, and *ichnos*, a trace or footprint), as the bird-tracks are called, so far exeed those that would be made by the largest living birds, that it was doubted whether their origin had been satisfactorily explained, until the discovery, in New Zealand, of the remains of the *Dinornis*. In one species, the imprint of the foot measures fifteen inches in length, and ten inches in breadth, excluding the hind claw, which is two inches long. The distance of the impressions from each other varies from four to six feet. These measurements indicate a bird about four times the size of an ostrich, but probably not much larger than some species of *Dinornis*. The footprints are for the most part trifid, and show the same number of joints as exist in the living tridactylous birds.

No indications of the existence of birds have been discovered on the rocks of the cretaceous period. It does not follow, however, that the class of *Aves* had no representatives during the ages when the chalk was being deposited. This is a deep-sea formation, and for the reasons already stated, it is not to be expected that the remains of this class should be found in these measures. And so also it would be rash to conclude, that the oolitic footprints give the date of the first appearance of B. on the globe. The bone of *Cimiliornis Diomedeus*, found in the chalk, which was described by Professor Owen as part of the humerus of a bird, is now believed to belong to a Pterodactyle.

No true fossil remains of B. have been discovered in rocks older than the Eocene-gypseous deposits of Montmartre, where ten species have been found. Seven species have been described from strata of the Miocene period, the most important of which have been found in the Sewalik beds, associated with the remains of huge proboscidea. But the Pleistocene deposits have supplied more than half of the known fossil birds. The most remarkable of these are the bones of huge struthious B. of the genera Dinornis (q. v.), Palapteryx (q. v.), and Aptornis; and the Æpyornis, from Madagascar. The recently classified toothed-birds of America are called by Marsh, Odontornithes (q. v.).

BIRD'S-EYE LIMESTONE is a division of the Trenton group of the Lower Silurians of North America, apparently equivalent to the Llandeilo flags, and containing, besides the remains of brachiopods, many enormous orthoceratites.

BIRD'S-EYE VIEW, is a term applied generally to modes of perspective to which the eye is supposed to look down upon the objects from a considerable height. If the eye is considered as looking perpendicularly down while it sweeps over each point of the scene in succession, we have an exact ground-plan; no object covers another, horizontal angles and distances are exactly represented; while, on the other hand, no vertical angles or side-views appear. In sketching or drawing a locality for military or economical purposes, this kind of perspective is always used. The great difficulty is to represent at the same time the relative heights of mountains and steepness of acclivities. But the more usual kind of bird's-eye views differ from common perspective only in the horizontal line being placed considerably above the picture. In the 16th c., the only kind of views known were of the nature of ground-plans, and the artists of the 17th c. tried to combine this method with side views.

BIRD'S FOOT (*Ornithopus*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, deriving both its popular and botanical name from the resemblance of the curved pods to bird's claws; the leaves are pinnate, with a terminal leaflet. One Species (*O. perpusillus*) is a native of Britain, growing on dry, sandy, or gravelly soils—a small plant of little importance.

the flowers of which are white, striated with red. But *O. sativus*, an annual growing to the height of two or three feet, a native of Portugal, is cultivated in that country as green food for cattle, and is very succulent and nutritious. Like its British congener, it grows well on very poor soils. Its Portuguese name is Serradilla.

BIRD'S FOOT TRE'FOIL (*Lotus*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*. The pods are cylindrical, somewhat spongy within and imperfectly divided into many cells. The name B. F. T. is derived from the resemblance of the clusters of pods to a bird's foot. It has received the name *Lotus* from botanists, because a species of this genus is supposed to have been one of the plants so named by the Greeks. See LOTUS. The species, which are pretty numerous, are natives of the temperate and colder regions of the old world. The COMMON B. F. T. (*L corniculatus*) is very abundant everywhere in Britain in pastures. It has a stem 6–12 inches in length, decumbent, and bearing umbellate heads of 8–10 yellow flowers, which have a rich honey-like smell. The leaves have three obovate leaflets, like those of the true Trefoils or Clovers, but at the base of each leaf-stalk there are also two large leaf-like ovate stipules. The plant is by some regarded as the shamrock (q. v.) of Ireland. It is eaten with great avidity by cattle, and its deeply penetrating roots adapt it well for very dry situations.—A larger species, otherwise very similar, by many regarded as merely a more luxuriant variety of this, with stem nearly erect, more compact heads of smaller flowers, and much smaller seeds, is the GREATER or NARROW-LEAVED B. F. T. (*L. major*), which also is a common native of Britain, generally found in moist, bushy places. The characteristic differences remain under cultivation in every variety of soil and situation.—A species called the Winged Pea (*L. tetragonolobus*), remarkable for four membranous wings which run along its pods, a native of the south of Europe, is frequently cultivated in gardens in Britain amongst other annual flowers; but in some parts of Europe it is cultivated for its seeds, which are used as a substitute for coffee.

Bird's Foot Trefoil (*Lotus corniculatus*).
a, a stem with leaves, flowers, and pods; *b*, calyx; *c*, standard of flower; *d*, keel of flower; *e*, style; *fg*, stamens.

BIRDS OF PASSAGE are those birds which spend one part of the year in one country or climate and another part in another, migrating according to the season. No species of bird is known to hybernate (see HIBERNATION); and although many naturalists were at one time inclined to believe in the hybernation of swallows, this opinion has been entirely relinquished, and their annual migrations are fully ascertained. Birds avail themselves of their powers of wing to seek situations adapted for them in respect of temperature and supply of food, and even within the tropics there are birds which migrate as the seasons change from wet to dry, or from dry to wet. See BIRD OF PARADISE. The migration of birds, however, is more generally from north to south, or from south to north, in the temperate and colder regions of the globe, as winter passes into summer, or summer into winter; and B. of P. are commonly distinguished into Summer B. of P. and Winter B. of P., as they are summer or winter visitants; but, of course, those which are Summer B. of P. in one country are Winter B. of P. in another. They breed in the country in which they are Summer B. of P. The arrival of Summer B. of P. is always among the welcome signs of advancing spring, and is associated with all that is cheerful and delightful. In winter, flocks of swans, geese, and other waterfowl seek the British coasts and inland lakes and marshes from the frozen north; and at the same time, woodcocks, fieldfares, redwings, and many other birds which breed in more northern regions, regularly appear. Some birds come almost at the same date annually; others are more influenced by the character of the season, as mild or severe. Many sea-fowl are migratory, and the inhabitants of St. Kilda and other isles, to whom they are of the greatest importance, depend with confidence upon their return almost at a particular day. The migrations of pigeons in North America are extraordinary, from the vast numbers of which the migrating flocks consist. See PIGEON. The whole subject of the migration of birds is one of great interest, particularly in reference to the instinct by which they appear to be guided. Birds of migratory species, which have been reared in confinement, become restless when the season for migration arrives, and in many species the migration seems to be little influenced by the state of the weather. It would seem that the youngest swallows are left behind, to follow the first migrating hosts of their species. The number of B. of P. is very considerable, nor are they all or mostly birds of long wing and powerful flight, but many short-winged birds are included among them. Some B. of P., as woodcocks, have, however, been found in a very exhausted state after their arrival; and it is to be considered that, both in the old and new world, distant migrations are possible without long flights. Some birds possess such powers of wing, that they may easily pass over wide seas; and the rapidity of the flight of birds—from 50 to 150 miles an hour—partly explains the possibility of their migrations between distant parts of the world. It is believed that B. of P. habitually return to the same localities which they have inhabited in former years, and this seems to have been sufficiently established by proof, at least in regard to swallows.

BIRDS OF PREY, a common English appellation of the order of birds called *Accipitres* (q. v.) by Linnæus. Some birds, however, which do not belong to this order, frequently pursue and prey upon other birds. If those which make fishes, insects and worms their food, were also reckoned, great part of the whole class of birds must be considered predaceous. B. of P. are very commonly divided into two sections.—*Diurnal* and *Nocturnal;* the latter consisting exclusively of owls.

BIRIOU''TCHÉ, or BIRIU''TCH, a town in the government of Voronej, Russia, on the left bank of the Sosna, a tributary of the Don. It is surrounded with earthen ramparts and a ditch, and has four annual fairs. Pop. (1880) 3500. A stream of the same name in its immediate vicinity is noted for its pearl-oysters; and the teeth of elephants are often found exposed on its banks.

BIRKBECK, GEORGE, M.D., distinguished for the leading part he took in founding mechanics' institutions, and in the education of the working-classes, was born at Settle, in Yorkshire, January 10, 1776. He commenced his medical studies at Leeds, and pursued them at Edinburgh, where he made the acquaintance, among others, of Sydney Smith, Brougham, Jeffrey, and Horner. Appointed to the chair of the Andersonian Institution in Glasgow, he delivered his first course of lectures on Natural and Experimental Philosophy in the winter of 1799. He took a leading part, along with Brougham and others, in the formation of the London Mechanics' Institution—the first of its kind in the kingdom—and was chosen its president for life. He died in London, December 1, 1841.

BI'RKENHEAD, a market-town, sea-port, and parliamentary borough in the parish of Bidston, and hundred and union of Wirral, Cheshire, lies opposite Liverpool, on the left bank of the Mersey. The parliamentary borough, which was constituted in 1861, when one of the seats rendered vacant by the disfranchisement of Sudbury and St. Albans was assigned to it, includes, besides the chapelry of B., the townships of Claughton, Oxton, Tranmere, and part of Higher Bebington. Pop. of the parliamentary borough (1871) 65,971; (1881) 83,324. B. has within the last few years risen from comparative obscurity to its present important position. No later than 1818, only a few straggling houses existed, and the population numbered 50. In 1821 it amounted only to 236. The principal streets of B. are laid out with great regularity, crossing each other at right angles, and about 20 yards wide; but the back streets are narrow and the houses mean. Hamilton Square, a quad. rangle of about 8 acres, is scarcely excelled by any buildings in the United Kingdom. The park is a splendid feature of B., consisting, as it does, of 190 acres.

B. is so situated as to have communication with the entire railway system of the country. A railway bridge over the Mersey at Runcorn was opened for traffic in 1869, which shortened by ten miles the distance between the Liverpool and Birkenhead docks. It is to these docks chiefly that B. owes its rapid development and prosperity. The original idea is due to the late Mr. Laird, who in 1824 purchased, at a very low price, a large piece of ground on the borders of the Wallasey Pool, on which he meant to start a ship-building yard. Discovering the capabilities of the site, he began to project plans for extensive docks; and the corporation of Liverpool, dreading the rivalry, purchased the Pool and the lands about it; and in 1847, two docks, the Morpeth and the Egerton, were opened by Lord Morpeth, the chief commissioner of woods and forests. Other docks, and a great floating harbor, were subsequently added, and now they have a reputation wide as the world, as splendid specimens of engineering skill.

B. has for some years been celebrated for its ship-building yards, some of the largest iron ships afloat having been built there by extensive firms. The too historical *Alabama* was built by the

Messrs. Laird, to whose enterprise, more than that of any other company, the town owes its present eminence. In the neighborhood of the docks are the Canada Works for the construction of gigantic bridges, the Britannia Machinery Works, and others.

B. owes its origin to a Benedictine Priory founded there in the 12th c., of which some remains still exist. Edward II. granted the entire monopoly of the ferries to its monks. The remains of the monastery are still in a tolerable state of preservation, exhibiting some fine specimens of the English architecture of the period of its foundation.

BI'RMAH. See BURMAH.

BI'RMINGHAM, the chief town in Britain for metallic manufactures, and supplying much of the world with hardwares, stands near the center of England, in the north-west of Warwickshire, with suburbs extending into Staffordshire and Worcestershire, 112 miles north-west of London. Built on the east slope of three undulating hills, on the Rea and the Tame, on a gravelly foundation overlying clay and new red sandstone, and supplied with plenty of water, it is one of the best drained towns in England, while the means which have been adopted for the prevention of smoke-contamination of the atmosphere are so far effectual that the air is unusually clear and salubrious. The older part of B. is crowded with workshops and warehouses; but the modern is well built, and possesses some architectural beauty. Among the finer buildings are the Post-office, the Corporation Buildings, the Town Hall, the Exchange, the Rooms of the Royal Society of Artists. B. began very early to be the seat of iron manufactures, from its vicinity to a forest and extensive iron mines; but its industry and trade were long small. Its high commercial importance dates from the 17th century, when the restoration of Charles II. brought from France a fashionable rage for metal ornaments, and B. supplied the demand with unexampled vigor.

From being the 'toyshop of Europe' of Burke's time, B. now constructs steam-engines, hydraulic-presses, and Crystal Palaces; and its hardwares are unequalled in the world for quantity, variety, and value. Pop. (1690) 4000; (1801) 60,822; (1851) 232,-841; (1871) 343,787; (1881) 408,004. B. returns three members to parliament. It produces upwards of £5,000,000 worth of goods yearly, chiefly articles made of gold, silver, iron, brass, steel, mixed metal, plated metal, glass, papier-maché, japanned and electrotyped articles; including firearms, ammunition, swords, metal ornaments, toys, jewelry, buttons, buckles, lamps, pins, steel-pens, tools, locks, bedsteads, saddlery, steam-engines, and all sorts of machinery. In B. 1000 ounces of gold are made into chains weekly; at least 70 ounces of gold-leaf are used weekly; 30,000 gold rings are made yearly; 150,000 ounces of silver are used yearly; a billion of steel-pens are made yearly, more than 500 tons of steel being used; above 80,000 copper coins are struck daily; 20,000,000 nails are made weekly at one work; 5,000,000 fire-arms were made between 1804—1818; and during the Crimean war the government were supplied with 3000 muskets weekly. The button manufacture of B. is very large. The steam-engines in B. are estimated as equal to 10,000 horse-power, and consume 600 tons of coal daily. In B. about 20,000 families are engaged in trade, manufactures, and handicraft. B. has more than 170 places of worship, about 60 of the Establishment; a grammar-school; a Queen's College; the admirably equipped Science College, founded by Sir Josiah Mason in 1880, occupying a handsome building in the heart of B.; a literary and scientific institute (the Midland Institute); a free library with branches; a Roman Catholic college and cathedral; a botanic garden; an art gallery; and four public parks. It is famed for its charitable institutions, and in B. was originated the system of annual collections for local charities. The town-hall can hold 6000 persons, and has a magnificent organ, and a musical festival is held in it once every three years. Of the many ways of spelling the name of this city, the oldest is that given in *Doomsday Book*—namely, Bermingeham. This was corrupted into Brummagem, a name which has become synonymous with worthless wares with a glittering outside. B. took the Parliament side in 1643, supplying swords, and using them well against Prince Rupert and his lancers. In 1791, a B. mob denounced the distinguished Dr. Priestley as an atheist and Jacobin, destroyed his house, library, and apparatus, besides much other property; a statue has recently been erected to his memory. Near Handsworth, a little to the south of B., were the famous Soho Works, founded by Watt and Boulton, where steam-engines were first made. Handsworth church has a statue of Watt by Chantrey, and a bust of Boulton by Flaxman. Willmore and Pye, the engravers, and David Cox, the landscape painter, were B. men. Thomas Attwood originated the Political Union here, which greatly hastened the passing of the Reform Act of 1832, and the enfranchisement of Birmingham.

BI'RNAM, a hill 1580 feet high, in the east of Perthshire, near Dunkeld, 12 miles north-west of Perth, and 12 miles west-north-west of Dunsinnan hill, one of he Sidlaws. It commands a fine view of the valley of the Tay. It was formerly covered by part of an ancient royal forest. Shakspeare has immortalized B. wood in his tragedy of *Macbeth*.

BI'RNEE, Old and New, the name of two towns of Bornu, central Africa. Old B., which was formerly the chief city of the empire, walled and of vast extent, is situated on the banks of the Yeu, about 70 miles north-west of the modern capital Kuka, or Kukawa, and about 75 miles west of Lake Tsad, in lat. 13° N., and long. 13° 15′ E. It is now greatly deserted and decayed, but it has still a population estimated at 10,000, and considerable markets. New B. is about 20 miles south of Kuka, is walled, and has a large mud palace. Pop. about the same as that of Old Birnee.

BI'RON, or BI'REN, Ernest John de, Duke of Courland, born 1687, was the son of a landed proprietor in Courland, of the name of Bühren. He studied at Königsberg, and in 1714 visited St. Petersburg, where his handsome person and cultivated mind soon gained him the favor of Anna Ivanovna, niece of Peter the Great. When Anna ascended the throne of Russia in 1730, Biron repaired to court, and was loaded with honor. He assumed the name and arms of the French dukes De Biron, and soon swayed all Russia through his royal mistress. Proud and despotic by nature, he hated every one who stood in the way of his ambition. The princes Dolgorucki and their friends were his first victims. More than a thousand persons were executed by his orders, and a still greater number sent into banishment. The empress is said to have often thrown herself at his feet to induce him to relent, but her prayers and tears were of no avail. Is is, however, undeniable, that by the strength of his character he introduced vigor and power into every branch of the public administration throughout Russia. In the year 1722, he married a Courland lady, and in 1737, the Courlanders were compelled to choose him as their ducal ruler. By his desire the empress, on her death-bed, appointed him guardian and regent during the minority of her presumptive heir, Prince Ivan. On the death of the empress (28th October 1740), Biron assumed the regency, and acted with great prudence and moderation. A secret conspiracy was, however, soon formed against him, and on the night of the 19th November he was arrested, by the orders of Field-marshal Münnich, and conveyed to the fortress of Schlüsselburg, where he was tried and sentenced to death. His sentence was afterwards commuted to imprisonment for life, and confiscation of his property. He was now, along with his family, conveyed to Pelim, in Siberia. When, in the following year, Elizabeth ascended the throne of Russia, B. was recalled, and Münnich sent to occupy his prison in Siberia. The sledges met at Kasan; the two enemies looked at each other, but continued their journeys without exchanging a word. During the remainder of Elizabeth's reign, B. continued to reside with his family at Jaroslaw. The Empress Catharine II. restored to him the Duchy of Courland, and he died 28th September 1772.

BIRR. See Parsonstown.

BIRS, a small but famous affluent of the Rhine. It rises in the canton of Bern, Switzerland, near the pass of the Jura called Pierre Pertuis, flows in a north-easterly direction through the Münsterthal, and enters the Rhine near Basel. In a narrow gorge through which the stream breaks, at a little distance from that city, 500 confederate Swiss died heroically, on the 26th August 1444, in battle against the French army under the Dauphin Louis. On the same river, near the village of Dornbach, about a mile and a half south of Basel, 6000 confederate Swiss gained a splendid victory over 15,000 Austrians, under Fürstenberg, on the 22d of July 1499; in consequence of which, the Emperor Maximilian signed a peace at Basel on the 21st of September following.

BIRTH. The act of coming into life has an important legal bearing in regard to the evidence of its legitimacy or illegitimacy. These qualities are variously determined by the regulations of different systems of jurisprudence. The ancient Roman law, as well as the modern Prussian and French Codes, in particular, contain anxious provisions on the subject. In England, no precise time appears to be prescribed for fixing legitimacy or illegitimacy of birth. Forty weeks is considered, in practice, the more usual time for legitimate births; but a discretion to allow a longer time is exercised, when, in the opinion of medical men, or under the peculiar circumstances of the case, protracted gestation may be anticipated, or is likely to occur. In Scotland, the law is more distinct. There, in order to fix bastardy on a child, the husband's absence must continue till within six lunar months of the birth, and a child born after the tenth month is accounted a bastard. The fact of legitimacy or illegitimacy may be judicially determined by an Action of Declarator in the Court of Session, which concludes, according to the nature of the case, for the legitimacy or illegitimacy of the party whose birth is the subject of the legal inquiry. In England, legitimacy may be ascertained by proceedings in the Court for Divorce and Matrimonial Causes, under the 21 and 22 Vict. c. 93, called the 'Legitimacy Declaration Act, 1858;' but there the remedy is not so complete as that afforded by the Scotch

declarator, which may decree not only legitimacy, but also *illegitimacy*. See BASTARDY, HEIR, INHERITANCE.

BIRTH, CONCEALMENT OF, is an offence against the public economy, and punishable as a misdemeanor. By the 9 Geo. IV. c. 31, s. 14, it is enacted, that any woman endeavoring to conceal the birth of a child, shall be liable to be imprisoned, with or without hard labor, for any term not more than two years; and it shall not be necessary to prove whether the child died before, at, or after its birth. It is also provided, that if any woman tried for the murder of her child shall be acquitted thereof, it shall be lawful for the jury, so acquitting her, to find her guilty (if the case be so) of concealing the birth: upon which the court may pass the same sentence as if she had been committed upon an indictment for the concealment.

In Scotland, the law on this subject appears to be regulated by the 49 Geo. III. c. 14, by which it is enacted, that if a woman shall conceal her being with child during the whole period of her pregnancy, and shall not call for, or make use of help or assistance in the birth; and if the child shall be found dead, or be amissing, she shall be imprisoned for a period not exceeding two years. It has, however, been decided, that disclosure by the mother to the putative father is a sufficient defence. The punishment usually awarded for this offence in Scotland, is imprisonment from three to six, and in aggravated cases, from nine to eighteen months. See PREGNANCY, CONCEALMENT OF.

BIRTHRIGHT. See INHERITANCE, and PRIMOGENITURE.

BIRTHS, REGISTRATION OF, as also that of Burials and Marriages (see REGISTRATION), is regulated by 6 and 7 Will. IV. c. 86, amended by 7 Will. IV. and 1 Vict. c. 82, by which a general register-office for the whole of England is established. The registrar-general shall, under the act, furnish a sufficient number of strong iron-boxes to hold the register-books, and every such box shall be furnished with a lock and two keys, one of which shall be kept by the registrar, and the other by the superintendent registrar; and while the register-books are not in use, they are to be kept in the register-box, which shall always be left locked.

The form for general registration of births, comprises the time of birth, name, and sex of the child; the name, surname, maiden surname, and profession of the parents; the signature, description, and residence of the informant (who must be the father or mother, or in case of their inability, the occupier of the house, s. 20); the date of registration and signature of the registrar; and also the child's baptismal name (if any be given after registration, within six months). Searches may be made, and certified copies obtained, at the general registrar-office, or at the office of the superintendent-registrar of the district, or from the clergyman, or registrar, or any other person who shall for the time being have the keeping of the register-books. By 3 and 4 Vict. c. 92, provision is made for depositing with the registrar-general a number of non-parochial registers and records of births, baptisms, deaths, burials, and marriages, which had been collected by a commission appointed for that purpose, and for rendering such registers and records available as evidence. For other regulations on the subject of this article, see 21 and 22 Vict. c. 25, and 31 and 32 Vict. c. 122.

The Scotch law relating to the registration of births commenced with 17 and 18 Vict. c. 80, by which a registrar-general, parochial registrars, and other officers are appointed with suitable machinery for carrying out the provisions of the act. It is the duty of the local registrar to ascertain and register all births within his parish or district, without fee or reward, save as provided by the act; but parents, or persons in charge of children after their birth, are required to give information of such births, and to sign the register; and after the expiration of three months following the day of birth, it shall not be lawful for the registrar to register the same, except as provided by the act. The act declares that the sheriff of the county shall have the care and superintendence of the parochial registrars; and, as in England, the registrar-general is directed to furnish strong iron-boxes to hold the registers and other documents, such box to have a lock and two keys, one of which shall be kept by the registrar, and the other by the sheriff. The 36th section contains the noticeable provision, that in the case of children legitimated by subsequent marriage of the parents, but who were originally registered as illegitimate, such registration shall be corrected by an entry of the marriage on the margin. The act contains other provisions, more or less corresponding to the enactments of the above English statutes, and has been amended by the acts 18 and 19 Vict. c. 29; 19 and 20 Vict. c. 96; and 23 and 24 Vict. c. 85.

BIRTHS, DEATHS, AND MARRIAGES. See VITAL STATISTICS.

BI'RTHWORT. See ARISTOLOCHIA.

BIRU', BEEROO', or BEROO', a kingdom of Sudan, Western Africa, in lat. 15°—16° N., long. 5° 30—7° 15 W. It is bounded on the N. by the Sahara, on the E. by the Niger, and has Bambarra on the S. Its western limits are not clearly defined. The capital town, Walet, is about 260 miles west-south-west from Timbuctu.

BIS, in Music, denotes that the passage over which it is placed is to be played twice, or repeated. Such passages generally have a slur or bow over them, and the word 'bis' written below it, thus

BISA'CCIA, a town of the Italian province of Avellino, situated on a hill about 30 miles east-north-east of Avellino, with a population of about 6000. Numerous ancient remains discovered here appear to fix B. as the site of the old *Romulea*, captured by the Romans in the third Samnite war.

BISACQUI'NO, or BUSACCHI'NO, a town of Sicily, about 27 miles south of Palermo, with a population of 9120, who carry on an extensive trade in grain and oil.

BI'SCAY, or VIZCAY'A, the most northerly of the Basque Provinces (q. v.), is bounded N. by the Bay of Biscay; E. and S. by its sister-provinces, Guipuzcoa and Alava; and W. by Santander. It has an area of about 1300 square miles, and a population of (1877) 189,954.

BI'SCAY, BAY OF, that portion of the Atlantic Ocean which sweeps in along the northern shores of the Spanish peninsula in an almost straight line from Cape Ortegal to St. Jean de Luz, at the western foot of the Pyrenees, and thence curves northward along the west shores of France to the island of Ouessant. Its extreme width is about 400 miles, and its length much about the same. The depth of water varies from 20 to 200 fathoms, being greatest along the north shores of Spain. The whole of the south coast is bold and rocky, in some places rising to a height of several hundred feet, and interspersed with short inlets, some of which form safe and commodious harbors. From the mouth of the Adour to the Gironde, the shore presents a totally different aspect, being low and sandy, with numerous lagoons, the embouchures of these two rivers forming the only harbors. For 200 miles north, the coast is still low, but marshy instead of sandy; and from the peninsula of Quiberon northward to Ouessant, it is moderately elevated and rocky in some places, with several good harbors. The rivers falling into the Bay of B. on the Spanish shores are unimportant, none of them having a course of more than 30 or 40 miles. On the coast of France, it receives, through the rivers Loire, Charente, Gironde, and Adour, the waters of half the surface of the whole country. Its chief ports are Gihon, Santander, Bilbao, San Sebastian, and Passages, in Spain; and Bayonne, Bordeaux, Rochefort, La Rochelle, and Nantes, in France. Its chief islands—which are all situated north of the Gironde—are Belleisle, Ré, and Oléron. Navigation is rendered difficult and dangerous by the prevalence of north-west winds (which drive in through the wide mouth of the bay large volumes of water from the Atlantic, to be again thrown back from the long regular line of coast towards the center, thus causing great commotion, and high, short, broken waves), and by the existence of a current—called Rennel's Current—which sweeps in from the ocean round the north coast of Spain, along the west and north-west coasts of France, then shooting across the British Channel, brushes the Scilly Isles, and after approaching the coast of Ireland, turns west and south, till it joins the north African current.

BISCE'GLIE, a seaport town of Italy, on the Adriatic, in the province of Bari, in the former kingdom of Naples, 21 miles north-west-by-west from Bari. It is built on a rocky promontory, defended by strong fortifications. The port admits only vessels of small burden. B. is a bishop's seat, and has a cathedral, besides two collegiate and several other churches, convents, a seminary, a hospital, &c. Rain-water is collected in public reservoirs, the water-supply being otherwise very insufficient. Pop. (1881) 21,675. Around the town are many fine villas and country-houses. The neighborhood produces good wine and has acquired particular celebrity for its currants, which are said to be equal to those of the Ionian Islands. During the Crusades, B. was famous for its hospital, founded by Bohemond, for pilgrims from the Holy Land, of which some ruins still exist.

BI'SCHOF, KARL GUSTAV, a distinguished chemist and geologist, was born at Nürnberg (1792), and became professor of chemistry in Bonn in 1822. Having obtained the prize of the Scientific Society of Holland for his treatise on Internal Terrestrial Heat he published in England, in connection with it, *Researches on the Internal Heat of the Globe* (Lond. 1841) which was followed by a number of papers on connected geological subjects. The results of his researches (1837—1840) on inflammable gases in coal-mines, and on safety-lamps, appeared in the *Edinburgh New Philosophical Journal* and other periodicals. His chief work is his *Manual of Chemical and Physical Geology*. He died at Bonn in 1870.

BI'SCHOFF, THEOD. LUDW. WILH., anatomist and physiologist, was born in Hanover, 1807, became professor of anatomy in Heidelberg in 1836. From Heidelberg he removed, in 1843, to

the university of Giessen, and in 1854, to that of Munich. He has devoted himself specially to embryology, to which he has made many contributions. His *Entwickelungsgeschichte des Kanincheneies* (Bruns. 1843) received the prize from the Berlin Academy. Of his numerous writings in Müller's *Archiv*, and published separately, may be singled out the *Beweis der von der Begattung unabhängigen periodischen Reifung und Loslösung der Eier der Säugethiere und der Menschen* (Giess. 1844), in which he establishes the important doctrine of the periodic ripening and detachment of the ova in mammalia and man, independently of generation. He demonstrated the impossibility of Spontaneous Combustion, and discussed the development, from the egg, of various animals. Other works are on the differences in the formation of the skull in the chimpanzee, gorilla, and orang-outang (1867); *Die Grosshirnwindungen des Menschen* (1868); and *Beiträge zur Anatomie des Hylobates-Leuciscus* (1870). B. was ennobled in 1871.

BI'SCHWEILER, a German town situated on the Moder, about 14 miles north of Strasburg. B. was formerly fortified, but was dismantled in 1706. It has manufactures of earthenware, coarse woolens, linens, and gloves, and a trade in beer, leather and the agricultural produce of the district. Pop. (1880) 6827.

BI'SCUIT, in Pottery, is the term applied to porcelain and other earthenware after the first firing, and before it has received the glaze and embellishments. See PORCELAIN and POTTERY. In this condition the ware is very porous, adheres to the tongue when placed upon it, and allows water very slowly to percolate through its pores. The unglazed bottles employed in cooling water are examples of Biscuit-*ware*.

BI'SCUIT, MEAT, a preparation of the substance of meat combined with a certain quantity of flour, made into the form of biscuits, by which process the nutritive qualities of the meat are preserved for any length of time. One way of preparing these biscuits is as follows: Large pieces of beef are placed in a quantity of water sufficient to cover them, and are subjected to slow ebullition. The fat being skimmed off, evaporation is allowed to take place, until the liquid is about the consistency of syrup, when it is mixed with fine wheaten flour, rolled out to the thickness of ordinary ship-biscuit, cut into any shape required, baked, and dried in the ordinary manner. One pound of biscuit usually contains the soluble part of 5 lbs. of meat, and half a pound of flour. The meat-biscuits can be eaten like ordinary biscuits; but boiled in about twenty times their own weight of water for half an hour, with the usual condiments, they make excellent soup, and for this they were chiefly intended. Meat-biscuits were first introduced into Britain from America by Mr. Borden, in the year 1851. They have been spoken highly of by medical men as food, and are still made to a limited extent; but one purpose they were at first intended to serve—that of preserving the animal food of South America and Australia—has since been more effectually done by other means. See PRESERVED PROVISIONS.

BI'SCUITS (Fr. twice-baked), small, flat bread, rendered dry and hard by baking, in order to their long preservation. They are divided into two classes—the *unfermented* and the *fermented*. *Unfermented* or *unleavened* B., generally known as common *sea-biscuits* or *ship-bread*, are made of wheaten-flour (retaining some of the bran) water, and common salt. The materials are kneaded together, either by manual labor—that is, by the hands and feet of the workmen—or by introducing the materials into a long trough or box, with a central shaft, to which a series of knives is attached, and which is made to revolve rapidly by machinery. The mass of dough so obtained is then kneaded and thinned out into a sheet the proper thickness of the B., by being passed and repassed between heavy rollers. This sheet being placed below a roller with knife-edge shapes, is readily cut into hexagonal (six-sided) or round pieces of dough of the required size of the biscuits. The indentation of the slabs of dough, in the case of the hexagonal B., is not complete, so that all the B. cut out of each slab remain slightly adhering together. These slabs of B. are then introduced into an oven for about 15 minutes, and are placed in a warm room for 2 or 3 days, to become thoroughly dry. The more modern oven is open at both ends, and the B. being placed in a framework, are drawn by chains through the oven. So rapidly is this operation conducted, that about 2000 lbs. weight of B. are passed through one of these ovens every day of ten hours.

Captain's B. are prepared from wheaten-flour, water, with common salt, and butter, with an occasional small dose of yeast to cause partial fermentation. Milk is also sometimes employed. *Water or hard B.* are made of flour, water, with variable quantities of butter, eggs, spices, and sugar. *Soft B.* contain increased quantities of butter and sugar. *Yeast B.* are those the dough of which is mixed with a small quantity of yeast, yielding more porous biscuits. *Buttered B.* are made with much butter and a little yeast. Other varieties of B. are named in the following table, which gives the materials added to the sack of flour, 280 lbs. in weight:

	Water or Milk. quarts.	Butter. lbs.	Sugar. lbs.	Flavoring. Caraway seeds in ounces.	Eggs.
Captains'	10	15			
Abernethy	8¾	17½	17½	17½	
Machine	5¾	58	14		
American	10	40			
Jamaica	8¾	17½	17½		
Coffee	8¾	17½			140

Great care must be taken in the manipulative part of the process to incorporate the ingredients in a systematic manner. Thus, the butter is mixed with the flour in a dry condition, and then the water or milk added; and when eggs are used, they are thoroughly beaten up with water, and the sugar (if the latter is required) and the egg-paste added to the dough, which has been previously prepared with butter, or without butter. The various kinds of B. in the preparation of which yeast is employed, present a more spongy aspect than the unyeasted biscuits. Occasionally a little sesquicarbonate of ammonia (volatile salt) is added, to assist in raising the dough, and make a lighter biscuit. There are three principal varieties of the yeast or fermented B., and the following table gives the ingredients used in their manufacture from a sack of flour, or 280 lbs.:

	Water or Milk. galls.	Dried Yeast. lbs.	Butter. lbs.	Sugar. lbs.
Oliver	10½	4½	35	
Reading	..	4½ to 5	25 to 30	
Cheltenham	10½	..	..	5

Soft or *spiced* B. are prepared from flour, with much sugar, a great many eggs, some butter, and a small quantity of spices and essences. The eggs tend to give a nice yellow cream-color to the B., which is occasionally imitated by the admixture of a chromate of lead (*chrome yellow*); but this is dangerous, and has given rise to several cases of poisoning. Several of the soft or spiced B. are referred to in the following table, a sack, or 280 lbs., being the amount of flour employed in each instance:

	Eggs.	Sugar. lbs.	Butter. lbs.	Flavor.
Tunbridge Cakes,	930	140	23	Orange flower, Water-currants, Citrons and Caraways.
Shrewsbury	93	93	93	Volatile salt, Cinnamon, Nutmeg or Mace.
Ginger Wafers	600	112	112	Ginger.
Victoria	750	70	80	Essence of lemon.

The extent to which B. are now consumed may be learned from the fact, that several of the largest biscuit-manufactories each prepare and throw into market every week from 30,000 to 50,000 lbs. weight of B. of various kinds. One of the largest and most complete biscuit-manufactories in England is that of Carr at Carlisle, whose biscuits, sold in tin-boxes, are well known. Still more famous is that of Huntley and Palmer at Reading, employing over 3000 persons.

BISE'GLIÉ, a fortified town of Italy, in the province of Bari. It is built on a promontory in the Adriatic, about 21 miles west-north-west of Bari, the district around being studded with handsome villas and country-houses, and famous for its production of currants, which are considered equal to those of the Ionian Islands. The vine and olive are also cultivated in the neighborhood. B. has a cathedral, numerous churches, two monasteries, a hospital, an ecclesiastical college, &c., with the ruins of a hospital founded by Bohemond for pilgrims from the Holy Land, and celebrated during the Crusades. Pop. (1881) 21,765.

BI'SHOP, the title of the highest order of clergy in the Christian Church. The name is in the Saxon, *biscop*, and is from the Greek *episcopos*, an overseer. The Athenians used to send officers called *episcopoi* to their subject states. The word was adopted by the Romans; and Cicero speaks of himself as an *episcopus* in Campania; it was also applied by them to the officers who inspected the provision-markets. There are two theories as to the functions of a B. in the primitive church, which may be described as the Episcopalian and the Presbyterian theories.

According to the former, the first bishops in the Church of Christ were his apostles; 'for the office whereunto Matthias was chosen is termed (Acts i. 20) *episcope*—i. e., an episcopal office, which being spoken expressly of one, agreeth no less unto them all; and therefore St. Cyprian, speaking generally of them all, calls them *bishops*.' The form of government at first established by the apostles was, that the laity or people should be subject to a college of ecclesiastical persons appointed for that purpose in every city. These, in their writings, they term sometimes 'presbyters,' sometimes 'bishops.' Thus St. Paul to the elders at Ephesus says: 'Take heed to the flock over which the Holy Ghost hath made you *overseers*'—i. e., bishops. This explains the

Presbyterian view of the office. But as the apostles could not themselves be present in all churches, and as in a short time strifes and contentions arose, they appointed, after the order began at Jerusalem, some one president or governor over the rest, who had his authority established a long time before that settled difference of name took place whereby such alone were called bishops; and therefore, in the book of Revelation, we find that they are entitled 'angels.' St. Irenæus, martyred in the 2d c., says: 'We are able to number up them who by the apostles were made bishops.' In Rome, he tells us, they appointed Linus; and in Smyrna, Polycarp. St. Ignatius witnesses that they made Evodius B. of Antioch.

St. Jerome says: 'All bishops are the apostles' successors;' and St. Cyprian terms bishops '*præpositos qui apostolis vicaria ordinatione succedunt*' (presidents who succeed to the apostles by vicarious ordination). Hooker says, in his usual judicious manner: 'Such as deny apostles to have any successors at all in the office of their apostleship, may hold that opinion without contradiction to this of ours, if they will explain themselves in declaring what truly and properly apostleship is. In some things, every presbyter, in some things only bishops, in some things neither the one nor the other are the apostles' successors.' And he adds, what fairly states the Episcopal theory on this subject: 'The apostles have now their true successors, if not in the largeness, surely in the kind of that episcopal function whereby they had power to sit as spiritual ordinary judges, both over laity and over clergy, where churches Christian were established.' We find also, that throughout those cities where the apostles did plant Christianity, history has noted a succession of pastors in the seat of *one*, not of many; and the first one in every rank we find to have been, if not some apostle, yet some apostle's disciple. By Epiphanius, the bishops of Jerusalem are reckoned down from St. James to his own time; and Tertullian, writing in the 2d c., has the following: 'Let them show the beginnings of their churches, let them recite their bishops one by one, each in such sort succeeding other that the first B. of them have had for his author and predecessor some apostle, or at least some apostolical person who persevered with the apostles; for so apostolical churches are wont to bring forth the evidence of their estates.' The judgment of the Church of England as to the primitive existence of bishops is to be found in the preface to the ordination service, drawn up in the reign of Edward V., where it is said: 'It is evident unto all men diligently reading the Holy Scripture and ancient authors, that from the apostles' time there have been these orders of ministers in Christ's church—bishops, priests, and deacons.'

According to the other or Presbyterian theory of bishops, the origin and general history of the institution are thus sketched. In the earliest churches, no traces of a hierarchy, it is affirmed, are to be found. The superintendents or directors appointed over the first churches by the apostles, or chosen by the members of the congregations, were unquestionably styled indifferently presbyters or bishops—the former title being borrowed from the Jewish synagogue, the superintendent or director of which was called the Elder (Gr. *presbyter*); the latter (*episcopos*) being familiar to the heathen converts as a title of a civil office corresponding in function to that of a Christian pastor. But this original equality did not last long. As new churches multiplied, those formed round the original church, though each having its own bishop or presbyter, remained in confederacy; and in the meetings of the pastors to regulate the common affairs, one must of necessity preside, most likely determined by age, superior piety, or other qualification. From this simple circumstance, as is indicated by Clemens Alexandrinus in the beginning of the 3d c., sprang the habit of looking upon one of the bishops as superior to the others; and this superiority, at first personal and accidental, soon came naturally to be regarded as attached to the B. of a particular congregation. In his case the word B. came to signify an overseer of pastors rather than an overseer of people. The monarchical form of state government favored this tendency, and converted the president of a presbytery into the privileged superintendent of his brother-pastors. The assumption was resisted by the presbyters at first, but from the middle of the 5th c., Episcopacy, or the domination of bishops, continued to gain the upper hand over Presbyterianism, or equality of all pastors.

In the 3d c. bishops appear still dependent on the advice of their presbyters, and the consent of the people, and shared with the former the office of teaching and the cure of souls. As yet their exclusive privileges or functions were limited to confirmation, ordination of ministers, consecration of sacred things, settlement of secular differences among Christians, and management of the revenues of the church. But the tendency to subordination and unity did not rest here. Among the bishops, at first all equal, those of the larger and more important cities began gradually to acquire a superiority over those of inferior cities. When Christianity was made the religion of the Roman empire, the bishops became more and more monarchical, and put themselves on the footing of ecclesiastical princes. The chief cities of the larger civil provinces rose to be seats of extensive dioceses, the bishops of these assuming the distinctive titles of *patriarch, metropolitan, papa*—titles of courtesy that had long been applied to all bishops; while the less important provinces, with their capitals and bishops, became subordinate. Among these provincial bishops, again, three, from obvious causes, acquired a prominence that cast all the rest into the background—namely, Alexandria, Constantinople, and Rome. The beginnings of the ascendency of the Roman B. are discernible as early as the end of the 2d century. While ancient Rome sought her secular dominion more in the south and east, modern ecclesiastical Rome turned herself chiefly to the nations of the west and north; and round the B. of Rome has grown a power—the Roman Catholic Church—not less important than that of imperial Rome.

In the Roman Catholic Church the episcopal office is the foundation of the whole system. Christ's apostles are held to have transferred their functions to the episcopacy as a body. Every B., therefore, exercises within his own diocese, first the *jus magisterii*—i. e., the right of maintaining and propagating the orthodox faith; and second the *jus ordinis*, or regulation of the sacred and mysterious rites of the priestly office, some of which are transferred to the inferior clergy, as *jura communia*, while others remain the privileges of the bishop (*jura propria*). Among episcopal prerogatives, in addition to those already mentioned as assigned to them in the 3d and 4th c., are anointing of kings, consecration of abbots, preparation of the chrisma, &c. They have also the management of the church-property in their respective dioceses, and the oversight of all ecclesiastical institutions. Election to the office of B. rests generally with the presbyters of the diocese assembled in chapter, with the sanction of the secular power and of the pope. This is the case in Prussia. Where the sovereign is a Catholic, the appointment is mostly made by him, but subject to papal approbation. At consecration, which requires the presence of three bishops, the new B. takes an oath to the sovereign and to the pope, and signs the articles of belief, on which he receives the episcopal insignia—the mitre (q. v.); crosier (q. v.), or staff; a gold ring, emblematic of his marriage to the church; the cross upon the breast; the dalmatica (q. v.), tunic, pallium (q. v.), and peculiar gloves and chaussure; and being enthroned, as formal installation into office, he then pronounces the blessing on the assembled people. In the discharge of his office, the B. has a number of subordinate assistants; sometimes, in case of age or weakness, a coadjutor, but ordinarily deans, archdeacons, &c. (q. v.).

In the Greek church, the office of B. is essentially the same, though less influential. Greek bishops, however, are always chosen from the monkish orders and generally from the archimandrites—i. e., abbots or priors.

As Protestantism met with its chief resistance from the bishops, and, besides, laid the chief stress on doctrine rather than on church order, the episcopal order, in most of the reformed churches, either disappeared or sank into comparative insignificance. Of the continental Protestant churches, episcopacy has kept the foremost hold in Sweden and Norway. The Scandinavian bishops acceded to the reformation in 1531 only on compulsion from Gustavus Vasa, who confirmed them in their revenues and prerogatives. The B. of Upsala is primate, and has the prerogative of crowning the king, consecrating the other bishops, &c. The bishops are named by the king out of three proposed by the chapters. They preside in consistories, hold synods, visit the churches, examine and ordain ministers, consecrate churches, and watch over purity of doctrine and the property of the church. They have seats in parliament, and wear the pallium, mitre, crosier, and cross. There are only six bishops in Sweden and Norway, with an additional B. of the order of the Seraphim.

In Denmark, the Catholic bishops opposed the reformation, and were (1536) deposed by Christian III., and their extensive possessions confiscated. The king appointed in their stead a general superintendent and 9 Protestant bishops, with a fixed stipend. They are under the secular government, and have very limited authority over the clergy under their charge. The first in rank is the B. of Seeland.

In Protestant Germany, the episcopal dignity and rights passed into the hands of the secular sovereigns, who, down to quite recent times, assumed the title of supreme bishops, and exercised the prerogatives of such. Where the sovereign, as in Saxony, was of a different confession from the majority of his subjects, the episcopal authority was delegated to a minister. The bishopries, however, were gradually secularized, and with the nominal or titular bishops of Osnabrück and Lubeck (1803) the old episcopal dignities became almost extinct on the Protestant soil of Germany. The Lutheran Church, however, never formally abolished the office of B., and Melanchthon endeavored to get it expressly recognized. In Prussia, accordingly, the title of B. has had a fluctuating fate. The bishops in office at the time having acceded to the reformation in 1525, were continued; but in 1551 the revenues were confiscated, and the duties assigned to superintendents. In 1587 this last rem-

nant of the episcopal office also disappeared; till Frederick I. conferred the title of B. on two of his court-preachers on occasion of his coronation. At their death it again ceased, and was not revived until at the peace-festival in 1816 Frederick William III. raised two clergymen to the dignity of bishops. One of them, the B. of Königsberg, received in 1829 the title of Evangelical Archbishop. Several have since received the title of B., along with that of superintendent-general, entitling them to the first place in the consistories, a certain civil rank, insignia, and salary. Of the other German states, only Nassau followed the example of Prussia, by naming in 1818 a B. for the united evangelical churches of the duchy. Elsewhere, the episcopal authority, mostly in very limited form, is exercised by consistories, ministries of worship, superintendents-general, inspectors, &c.

In the Church of Scotland, and other Presbyterian churches on the Geneva model, the episcopal office is not recognized. Roman Catholic Scotland was divided into eleven dioceses or bishoprics.

In none of the Protestant countries have the prerogatives and revenues of bishops remained so little impaired as in England, where the reformation was taken into his own hands by the king, and being propagated from above downwards, was effected in a very conservative spirit. Episcopacy was abolished about the time of the Commonwealth, but at the restoration the bishops were restored, and have since retained their position in church and state.

The practice and history of the Church of England in the matter of bishops may be given somewhat more in detail. The B. is the head of the clergy in his diocese; he ordains them, whereby he calls them into existence as ecclesiastical persons; he institutes them to benefices, and licenses them to cures, and to preach; visits them, and superintends their morals; and enforces discipline, for which purpose he has several courts under him, and can suspend or deprive them for due cause.

Over the laity he exercises a general pastoral authority, but they are more particularly brought under his notice at the time of their confirmation. The style, title, and privileges of the B. are inferior to these of the archbishop (q. v.). He is said to be *installed* in his bishopric; he writes himself, By Divine Permission; and has the title of Lord, and Right Rev. Father in God; and he may retain six chaplains. A bishop must be at least 30 years of age; the reason for which is, that Christ began his ministry at that age. For many centuries after the Christian era, the B. received all profits of his diocese, and paid salaries to such as officiated under him. The mode of election, confirmation, and consecration is the same in the case of bishops and archbishops, for each archbishop is also B., and has his own diocese. The B. is elected by the chapter of his Cathedral church by virtue of license from the crown. The laity used to take part in the election, but from the tumults that arose, the different sovereigns of Europe took the appointment, in some degree, into their own hands by reserving to themselves the right of confirming these elections, and of granting investiture to the temporalities which now began to be annexed to these dignities. This right was acknowledged in the Emperor Charlemagne by Pope Hadrian I., 773 A.D., and the Council of Lateran. The right of appointing to bishopries is said to have been in the crown of England even in Saxon times. But when, by length of time, the custom of electing by the clergy only was fully established, the popes began to object to the usual method of granting these investitures, which was *per annulem et baculem*.—i. e., by the prince delivering to the prelate a ring and pastoral staff or crosier. In the 11th c., Pope Gregory VII. published a bull of excommunication against all princes who should dare to confer investitures. There were long and eager contests occasioned by this papal claim, but at length the matter was compromised, the Emperor Henry V. agreeing to confer investiture for the future, *per sceptrum;* and the kings of France and England consented to receive only the homage for the temporalities, intead of investing them by the ring and crosier, the pope keeping in his hands the power of confirmation and consecration.

This concession was obtained from Henry I.; but King John, in order to obtain the pope's protection against his barons, gave up, by a charter to all the monasteries and cathedrals, the free right of electing their prelates. This grant was confirmed in Magna Charta, and was again confirmed by statute 25 Edward III. But by statute 25 Henry VIII., the ancient right of nomination was in effect restored to the crown. The sovereign, on the vacancy being notified, sends to the dean and chapter a letter missive, or *congé d'élire*, containing the name of the person to be elected; and if they do not elect in the manner appointed by the act, or if the archbishop or B. appointed for the purpose refuse to confirm, invest, and consecrate the B. elect, the recusants incur the penalty of the *præmunire* (q. v.). A bishop is not consecrated more than once, and he cannot be *deposed*, as it is supposed that the order itself cannot absolutely be taken from him; he may, however, be *deprived*, as was done to the B. of Clogher in 1822; he may also resign his see; and he may be removed from one see to another, which is called *translation;* but this practice is now less frequent than it used to be. The Dean and Chapter of Canterbury claim it as an ancient right of that church, that every B. of the province is to be consecrated in it, or the archbishop to receive from them a license to consecrate elsewhere; and it is said that a long succession of licenses to that purpose are regularly entered in the registry of that church. When elected and confirmed, a B. may exercise all spiritual jurisdiction, but he is not completely B. until consecration. Bishops, upon their election, become peers of the realm, and are summoned to the parliament as well as the other nobles; but the right under which they sit there, whether in respect of their baronies, or by usage and custom, is a matter of uncertainty. It appears, however, that the bishops sat in the Wittenagemote, under the Saxon monarchs, as spiritual persons; for they were not barons until William the Conqueror turned their possessions into baronies, and subjected them to the tenure of knights' service. The bishops created by Henry VIII.—viz., Bristol, Gloucester, Chester, Oxford, and Peterborough, as also the lately created bishops of Ripon and Manchester—sit in parliament, though they do not hold their lands by baronial tenure. The bishops withdraw from the House (under protest, however) when any capital charge is to be decided. The bishops sit in parliament next to the archbishop of York; first, London; second, Durham; third, Winchester; and then the rest according to their ancienties. In respect of their persons, bishops are not peers with the nobility; and in cases of alleged crimes, they are tried by a jury in the same manner as commoners, as was the case with Cranmer and Fisher. When a see is vacant, the archbishop of the province is guardian of the spiritualities; but he cannot as such consecrate or ordain or present to vacant benefices. The sovereign has custody of the lay revenues during a vacancy. Queen Elizabeth kept the see of Ely vacant nineteen years.

All the bishops of a province, with respect to their archbishop, are called his suffragans. See SUFFRAGAN.

The B. of Durham had formerly a *palatine* jurisdiction, as it was called, in the county of Durham; and the B. of Ely had a similar secular authority in certain places; but these powers were transferred to the crown in 1836. The houses of bishops are called their palaces. In old times their palaces in London were extra-diocesan; and while residing there, they exercised jurisdiction in the same manner as in their own dioceses. This personal privilege is now extinct in the bishops; but Lambeth House, Croydon, Winchester Palace, and Ely House retain the privilege. A bishop makes a triennial visitation of his diocese.

The conferring of orders rests, in a great measure, with the discretion of the bishop. He can refuse to ordain without giving any reason, but he can ordain no person who does not subscribe to the Queen's supremacy, the Book of Common Prayer, and the Thirty-nine Articles. See ORDINATION.

In England, there are 32 bishops, including the two metropolitans—viz., Canterbury; York; London; Durham; Winchester; Bangor; Bath and Wells; Carlisle; Chester; Chichester; Ely; Exeter; Gloucester and Bristol; Hereford; Lichfield; Lincoln; Liverpool; Llandaff; Manchester; Newcastle; Norwich; Oxford; Peterborough; Ripon; Rochester; St. Albans; St. Asaph; St. David's; Salisbury; Truro; Worcester; Sodor and Man. Truro and St. Albans became bishoprics in 1876 and 1877; and an Act of 1878 provided for founding four other sees, Liverpool, Newcastle, Southwell (in Notts), and Wakefield. The first B. of Liverpool was consecrated in 1880, and the B. of Newcastle in 1882. When Manchester was made a see in 1847, it was provided that the establishment of new bishoprics should not alter the number of bishops (24) sitting in the House of Lords. The archbishops and the bishops of London, Durham, and Winchester are always entitled to sit; the B. of Sodor and Man is not a spiritual peer of the realm; but the other bishops enjoy the privilege according to senioritory, the junior bishops (at present 5) having to wait their turn.

In Ireland, there are twelve, including the two metropolitans, whose sees stand first—viz., Armagh and Clogher; Dublin and Kildare; Meath; Killaloe, Kilfenora, Clonfert and Kilmacduagh; Tuam, Killala, and Achonry; Ossory, Ferns, Leighlin; Cashel, Emly, Waterford, and Lismore; Down, Connor, and Dromore; Derry and Raphoe; Limerick, Ardfert, and Aghadoe; Kilmore; Elphin, and Ardagh; Cork, Cloyne, and Ross.

In British North America, there are ten sees; in the West Indies, four; in South America, one; in Africa, six; in Asia, six; in Australasia, twelve; and in Europe, one—that of Gibraltar; besides missionary bishops and the B. at Jerusalem. There are seven bishops of the Episcopal Church in Scotland. In the United States, there are thirty-nine bishops of the Protestant Episcopal Church.

There are an archbishop and thirteen Roman Catholic bishops in England. In Ireland there are four Catholic archbishops and twenty-eight bishops. The Roman Catholic hierarchy in Scotland was formerly restored in 1878, and has two archbishops and four bishops. The assumption of territorial titles by Roman Catholic bishops in England and Scotland is illegal, but they are, nevertheless, commonly ascribed to them by members of that

communion. See Hooker's *Ecclesiastical Polity*, Burn's *Ecclesiastical Law*, Cripp's *Laws of the Church*, and Blackstone. See also ARCHBISHOP.

BI'SHOP, BOY. See BOY BISHOP.

BI'SHOP, a favorite beverage composed of red wine (claret, Burgundy, &c.) poured warm or cold upon ripe bitter oranges, sugared and spiced to taste, and drunk either hot or cold. The quality of the B. depends upon the excellence of the wine employed in its preparation. The oranges must be carefully selected, and the white part between the peel and pulp must be thrown away. If white wine be used, the beverage is called *cardinal;* and with Tokay it becomes *pope*. Taken in moderation, B. is a wholesome drink; but if partaken of too freely, the æthereal oil contained in the orange-peel is apt to occasion headache. The beverage was known under other names in Germany during the middle ages, having been imported into that country from France and Italy; its present name seems to have been bestowed during the 17th c.

BISHOP, SIR HENRY ROWLEY, an eminent English composer of music, was born in London in 1780. His principal musical instructor was Signor Francisca Bianchi, an opera composer settled in London. In 1806 B. was appointed composer of ballet music at the Opera. His most popular operatic entertainments were *Guy Mannering; The Slave; The Miller and his Men; Maid Marian; Native Land; The Virgin of the Sun;* &c.—all remarkable for their long flowing melodies, animated style, and true musical power. From 1810 to 1824, he was director of the music at Covent Garden Theater. One of the first directors of the Philharmonic Society, he for many years conducted the concerts of Ancient Music. He arranged several volumes of the *National Melodies*, and succeeded Sir John Stevenson as arranger of the airs selected by Moore for his *Melodies*. In June, 1839, he received the degree of Bachelor of Music from the University of Oxford, and in November, 1841, was elected Reid Professor of Music in the university of Edinburgh. In 1842 he was knighted. In December, 1843, he resigned his Edinburgh chair, and in February, 1848, was elected professor of music in the university of Oxford. In his later years he was in very necessitous circumstances. He died April 30, 1855.

BI'SHOP'S CASTLE, a town in the south-west of Shropshire, 19 miles south-west of Shrewsbury. It is irregularly built on a hill slope. Pop. about 2,000. The bishops of Hereford had formerly a castle here, now destroyed. During the civil wars of the 17th c., the inhabitants took shelter in the church, which was demolished over their heads.

BI'SHOP'S STO'RTFORD, a town of Hertfordshire, on the Stort, 10 miles E.N.E. of Hertford. It chiefly consists of two streets in the form of a cross. It carries on a trade in grain and malt, and has several tan-yards. B. S. was in Saxon times the property of the bishops of London. Pop. (1881) 6704.

BI'SHOP'S WA'LTHAM, a town of Hampshire, about 10 miles east-north-east of Southampton. Pop. of parish about 2000. Corn, leather, and malt form the chief trade of the town. It has been immemorially the property of the see of Winchester. There are the remains of a bishop's castle, built in 1135 by Henry de Bloisking, King Stephen's brother, and was reduced to ruins during the civil wars of the 17th c. A gang of 'Waltham Blacks,' or deer-stealers, infested the forest in this vicinity in the early part of the 18th c. The *Black Act* (q. v.) was passed in 1723, to put them down.

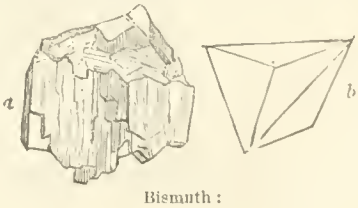
BISIGNA'NO, a town of Italy, in the province of Cosenza, is situated on a hill near the junction of the Mucone with the Crati, about 15 m. N. of the town of Cosenza. It has a cathedral, a castle, and a trade in silk, and gives the title of Prince to the existing branch of the Sanseverino family. Pop. 4096.

BI'SLEY, a town of Gloucestershire, 11 miles south-east of Gloucester. Pop. of parish (1881) 5168. The chief manufacture is coarse clothing. The church contains some interesting monuments, a cross-legged knight in armor, and an ancient stone font. There is also an ancient octagonal stone cross in the churchyard. The canal uniting the Severn and the Thames passes through the parish, the highest part being 370 feet above sea level.

BISMARCK-SCHOENHAUSEN, OTTO EDUARD LEOPOLD, PRINCE VON, chancellor of the German empire, now the most prominent man in Europe, was born in 1813 at Brandenburg, of an old family, of which various members have gained a reputation both as soldiers and statesmen. B. received his university education at Göttingen, Berlin, and Greifswald, where he studied law. After he had finished his studies, he lived for a time on his estates. Before 1847, he was little heard of, but about that time he began to attract attention in the Prussian parliament as an ultra-royalist, and an advocate of the extremest absolutism. He was one of those who opposed the scheme of a German Empire, proposed by the German parliament of 1849. His diplomatic career commenced in 1851, when he was appointed chief secretary of the Prussian legation, at the resuscitated German diet at Frankfurt. Here he began to manifest that zeal for the interests and aggrandizement of Prussia, which has since undeviatingly guided him, often regardless of the means. In the diet, he gave open expression to the long-felt discontent with the predominance of Austria, and demanded equal rights for Prussia. In St. Petersburg, whither he was sent in 1859, he is said to have tried to bring about an alliance between France, Prussia, and Russia, but without success. By this time he had acquired the special regard and confidence of the king, who sent him, in the spring of 1862, as ambassador to Paris, in order to give him an insight into the politics of the Tuileries, before taking the direction of affairs at home. In autumn, when the king's government could not obtain the consent of the lower house to the new military organization, B. was recalled, to take the portfolio of the ministry for Foreign Affairs, and the presidency of the cabinet.

Not being able to pass the re-organization bill and the budget, he closed the chambers (October 1862), announcing to the deputies that the king's government would be obliged to do without their sanction. Accordingly, the army reorganization went on; and the next four sessions of parliament were closed or dissolved in the same way, without the government obtaining, or even caring to obtain, the sanction of the house. The people were now looking for a *coup d'état*, and the government for a revolution. At this crisis, the death of the king of Denmark opened up again the Slesvig-Holstein question, and excited a fever of national German feeling, which B. was adroit enough to work so as to aggrandize Prussia by the acquisition of the Duchies, and reconcile his opponents to his high-handed policy by being able to point with success of the newly modelled army. Throughout the events which ended in the humiliation of Austria and the reorganization of Germany under the leadership of Prussia (see GERMANY), B. was the guiding spirit, and such is the magic of success, that, from being universally disliked, he has become the most popular man in Germany. What is perhaps still stranger, the man who, of all others living, has been the most strenuous upholder of absolutism, and has all along manifested the strongest contempt for public opinion, received, in 1871, the thanks and congratulations of the extreme democrats of Great Britain for giving to North Germany a constitution based on universal suffrage. It was B. that negotiated the neutralization of the Luxembourg territory (1867). The action of France in regard to the candidature of Prince Leopold of Hohenzollern for the throne of Spain gave B. the opportunity of carrying into action the intensified feeling of unity amongst Germans. During the war of 1870—1871, B. was the spokesman of Germany; he it was that, in February 1871, dictated the terms of Peace to France. He was soon created prince and chancellor of the German empire. The most striking feature of his administration has been a contest with the Catholic church, in which the expulsion of the Jesuits (July 1872), and the carrying out of the new ecclesiastical laws, were the most prominent events. His life was attempted in 1874. He presided at the Berlin Congress of 1878. His recent financial schemes, including a tobacco monopoly and the extension of the protective system, have met with strong opposition from the National-liberal party. In social life B. is genial and witty. The work B. *und seine Leute*, by Dr. Busch (1878), contains many facts and amusing incidents, throwing light on the Chancellor's character and manners.

BIS'MUTH is a brittle metal of a crystalline texture, and of a white color tinged with a faint red hue. It is found native in Cornwall, Germany, France, and Sweden, where it occurs in veins or fissures passing through other rocks. The principal natural source is an impure metal; but it is likewise found in combination with oxygen, sulphur, and arsenic. The pure metal is generally obtained by heating the impure native B. in iron tubes in a furnace, when the metal volatilizes, and the vapor, condensing into a liquid in a somewhat cool part of the tube, runs into a receiving-vessel, and is ultimately transferred to moulds, where it solidifies with a crystalline texture. B. is represented by the chemist by the symbol Bi; has the atomic weight or equivalent of 213, and has the specific gravity of 9783 to 9833 (water = 1000). The metal B. is seldom employed by itself in the arts. The alloys of B. are of considerable commercial importance. In combination with tin, B. forms an alloy possessing great sonorousness, and therefore suitable for bells. The alloy of 8 of B., 5 of lead, and 3 of tin, readily fuses at 202° F., and therefore melts in boiling water; and the alloy of 2 of B., 1 of lead, and 1 of tin, at 200·75° F. Either of the latter alloys is entitled to the term *fusible alloy*, and when mixed with some mercury, becomes



Bismuth:
a, example of native bismuth from Redruth, in Cornwall; *b*, crystal of bismuth.

still more fusible, and may then be used in forming moulds for toilet-soaps, and in taking casts.

B. forms several compounds of service in the arts and in medicine; it combines with oxygen to form several oxides, of which the teroxide (BiO_3) is the most important. It may be prepared by evaporating the solution of the ternitrate of B. ($BiO_3,3NO_5$) to dryness, and then heating, when the nitric acid ($3NO_5$) escapes, and leaves the teroxide of B. (BiO_3) as a yellowish powder. It is employed in the porcelain manufacture as an agent for fixing the gilding, and for increasing the fusibility of fluxes, at the same time neutralizing the colors which are often communicated by them. The ternitrate of B. is prepared by acting upon the metal B. with a mixture of one part of commercial nitric acid and one part of water, and applying heat. The subnitrate or basic nitrate of B. receives the names of *Pearl White, Pearl Powder, Blanc de Fard, Blanc d'Espagne, Majestery of B.*, and *Perlweiss* and *Schminkweiss* (German). It is used as a cosmetic, but is apt to become gray in tint, and even brown or black, when sulphuretted hydrogen, often evolved from sewers, cesspools, and drains, comes in contact with it.

The subnitrate of B., the only medicinal preparation formed from this metal, acts as a local irritant and caustic poison on animals. On man, when given in small doses, it acts locally as an astringent, diminishing secretion. On account of the frequent relief given by it in painful affections of the stomach, where there is no organic disease, but where sickness and vomiting take place, accompanied by cramp or nervous disorder, it is supposed to act on the nerves of this viscus as a sedative. It has also been denominated tonic and antispasmodic. Vogt says, that when used as a cosmetic, it has been known to produce a spasmodic trembling of the face, ending in paralysis.

BI'SON, a name given by the ancients to an animal of the same genus with the ox (q. v.), still called the B., or the European B. (*Bos Bison* of some naturalists, *Bos Urus* of others); also known as the Aurochs (Germ., wild animal, or wild ox). This animal at one time abounded in most parts of Europe, but is now found only in the forests of Moldavia, Walachia, Lithuania, and Caucasus. Herds of bisons, carefully protected by the emperor of Russia, and believed to amount to about 800 in all, roam through the great forest of Bialowieza, in Lithuania. The B. differs from all varieties of the common ox, in the arched line of the back, which rises in a sudden elevation behind the neck; the hump which is formed not consisting, however, of mere fat, but in great part of the very thick and strong muscles which support the large head. It is remarkable for strength in the fore-parts, and trees of five or six inches in diameter cannot withstand the thrusts of old bulls. It is capable of repelling all the attacks of the wolf or bear, rushing upon, overthrowing, and then trampling an adversary. Its horns are short, tapering, very distant, spreading, a little curved inwards at the point. They are affixed not at the extremities of the most elevated salient line of the head, as in the ox, but considerably in front of it. The figure of the forehead differs also from that of the ox in its greater breadth, and in its convex profile. Another important anatomical difference is in the number of ribs, of which the B. has fourteen pair, whilst the ox has only thirteen; and the vertebræ of the tail are fewer, being only nineteen instead of twenty-one. The hair of the forehead is long and shaggy; that under the chin and on the breast forms a sort of beard; and in winter the neck, hump and shoulders are covered with long woolly hair, of a dusky brown color, intermingled with a short, soft, fawn-colored fur. This long hair is gradually cast in summer. The legs, back, and hinder-parts are covered with short dark-brown hair. The tail terminates in a large tuft. The females are not so large as the males, nor do they exhibit the same shagginess of the fore-parts. The B. is the largest quadruped now existing in Europe, although within the historic period there appears to have existed along with it an ox exceeding it in size; and it appears to have been this ox, and not the B., which was called *Urus* (q. v.) by the ancients, although their *Bonasus* (or *Bonassus*) was probably the same with the bison.—The food of the B. consists of grass and brushwood, and the leaves and bark of young trees. Its cry is peculiar, 'resembling a groan or a grunt, more than the lowing of an ox.' It does not attain its full stature till after its sixth year, and lives for about thirty or forty years. The period of gestation appears to be the same with that of the ox. The B. has never been reduced to subjection by man, and the domestication even of individuals taken young, has been very partial. It generally shows a great aversion to the domestic ox. The common statement, however, that the B. calf invariably refuses to be suckled by the domestic cow, is contradicted on the excellent authority of the master of the imperial forests in the Russian government of Grodno.—The B. is generally very shy, and can only be approached from the leeward, its smell being very acute. It is easily provoked, and is not approached without danger. It runs very swiftly, although it cannot long continue its flight, galloping with its head very low, so that the hoofs are raised higher than the head.

There is no historical evidence that the B. ever existed in Britain; but remains of this, or of a very closely allied species, are found in pliocene fresh-water beds in several parts of England, as well as on the continent of Europe. The size of these B. bones is, however, so great as of itself to cause a doubt of the identity of the species, and the horns are longer in proportion. The fossil B. has been called *Bison priscus; Bison* being by some naturalists separated as a genus from *Bos*, upon the ground chiefly of the osteological differences in the head.

The American B. (*Bos Americanus* of some naturalists, *B. Bison* of others) is interesting as the only species of the ox family indigenous to America, except the Musk Ox (q. v.) of the subarctic regions. It is commonly called *Buffalo* by the Anglo-Americans, although it is very different from the Buffaloes (q. v.) of the old world. It is found in vast numbers in the great prairies between the Mississippi and the Rocky Mountains; it occurs as far north as the vicinity of Great Marten Lake, in lat. 63° or 64°; extensive level and marshy tracts there affording it suitable food, although it is nowhere else to be met with in so high a latitude. Its southern limit appears to be in New Mexico. It is comparatively rare to the west of the Rocky Mountains, and appears to have been rare to the east of the Appalachians, even on the first settlement of Europeans. Within the present century, however, it was found in the western parts of the State of New York, and in large numbers in that of Ohio; but it has now disappeared from the whole region east of the Mississippi, and it is necessary to advance about one hundred miles to the westward of that river before considerable numbers are anywhere to be found. In the western prairies, enormous herds still congregate; great plains are sometimes spotted and darkened with them as far as the eye can reach; 'countless thousands' are described as coming to refresh themselves in stagnant pools; and their paths are said to be, in some parts of the wilderness, as frequent and almost as conspicuous as the roads in the most populous parts of the United States.

About 300,000 Indians are supposed to subsist almost entirely on the flesh of the B. The spear and the bow and arrow are still much employed by them in hunting it, although many of them also use firearms. They frequently pursue it on horseback; but the hunter, whether on horseback or on foot, has often much difficulty in getting within shot, upon account of its keenness of scent, and the speed with which it runs. The chase of the B. is also very dangerous, as it is apt to turn upon an adversary, and even a fleet horse cannot always escape it. Great numbers, however, are sometimes killed when the hunters can succeed in throwing the herds that are scattered over the plains into confusion, so that they run wildly, without heeding whither. Another expedient of the Indians is to set fire to the grass of the prairies around them, when they retire in great consternation to the center, and are easily killed. A sort of pound or enclosure is sometimes made, with a long avenue leading to it, and an embankment of snow, such that when the animals have descended over it they cannot return, and by this means great numbers are often captured and killed. Livingstone describes a similar expedient as in use for killing wild animals in South Africa. Sometimes, also, the Indians contrive to throw them into consternation, and to make them run towards a precipice, over which many of the foremost are driven by the crowds which throng up behind.

The American B. is very similar to the European. In general, it is of rather smaller size, but this does not appear to be always

American Bison.

the case, and it is said sometimes to attain a weight of 2000 lbs. Its limbs and tail are shorter, and the tail consists of fewer vertebræ. The horns are shorter and more blunt. The fore-parts are still more shaggy, and retain more of their shagginess in summer. The ground upon which many naturalists have rested their chief confidence of specific difference has been, however, the presence of an additional pair of ribs, the American B. being said to have fifteen pair; but Mr. Vasey has recently ascertained that, like the European B., it has only fourteen. The more gregarious habit may perhaps be accounted for, like that of the American beaver, by difference of circumstances.

The wolf is quite unable to contend with the B., but many

wolves often hang around the herds, to devour calves which may stray, or aged animals which have become too weak to keep up with the rest. These have sometimes been seen assailed by whole packs of wolves, and dealing death to many of their assailants, before they were compelled to yield to numbers and hungry pertinacity. The only American animal that is singly capable of overcoming the B. is the grisly bear. See BEAR.

The flesh of the B. is very good, and differs from that of the ox in having a sort of venison flavor. The hump, in particular, is esteemed a delicacy.—*Pemmican* (q. v.), so much the food of fur-hunters and northern *voyageurs*, is made of the flesh and fat of the bison.—The tallow forms an important article of trade. One bull sometimes yields 150 lbs. The skins are much used by the Indians for blankets, and when tanned, for coverings for their lodges and beds. A blanket of B. skin is not unfrequently sold for three or four pounds sterling in Canada, to be used as a traveling cloak or wrapper. The Mandan Indians make canoes of B. skins spread upon wicker-work frames. These canoes have the round form of the Welsh *coracle* (q. v.). The long hair or fleece is spun and woven into cloth; and some of it which has been brought to England has been made into very fine cloth: stockings, gloves, &c., are also knitted of it. A male B. yields from six to eight pounds of this long hair.

The few attempts which have been made to domesticate the American B., have been so far successful, that they afford encouragement to further experiments. The size and strength of the animal make it probable that, if domesticated, it would be of great use.

BISSA'GOS or BIJU'GA ISLANDS, a group of small volcanic islands about 20 in all, off the west coast of Africa, in lat. 10° 2′—11° 42′ N., and long. 15°—17° W., opposite the mouth of the Rio Grande. The islands are enclosed by a reef, and, with a few exceptions, are thickly wooded. Many of them appear to be densely peopled by a savage, thievish negro race, who cultivate maize, bananas, and palms, and feed cattle and goats, which constitute their chief wealth. There are several fine ports. On one of the islands, Bulama, the British formed a settlement in 1792, but were obliged to abandon it the following year, on account of its unhealthiness. Bissao, one of the group, on which there is a Portuguese settlement, has a population of 8,000. It carries on a large trade in slaves, nearly all its European inhabitants being engaged in the traffic. It has also a trade in rice, wax, hides, &c., and imports annually about £20,000 worth of British manufactured goods.

BISSEN, WILHEM, a distinguished Danish sculptor of the present century, was born near Slesvig in 1798, and studied his art for ten years in Rome, under the guidance of his countryman, Thorwaldsen. Returning home, he executed a number of excellent works (a bust of Oersted, Atalante hunting, &c.). In 1841, he returned to Rome, being commissioned by the government to make 18 statues larger than life. Along with these he produced a Venus, and a charming piece, 'Cupid sharpening his Arrow.' Being recalled to Copenhagen, he was commissioned to execute a frieze of several hundred feet long for the great hall of the palace, representing the development of the human race according to the Greek mythology. Thorwaldsen, in his will, appointed B. to complete his unfinished works and have charge of his museum. In 1850 he was made director of the Academy of Arts, Copenhagen. At the Paris Exhibition in 1855, he was the only sculptor who represented Danish art. He died in 1868.

BI'STORT (*Polygonum Bistorta*), a perennial plant, 1—1½ foot high, with a simple stem, ovate subcordate and wavy leaves, the radical leaves tapering into a long footstalk, and one dense terminal cylindrical spiked raceme of flesh-colored flowers. The root is about the thickness of the little finger, blackish brown externally, reddish within, and tortuous (whence the name bistort). The whole plant is astringent, containing much tannin; the root is one of the strongest vegetable astringents, and is much employed in medicine, both internally and externally, in hemorrhages and many other complaints. B. is a native of meadows in Europe, and is found in Britain, but is by no means common. See POLYGONUM.

Bistort (*Polygonum Bistorta*).

BI'STRE, or BI'STER, is a pigment of a warm brown color, prepared from the soot of wood, especially beech. It is used in water-colors after the manner of Indian ink.

BI'STRITZ, a fortified town of Transylvania, beautifully situated on the Bistritz River, in a fine valley about 50 miles north-east of Klausenburg. In its vicinity are the remains of an ancient castle, once the residence of the illustrious Hunyads. It has several large cattle-fairs, but the extensive general trade it once carried on is now entirely gone. Forming, as it does, the last strong position in the N.E. of Transylvania, it was repeatedly during 1848—1849 the scene of hot strife between the Hungarian and Austrian generals. Pop. (1880) 8063.—B. is also the name of a river which, rising in East Hungary, flows south-east through Bukowina and Moldavia, and joins the Sereth near Baku, after a course of 110 miles, and is called the Golden B., on account of the auriferous character of its sands.

BISULNU'GGUR, or BISANAGAR, a town of India, in Guzerat, in the territories of the Guicowar, 82 miles N.W. of Mhow. It has a large transit trade, and manufactures cotton cloths. Pop. 18,000.

BISULPHUR, or BESULPORE, a town of India, in the British district of Bareilly, North-west Provinces. It is 24 miles south-east from Bareilly. It has a good bazaar, and is abundantly supplied with water. Pop. (1871) 9005.

BIT, or BITT, in ship-building, is a frame composed chiefly of two short but strong vertical timbers, fixed into or upon the deck in the fore-part of the vessel. Its main purpose is for fastening the cable when the ship rides at anchor, and for 'leading' the principal ropes of the rigging. To 'bit the cable,' is to fasten it round the bit. Various kinds are called 'riding-bits,' 'Elliott's bits,' 'Carrick-bits,' 'paul-bits,' 'jeer-bits,' 'topsail-sheet-bits,' &c. Having to resist great strains, the bits are strongly bolted to the beams that support the deck.

BITCHE, a German town of Alsace-Lorraine, in a wild and wooded pass of the Vosges, about 16 miles east-south-east of Sarreguemines. Its citadel, which is built on a precipitous and isolated rock, in the middle of the town, is well supplied with water, defended by 80 cannon, has accommodation for a garrison of 1000 men, and is considered all but impregnable. The Prussians under the Duke of Brunswick attempted to surprise it in 1793, but failed. Pop. of town, 3000, who are engaged in the manufacture of matches, watch-glasses, and porcelain. The German spelling is *Bitsch*.

BITHOO'R, a town in India in the district of Cawnpore, and lieutenant-governorship of North-west Provinces, stands on the right bank of the Ganges, about 12 miles north-west of Cawnpore itself. B., particularly devoted to the worship of Brahma, has numerous pagodas. It is, of course, a favorite resort for pilgrims, who here, as at Benares and Bindraban, have access to the sacred stream for purposes of ablution, by means of elaborately constructed ghauts. During the mutiny of 1857, B. acquired an unenviable notoriety as the stronghold of Nena Sahib. Here also Havelock more than once exacted retribution, however inadequate, defeating the Nena in the field, and burning his fort. B. in 1871 contained 8322 inhabitants.

BITHY'NIA, an ancient division of Asia Minor, was separated from Europe by the Propontis (Sea of Marmora) and the Thracian Bosporus (Strait of Constantinople), and was bounded N. by the Euxine, and S. by Galatia, Phrygia, and Mysia. Its eastern limits were not very clearly defined, but they at least extended as far as Paphlagonia. It contained the famous Greek cities or colonies of Chalcedon, Heraclea, &c.; and at later periods, Nicomedia, Nicæa, and Prusa, were flourishing cities of Bithynia. The inhabitants of B. were supposed to be of Thracian origin. The country was subdued (560 B.C.) by Crœsus of Lydia, and five years later, fell under the Persian dominion. But about 440 or 430 B.C., it became an independent kingdom under a dynasty of native princes, who made Nicomedia their capital. The last king, Nicomedes III., made the Romans his heirs, and with a large addition from the Pontic kingdom, B. became a province of the empire (74 B.C.). Under Trajan, B. was governed by Pliny the Younger, whose letters to the emperor on the administration and condition of the province contain the well-known passage respecting the Christians. The Emperor Diocletian made Nicomedia his habitual residence. In 1298, Osman the Turk broke into the country; and in 1328, Prusa, or Brusa, then the chief town of B., became the capital of the kingdom Osmanli.

BITLI'S, a town of Asiatic Turkey, in the vilayet of Erzerum, in lat. 38° 24′ N., and long. 42° 5′ E., about 120 miles south-east from Erzerum. It is situated at an elevation of 5156 feet above the level of the sea, in a deep ravine traversed by the river Bitlis, one of the head streams of the Tigris. B. is a straggling, irregular place, covering a large surface of ground, and surrounded by bare limestone mountains, rising to a height of about 2000 feet above the valley, which is filled with orchards and gardens, and

watered by numerous streams and springs. It has 3 mosques, about 12 convents belonging to the howling dervishes, who appear to have made B. their head-quarters, several well-stocked bazaars, and extensive manufactures of cotton cloths, which are celebrated for their bright red dye. It has also a very extensive trade. The import of British goods is small. The population consists of about 2000 Mohammedan, and 1000 Armenian families. The Persians defeated Solyman the Magnificent near B. in 1554.

BITO'NTO (ancient *Butuntum*), a town of Italy, in the province of Bari, and 10 miles west-south-west of the city of Bari. It is situated in a fruitful plain about 5 miles from the sea, is well built, is, conjointly with Ruvo, the see of a bishop, and has a fine cathedral, monasteries, and a nunnery. Pop. 23,000, who carry on an extensive trade in a wine called *Zagarello*, which is largely cultivated in the environs. B. is the birthplace of Giordani, the mathematician. In its vicinity, the Spaniards, under Count de Montemar, gained a splendid victory over the Austrians on the 25th of May 1734, the result of which was that Spain re-obtained possession of the kingdom of Naples.

BITTENFELD, Herwarth von, a Prussian general, one of the three leaders that commanded the invasion into Bohemia in 1866. B. was born in 1796, and gained his first martial laurels in the War of Liberation, especially in the battle of Leipzig. In the year 1848, he commanded the first regiment of the Guards. In 1863, raised to the rank of general, he acquired great fame through his daring crossing of the Sund, and capture of the isle of Alsen. In the campaign of 1866, he was intrusted with the occupation of Saxony, and then with the command of the army which advanced from Saxony into Bohemia. He contributed largely to the brilliant victories of Hünerwasser, Gitschin, Münchengrätz, and Königgratz. On the outbreak of the war in 1870, B. was made governor of the Rhine provinces; and in the next year he was raised to the rank of general field-marshal. In the war of 1866, one of his sons fell; in that of 1870, two were killed.

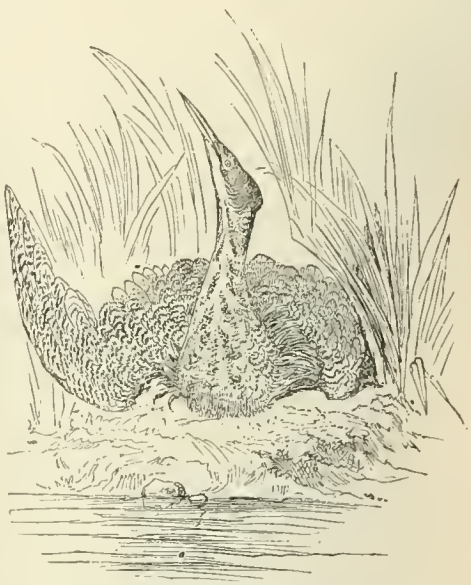
BITTER CRESS. See Cress.

BITTER KING (*Soulaurea ama'ra*), a shrub or small tree of the natural order *Polygalaceæ* (q. v.), a native of the Indian Archipelago, which has received its name from its intense bitterness. The genus differs from the usual structure of the order in its regular flowers. The B. K. has large oval leaves and axillary racemes of flowers. It is used medicinally in fevers and other diseases.

BITTER SPAR, a name given to Dolomite (q. v.), from the magnesia contained in it, which the Germans call *Bitter Salt*.

BITTER VETCH. See Orobus.

BI'TTERN (*Botaurus*), according to some modern ornithologists, a genus of the Heron (q. v.) family (*Ardeidæ*); but regarded by others as a mere sub-genus of Heron (*Ardea*), and not a very well defined one. Bitterns are indeed chiefly distinguished from herons by the long, loose plumage of the neck, which they have the power of erecting at pleasure, along with the rest of their clothing feathers, so as greatly to increase their apparent size. The back of the neck, however, is merely downy, or almost bare, the long feathers being on the front and sides. Bitterns also differ from herons in the greater length of the toes, the middle toe being as long as the shank. They are almost all solitary birds, inhabiting reedy and marshy places, where they lie hid during the day, and will almost allow themselves to be trodden upon ere they take wing; they feed during the night, and then, also, often rise spirally to a great height into the air, and emit loud resounding cries. Their food consists chiefly of frogs, and partly, also, of fish, lizards, water-insects, &c., and even of small birds, and quadrupeds. The claw of the middle toe is serrated on the inner edge, probably to aid in securing slippery prey.—The Common B. (*B. stellaris*, or *Ardea stellaris*) is a bird very widely diffused over the old world, being found in almost all, at least of the temperate, parts of Europe, Asia, and Africa, which are sufficiently marshy for its manner of life. It is now rare in Britain, owing to drainage; but was formerly more common, and in the days of falconry, was carefully protected by the law in England, on account of the sport which it afforded. Its flesh also was in high esteem, and is not rank and fishy, like that of herons generally. In size, it is rather less than the common heron; the bill is about four inches long, the feathers on the crown of the head are greenish black, and the plumage in general of a dull yellow color, beautifully and irregularly marked and mottled with black. The B. makes a rude nest of sticks, reeds, &c., in its marshy haunts, and lays four or five greenish-brown eggs. It has a peculiar bellowing cry, which has obtained for it such English provincial names as Mire-drum, Bull of the Bog, &c., and many of its appellations in other languages, perhaps even its name B. (*Bitour*, *Botur*, *Botaurus*). Some naturalists used to assert that the booming cry of the B. was produced by the bird inserting its bill into a reed; that notion, however, has long since been exploded. When assailed, it fights desperately with bill and claws; and it is dangerous to approach it incautiously when wounded, as it strikes with its long sharp bill, if possible, at the eye.—The Little B. (*B. minutus*, or *Ardea minuta*) is common in some parts of Europe, but rare in Britain. Its whole length is only about thirteen inches.—The American B. (*B. lentiginosus*, or *A. lentiginosa*), a species almost equal in size to the common B., and very similar to it in habits and voice, has occasionally been shot in Britain. It is common in many parts of North America, migrating northward and southward, according to the season. The crown of the head is reddish brown, and the colors and markings of the plumage differ considerably from those of the common B.—The Least B. (*B.* or *A. exilis*) is another North American species, of very small size, which is also migratory, and somewhat social in its habits. The Australian B. (*B.* or *A. australis*) is generally diffused throughout Australia, wherever marshes or sedgy rivers occur. In habits it closely resembles the B. of Europe. The head and upper parts generally are purplish brown, except the wings, which are buff, conspicuously freckled with brown; the throat, breast, and belly, mottled brown and buff.



Common Bittern (*Botaurus stellaris*).

BI'TTERN, BITTER LIQUID, or SALT OIL, is an oily liquid obtained during the preparation of common salt (q. v.). When the mother-liquor of the evaporating pans ceases to deposit crystals of common salt, there is left behind in the boilers the material called bittern. It consists principally of a strong solution of common salt, along with Epsom salts, and other compounds of magnesia.

The B. at our salt-works is generally run into tanks, and during winter it is employed as a source of Epsom salts. The B. is treated with a little sulphuric acid, which converts the chloride of magnesium ($MgCl$) into sulphate of magnesia ($MgOSO_3$), and on the liquid being allowed to cool, the crystals of Epsom salts (or sulphate of magnesia) separate.

BI'TTERS, are prepared from an infusion of herbs containing bitter principles. The plant generally used for the purpose is *Archangelica officinalis* or the *Garden Angelica*. See Angelica. The roots or seeds, or both, are placed in water, and the whole is left to simmer for several days, when the infusion will be strong enough. The B. from Angelica are not much used by physicians, having been superseded very much by infusions of gentian, &c.; but they are still used as a household medicine in town and country by elderly people. The chemical composition of the root is:

Bitter extractive	27·06
Volatile oil	0·70
Acrid soft resin	6·02
Gum and common salt	31·75
Starch	5·40
Woody fibre	8·60
Albumen	0·97
Water and loss	19·50
	100·00

The medicinal properties of B. are mainly those of a mild tonic and pungent aromatic stimulant, and hence they are serviceable as a stomachic in cases of weakness of the digestive organs. The taste is at first sweetish, rapidly becoming hot, aromatic and bitter and the odor is rather pleasant. The Angelica root yields a larger

amount of the bitter principle than Angelica seeds. Camomile flowers, coriander-seeds, and other vegetable tonics and stimulants are occasionally employed in the preparation of bitters.

BI'TTERSWEET, or WOODY NIGHTSHADE (*Solanum Dulcamara*), a plant found in hedges and thickets in Britain, and in most parts of Europe, also in Asia and in North America. The root is perennial; the annual stems climbing and shrubby, many feet in length; the leaves ovate-heart-shaped, the upper ones spear-shaped; the flowers purple, in drooping corymbs, much resembling those of its congener, the potato, but much smaller, followed by ovate red berries of tempting appearance, which, being poisonous, are not unfrequently the cause of serious accidents, particularly to children. The twigs, collected in autumn after the leaves are fallen, are used in medicine as a diaphoretic and diuretic, and as a remedy for leprosy and other cutaneous disorders. See SOLANUM.

Bittersweet (*Solanum Dulcamara*): *a*, branchlet with flowers and fruit, reduced; *b*, a flower, reduced.

BI'TTERWOOD, a name given to certain species of the genus *Xylopia*, trees and shrubs remarkable for the bitterness of their wood, particularly the West Indian *X. glabra*. Furniture made of this wood is safe from the attacks of insects.—The genus *Xylopia* belongs to the natural order *Anonaceæ* (q. v.), The fruit of some of the species, particularly *X. sericea*, is highly aromatic and pungent like pepper. *X. sericea* is a large tree, a native of Brazil; its bark is used for making cordage, which is excellent.

B. is also the name of *Pieræna excelsa* (formerly *Quassia excelsa*), a tree of the natural order *Simarubaceæ* (q. v.), a native of Jamaica, the wood of which is used in medicine for the same purposes as Quassia (q. v.), and often under that name; indeed, it is probable that all the present quassia of the shops is really this wood. It is, botanically, very nearly allied to the true quassia, and possesses very similar properties containing the crystallizable bitter principle called Quassite or Quassin. The wood, which is intensely bitter, is a very useful stomachic and tonic; an infusion of it is a well-known and useful fly-poison; and it appears to act as a powerful narcotic on many quadrupeds.

BITU'MEN, a mineral substance, remarkable for its inflammability and its strong peculiar odor; generally, however, supposed to be of vegetable origin. The name, which was in use among the ancient Romans, is variously employed, sometimes to include a number of the substances called *Mineral Resins* (see RESINS), particularly the liquid mineral substances called *Naphtha* (q. v.) and *Petroleum* (q. v.) or Mineral Oil, and the solid ones called *Mineral Pitch*, *Asphalt* (q. v.), *Mineral Caoutchouc*, &c.—sometimes in a more restricted sense it is applied by mineralogists only to some of these, and by some mineralogists to the solid, by others to the liquid ones. All these substances are, however, closely allied to each other. Naphtha and petroleum consist essentially of carbon and hydrogen alone, 84—88 per cent. being carbon; the others contain also a little oxygen, which is particularly the case in asphalt, the degree of their solidity appearing to depend upon the proportion of oxygen which they contain, which amounts in some specimens of asphalt to 10 per cent. Asphalt also contains a little nitrogen. Bituminous substances are generally found in connection with carboniferous rocks, in districts where there is, or evidently has been, volcanic agency. See the articles already referred to. Indeed, most kinds of coal contain B., and a substance essentially the same is produced from all kinds of coal by distillation; and whether before existing actually formed in the coal, or produced at the time by the action of heat, B. may often be seen bubbling from pieces of coal after they have begun to burn on an ordinary fire. Some of the shales of the coal-measures are very bituminous, as is also a kind of marl-slate abundant in some parts of the continent of Europe. See SHALE and MARL.—One of the most interesting of the bituminous minerals is that called *Mineral Caoutchouc* or *Elastic B.*, and for which the new name of *Elaterite* has been devised, as if to support the dignity of its exaltation to the rank of a distinct mineral species. It is a very rare mineral, only three localities being known for it in the world—the Odin lead-mine in Derbyshire; a coal-mine at Montrelais, near Angers, in France; and a coal-mine near South Bury, in Massachusetts. It is elastic and flexible like caoutchouc, and may be used, like it, for effacing pencil-marks. It is easily cut with a knife. Its color is blackish, reddish, or yellowish-brown; and its specific gravity is sometimes a little less, and sometimes a little more than that of water. It has a strong bituminous odor, and burns with a sooty flame.

BITU'MINOUS COAL, is a term applied to the varieties of coal which contain a large percentage of volatile matter. They yield, on their destructive distillation, a considerable quantity of gas, remarkably pure, and with good illuminating qualities, and are consequently largely used for that purpose. See COAL.

BITU'MINOUS LIMESTONES are limestones impregnated and sometimes deeply colored with bituminous matter, obtained from decaying vegetables, or, more probably, from the decomposed remains of those animals, the hard parts of which form so large an amount of the rock.

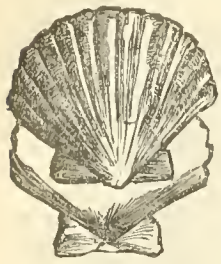
BITU'MINOUS SHALES are indurated beds of clay occurring in the coal-measures, and containing such an amount of carbon and volatile matter that they are able to keep up combustion when mixed with but a little coal. They are indeed impure coal, with a large percentage of ash or earthy matter, which after burning retains the original form. See COAL.

BITZIUS, ALBERT, better known under the *nom de plume* of Jeremias Gotthelf, a Swiss author, was born at Morat, in the canton of Freiburg, 4th October 1797. He was educated for the church; and after holding several cures, was appointed in 1832, pastor of Lützelflüh, in Emmenthal, canton of Bern, which office he retained till his death. His first work was entitled *The Mirror of Peasants* (Burgsdorf, 1836). It is the touching history of a poor villager, Jeremias Gotthelf, which pseudonym B. ever after retained. In 1838 appeared his *Sorrows and Joys of a Schoolmaster*; in 1839, *Dursli, the Brandy-drinker*, and *How Five Maidens miserably perish in Brandy*; in 1842—1846, *Scenes and Traditions of the Swiss*, in six vols., in which B. narrates, with great art, the old national legends, among which the most remarkable is the *Reconciliation*. The best and most popular of his stories, however, are *Grandmother Katy* (Berlin 1848); *Uli, the Farm-servant* (Berlin, 2d edition, 1850); its continuation, *Uli, the Farmer* (2d edition, Berlin, 1850); and *Stories and Pictures of Popular Life in Switzerland* (Berlin, 1851). Subsequently, he wrote several pamphlets against the German democrats, without, however, violating those popular sympathies and liberal convictions which pervade his writings, and which at an earlier period led him vehemently to oppose the family government of the Bernese aristocracy. His last work was *The Clergyman's Wife*, which appeared in 1854. Its author died on the 22d October of the same year. B.'s writings are greatly relished in Switzerland. They are characterized by simplicity, inventiveness, a wonderful fidelity in the delineation of manners and habits, great vigor of description, and raciness of humor, while their tone is strictly moral and Christian.

BI'VALVE SHELLS, or BIVALVES, are those testaceous coverings of mollusks which consist of two concave plates or *valves*, united by a hinge. So long as molluscous animals, provided with shells, were considered by naturalists almost exclusively with respect to these, the order of B. S., originally established by Aristotle, retained its place (see CONCHOLOGY); and indeed the external character upon which it is founded is closely connected with some of the important structural characters according to which mollusks are now classified. See MOLLUSCA. A vast majority of recent B. S. belong to Cuvier's *Testaceous* order of *Acephalous Mollusca*, the *Lamellibranchiate* (q. v.) *Mollusca* of Owen, although with them are classed some which were placed among *Multivalves* (q. v.) by conchologists, on account of the accessory valves which they possess, and some which have a calcareous tube superadded to the true valves, or even taking their place as the chief covering of the animal. There are also mollusks of the class *Brachiopoda* (q. v.) or, *Palliobranchiata*, which possess B. S., as the *Terebratulæ*, or Lamp-shells (q. v.), &c. The structure of the shell, however, when closely examined, is found to be different in these two classes (see SHELL), although its general appearance is much the same. A very large proportion of the B. S. of the older fossiliferous rocks belong to the class Brachiopoda.

In the Brachiopoda, one valve is ventral, and the other dorsal; in the *Lamellibranchiata*, the one is applied to the right side, and the other to the left side of the animal. The valves of ordinary B. S consist of layers, of which the outermost is always the smallest; and each inner one extends a little beyond it, so that the shell becomes thicker and stronger as it increases in length and breadth. The valves are connected at the hinge by an elastic ligament; and in general this consists of two parts, more or less distinct—one on the outside, to which the name *ligament* is sometimes restricted, and which is stretched by the closing of the valves; another, sometimes called the *spring*, more internal, which

is compressed by the closing of the valves, and tends to open them when the compressing force of the *adductor* muscle or muscles is removed, the effect of which is to be seen in the gaping of the shell when the animal is dead. The hinge is often furnished with teeth which lock into each other; sometimes it is quite destitute of them; sometimes the hinge-line is curved, sometimes straight. Conchological classification has been much founded upon characters taken from this part. The valves of some B. S. are equal and symmetrical, in others they are different from one another, particularly in those mollusks which, like the oyster, attach themselves permanently by one valve to some fixed substance, as a rock. Sometimes the valves of B. S. close completely at the pleasure of the animal; those of others always gape somewhere.



Pecten.
A bivalve shell.

The point at the hinge, from which the formation of each valve has proceeded, is called the *umbo*. On the side of the umbo opposite to the ligament there is usually a small depression called the *lunule*. The marks, familiar to every one, upon the inside of a bivalve shell, are the impressions of the *mantle* of the (lamellibranchiate) mollusk, and of the adductor muscle or muscles.

BI'VOUAC (from the German *beiwacht*, or *bewachen*, to watch over) is the encampment of soldiers in the open air, without tents, where every one remains dressed, and with his weapons by him. Even during the Seven Years' War it was no uncommon thing for the whole army, when in the vicinity of the enemy, to pass the night in their ranks, each lying down in his place, in order to be ready to stand to their arms at a moment's notice. But the French revolutionary armies introduced the practice of dispensing with tents altogether, and regularly passing the night *en bivouac*. Hence in a great measure that rapidity in their motions which long made them uniformly successful; and the practice was afterwards imitated by the other armies of Europe, though less by the English. Soldiers in B. light fires, and improvise, where it is possible, huts of straw, branches, &c. But this mode of encampment, though favorable to celerity of movement, is purchased at the expense of the soldiers' health, besides being destructive of discipline, by leading to plundering and destroying of houses, fruit-trees, &c., in the vicinity. Accordingly, the tent is again coming into use, and for permanent encampments, regularly constructed wooden huts have been introduced. There are still, however, many cases where the B. is the only resource.

BIXA. See ARNOTTO.

BIZE'RTA, or BENZE'RTA (ancient *Hippo Diarrhytus*, or *Zaritus*), a seaport town of Tunis, at the bottom of a deep gulf or bay of the Mediterranean, and at the mouth of a lagoon, united to the gulf by a narrow channel. It is the most northerly town in Africa, being about 38 miles north-west of Tunis, in lat. 37° 17′ N., and long. 9° 51′ E. It is surrounded by walls, and defended by two castles; which, however, as they are commanded by the neighboring heights, are quite useless against a land-attack. Its port, formerly one of the best in the Mediterranean, has been suffered to fill up, until now only small vessels can be admitted. The inner lagoon, often said to have a depth of 40 fathoms, is really from 5 to 8 fathoms deep, and is extensive enough to shelter a navy. The fisheries of the lake are very productive, tunnies especially abounding; and much coral is obtained. Hence its importance to the French, who in 1881 made themselves masters of Tunis. The adjacent country is remarkably fertile, but its cultivation is neglected. Pop. about 8000. Agathocles fortified B. in 307 B.C.; and under the Romans, it was a free city.

BIZIU'RA. See MUSK DUCK.

BJORNSTJERNA, MAGNUS FRIEDRICH FERDINAND, COUNT, a Swedish statesman and author was born 10th October 1779 at Dresden, where his father then resided as secretary to the Swedish legation. He received his education in Germany, and entered Sweden for the first time in 1793 to join the army. In 1813 he was appointed lieutenant in the Swedish army that went to aid the allies in Germany; took part in the conflicts at Grossbeeren and Dennewitz; was present at Leipsic, and concluded the formularies of capitulation with the French at Lübeck and Maestricht. Subsequently he fought in Holstein, and in Norway, where he concluded the treaty that united that country with Sweden. In 1826, he received the title of count; and in 1828 was appointed ambassador to the court of Great Britain, which office he held till 1846, when he returned to Stockholm, where he died, 6th October 1847. As a politician, B.'s opinions were liberal. In addition to some political writings, he published a work on the Theogony, Philosophy, and Cosmogony of the Hindus in 1843.

BLACK may be considered as the negation of color, resulting from the absorption of the rays of light by certain substances. Painters produce it by an unequal combination of the three primary colors. In medieval art, B. was symbolical of evil, error, and woe; thus we find Christ, when the old illuminators wished to represent him as wrestling against the Spirit of Evil, arrayed in black drapery; and Byzantine painters, to express the sorrow of the Virgin Mary, gave her a black complexion. 'All faces shall gather blackness,' is the expression of Joel, when he wishes to convey the idea of the trouble of the people when the calamities which with prophetic eye, he sees brooding over Jerusalem, should come to pass. B. clothing among some oriental nations was regarded as a badge of servitude, slavery, or low birth; among the Moors, it has several significations—obscurity, grief, despair, constancy. B. in blazonry, under, the name of sable, denotes constancy, wisdom, and prudence. For B. as a funereal color, see FUNERALS, and MOURNING.

BLACK PIGMENTS, used in painting, are derived principally from animal and vegetable substances. They are very numerous, and of different hues and degrees of transparency; but the most important are vegetable blue-black—obtained from beech-wood burned in close vessels—ivory-black, cork-black, and lamp-black, the principal constituent of all being charcoal or carbon. A fine-toned B. pigment is obtained by burning German or French Prussian blue. Combined with white, B. P., which are slow driers, yield grays of several tints.

BLACK, JOHN, an eminent newspaper editor, and classical scholar of some reputation, was a native of Berwickshire, his father being a shepherd, or farm-laborer, in the Lammermoors, near Dunse. Born in 1783, and left an orphan at twelve years of age, B. commenced life in the office of a Dunse writer, but he soon left that place for Edinburgh, where he was engaged for several years as a writer's clerk. While in this capacity, B. was assiduous in the work of self-education; and besides considerable progress made in classical studies at this time, he acquired German from a German musician in an Edinburgh band, and Italian from a refugee. Finding Edinburgh too limited a sphere for his energies, he went to London about the year 1810, and was immediately engaged as a parliamentary reporter for the *Morning Chronicle*, of which paper he afterwards became editor. Under his management the *Morning Chronicle* was celebrated for its independence and fearless advocacy of progress, and that at a time when subserviency was so common that it was regarded as little or no disgrace. He retired from the editorship in 1843, and continued to reside, until his death, which took place June 25, 1855, in a pleasant cottage on the Kentish estate of one of his friends. Among those who acted on the *Morning Chronicle* under Mr. Black was Mr. Charles Dickens, the eminent novelist. B. was author of a *Life of Tasso, with a Historical and Critical Account of his Writings*, 2 vols. (Edin. 1810), and the translator of the lectures of the brothers Schlegel on *Dramatic Art and Literature* (since republished by Bohn), and on the *History of Literature Ancient and Modern*, as well as of one or two works from the French and Italian.

BLACK, JOSEPH, an eminent chemist, was born in 1728, at Bordeaux, where his father was engaged in the wine-trade. Both his parents were of Scotch descent, but natives of Belfast, to which their son was sent for his education in 1740. In 1746 he entered the university of Glasgow, and studied chemistry under Dr. Cullen. In 1751 he went to Edinburgh to complete his medical course, and in 1754 took his degree. His thesis, on the nature of the causticity of lime and the alkalis, which he showed to be owing to the absence of the carbonic acid (called by him fixed air) present in limestone and in what are now called the carbonates of the alkalis, contained his first contribution to chemical science, and excited considerable attention. In 1756, on the removal of Cullen to Edinburgh, B. succeeded him as professor of anatomy (which branch he afterwards exchanged for medicine) and lecturer on chemistry in Glasgow. Between 1759 and 1763, he evolved that theory of 'latent heat' on which his scientific fame chiefly rests, and which formed the immediate preliminary to the next great stride in discovery by his pupil and assistant James Watt. In 1766, Cullen was appointed to the chair of theoretical medicine in Edinburgh, and B. succeeded him in the chair of chemistry. Thenceforth he devoted himself chiefly to the elaboration of his lectures, in which he aimed at the utmost degree of perspicuity, and with perfect success. His class became one of the most popular in the university; it occasioned, however, some disappointment that one so capable of enlarging its territory made no further contributions to chemistry. Though of an extremely delicate constitution, he prolonged his life, by care and temperance, to the age of 71. He died on the 26th November 1799. His lectures were published in 1803 (Edin. 2. vol. 4to), edited, with a biographical and critical preface, by Professor Robinson.

BLACK, WILLIAM, a novelist with narrative and descriptive powers of a high order, was born in Glasgow in 1841. He received his education in his native town, and studied art at a

government school with the view of becoming an artist; but adopting journalism instead, he wrote for the press in Glasgow, previous to his removal to London in 1864. During the Prusso-Austrian war of 1866, he was employed as special war correspondent on the staff of the *Morning Star;* and in a novel which he published, *Love or Marriage*, 1867, he made use of some of the experiences he had gained. He was assistant editor of the *Daily News* for four or five years. Two novels, *In Silk Attire* and *Kilmeny*, proved more successful than the previous work; and *A Daughter of Heth* (1871) established his reputation with the novel-reading public. *The Strange Adventures of a Phaeton* (1872) is founded on an actual driving excursion between London and Edinburgh. *A Princess of Thule* (1873) proved extremely popular, and has been translated into several languages. In 1876 he visited America, were he received a warm reception. The other principal works of B. are—*Three Feathers* (1875); *Madcap Violet* (1876); *Green Pastures and Piccadilly* (1877); *Macleod of Dare* (1878); *White Wings* (1880); *Sunrise, a Story of these Times* (1880); *Shandon Bells* (1882); *Yolande* (1883).

BLACK ACTS are the acts of the Scottish parliament of the first five Jameses, those of Queen Mary's reign, and of James VI. down to 1586 or 1587. They were called the B. A. because they were all printed in the black or Saxon characters.

In English law-books, the expression 'Black Act' is applied to the 9 Geo. I. c. 22, because it was occasioned by the outrages committed by persons with their faces blackened or otherwise disguised, who appeared in Epping Forest.

BLACK ART. See MAGIC.

BLACK ASSI'ZE, the popular name commemorative of an extraordinary and fatal pestilence which broke out at Oxford at the close of the assizes, July 6, 1577. It was popularly interpreted as a divine judgment on the cruelty of a sentence passed by the court. From the 6th of July to the 12th of August, 510 persons are said to have died, in Oxford and the neighborhood, of this terrible malady, among whom were the chief officials who sat on the assize, most of the jury, and many members of the university. Women, poor people, physicians, visitors, and children are said to have escaped the infection. A similar event is recorded as having taken place at Cambridge at the Lent Assizes in 1521.

BLA'CK-BAND I'RONSTONE is an ore of iron found very extensively in Scotland and elsewhere. It occurs in the carboniferous system in regular bands, layers, or strata, and is generally associated with coal and limestone. It is mainly a carbonate of iron with much coaly matter.

The B. I. is easily reduced. It does not, however, yield a first-class iron when smelted by itself, and is therefore generally mixed with a small quantity of hematite (red iron ore), which communicates strength and hardness to the iron obtained.

BLACK BEETLE. See BLAPS and COCKROACH.

BLA'CKBERRY. See BRAMBLE.

BLA'CKBIRD, or MERLE (*Turdus Merula* of some naturalists, *Merula vulgaris* of others), a well-known species of Thrush (q. v.), common in all parts of Britain and throughout Europe generally; found also in the north of Africa and in the Azores. In Asia it gives place to a closely allied species, *Turdus pacilopterus*. In size, the B. is intermediate between the missel-thrush and the song-thrush or mavis. The plumage of the adult male is wholly of a deep black color, the bill and orbits of the eyes yellow; the female and the young are of a dark rusty brown, with dusky bill and eyelids. The B. frequents hedges, thickets, and woods; is shy, restless, and vigilant, keeping much under cover of evergreens or shrubs; and when disturbed, takes wing with a vociferous chattering of alarm, seeking refuge in some neighboring thicket. Its food consists of worms, snails, insects, berries, &c. Its fondness for fruit makes it often annoying to the gardener; but probably it would in general be better to protect cherries and pears by nets than to shoot the B., which is of great use as a destroyer of insect larvæ. Like some of the other thrushes, it also devours great numbers of small snails, dexterously breaking the shell against a stone. It is not usually a gregarious bird, although great flocks sometimes appear upon the British coasts in winter, on their passage from more northerly to more southerly countries (*Selby*, quoted by *Yarrell*). Otherwise, the B. is not in Britain a bird of passage. It pairs very early in spring; the male and female are indeed very often seen together during winter; it builds its nest early, and generally has two broods in the year. The nest is generally placed in some thick bush; it is of ruder workmanship than that of the song-thrush, which, however, it resembles, and is usually formed of strong stems of grass, with a finer lining of dry grass inside, and a massive plastering of clay outside. The eggs are four or five in number, of a pale blue color, generally speckled with brown. The voice of the B. is very powerful, and its song more mellow than that of the thrush, but with 'much less variety, compass, or execution.' The B. is often kept as a cage-bird, and would be much more frequently so, but for the too great loudness of its song: it is very susceptible of being trained, exhibits considerable powers of imitation, and has even been taught to speak. —The RING OUZEL (q. v.), a bird very nearly allied to the B., is sometimes called the Ring Blackbird.—The CROW BLACKBIRDS (q. v.) of America are entirely different.—The SAVANNA B of the West Indies is also of a different family. See CROTOPHAGA.

BLA'CKBURN, an inland town of Lancashire, England, 21 miles north-north-west from Manchester, and 12½ miles by railway east-by-south from Preston. It stands on a stream, from which it appears to derive its name, a branch of the Ribble. The surrounding district, formerly known as *Blackburnshire*, or *Blaghornshire* was long very wild and dreary, but is now very populous. Coal and lime abound in it. B. had acquired some importance as a market-town in the 16th century. Its manufacturing prosperity can be traced back at least to the middle of the 17th c., when it was noted for the production of a kind of linsey-woolsey known by the name of *Blackburn Checks*, afterwards superseded by the *Blackburn Greys*, so called from their being printed unbleached. In the course of the 18th c., the cotton manufacture became the chief industry of the town, which is now one of the chief seats of it, the number of cotton factories being very large, and many of them employing from 1000 to 2000 operatives. The value of the calicoes and other cotton goods annually produced was estimated some years ago at nearly £2,000,000 sterling, and is now certainly much more. The steam-power employed in the works for spinning and weaving cotton has been more than doubled within the last 20 years. Many improvements in machinery for the cotton manufacture have been made in B., among which the first place in importance as well as in date must be assigned to the invention of the spinning-jenny, by James Hargreaves (q. v.), a native of the town, in 1767. His invention, however, was regarded with so much dislike, that he was compelled to remove from the town, and it was not till the beginning of the present century that it came into general use. The pop. of B. in 1851 was 46,536; in 1861, 63,126. In 1871, the pop. of mun. bor. was 76,339; of parl. bor., 82,928; in 1881, 104,012 and 100,618 respectively. A range of hills on the north of the town shelters it from the coldest winds. Many of the streets are spacious, and the town is generally well built. A park of 50 acres, known as the *Corporation Park*, has recently been laid out for public recreation. The most elevated part of this park is about 700 feet above the level of the sea, and commands a very extensive view. The parish church, St. Mary's, is a very beautiful Gothic building, erected between 30 and 40 years ago. There are numerous other places of worship, both of the Established Church, and of various denominations of dissenters. The Grammar-school was founded by Queen Elizabeth in 1567; and there are many other educational establishments, and many benevolent and religious institutions. The finest building in the town is the exchange, built in 1865, in the Gothic style, and containing a magnificent room, 40 yards by 20. The town-hall is also worthy of being mentioned. B. is supplied with water from capacious reservoirs, which have been constructed in the neighborhood. The Leeds and Liverpool Canal, passing on the south side of the town, affords important facilities for the conveyance of goods; and B. is connected by several railways with all the neighboring towns, and so with all parts of the kingdom. B. is governed by a mayor, 12 aldermen, and 36 common-councilmen. It sends two members to parliament, a privilege which it obtained under the Reform Bill of 1832.

BLA'CKCAP, BLA'CKCAP WA'RBLER, or BLA'CKCAP FAUVE'TTE (*Curruca atricapilla*), a bird of the great family of

Blackcap (*Curruca atricapilla*).

the *Sylviadæ*, or Warblers, and of the same genus to which the nightingale is commonly referred. See FAUVETTE, WARBLER, and SYLVIADÆ. It is regarded as the sweetest song-bird in Britain, or indeed in Europe, except the nightingale, to which it is said to be even superior in 'its shake or trilling note.' Very often, however, the strain is desultory, and of short continuance;

but it is loud, rich in tone, and has a 'great variety of sweet and gentle modulations.' White says, in his *Natural History of Selborne*, that while the B. warbles, its throat is wonderfully distended. It is a rather smaller bird than the nightingale; the female is larger than the male. The back, wings, and tail are of an ash-brown color; the chin, throat, and breast are gray; the belly, white. The upper part of the head in the male is jet-black; in the female, of a dull rust color. The feathers of the head, both in the male and female, are somewhat erected, giving the bird a hooded appearance, on account of which it is called, in Germany, *the monk*. In Britain, the B. is a bird of passage, arriving early in spring, and retiring in September. The males, as in the case of the nightingale, arrive a few days before the females. The B. is not a common bird in Britain: it is most frequent in the southern counties of England, but is found even in Scotland; on the continent, it extends its migrations as far north as Lapland. In the south of Europe, it is found both in summer and winter. As a cage-bird, it is pleasing not only on account of its song—which, however, is sometimes partly spoiled by its too successful imitation of other birds—but also on account of its manners, the intelligence which it displays, and its strong attachment to those who are accustomed to feed and caress it.

BLA'CKCAP TITMOUSE, or CHICKADEE', a North American bird. See TITMOUSE. The Marsh Titmouse, a British bird, is sometimes called Blackcap, or Blackcap Titmouse.

BLACK CHALK is a variety of Clay-slate (q. v.), containing a considerable proportion of carbon. It is used for drawing, and is also ground down to form a black paint. It is found as a rock of a slaty texture and bluish-black color in the island of Islay and in Caernarvonshire, also in Spain, and other parts of the world.

BLA'CKCOCK, HEA'TH-FOWL, or BLACK GROUSE (*Tetrao Tetrix*), a species of Grouse (q. v.), abundant in Britain wherever there are moors of considerable extent, and more particularly where there are bogs and morasses with rank herbage, or, adjacent to the moors, natural woods or young plantations of pine and fir. Comparatively rare in the south of England, the B. becomes more common towards the north, and is very plentiful in the mountainous parts of Scotland. It is found in some of the Hebrides, but not in the Orkney or Shetland Isles. On the continent of Europe, it occurs both in mountainous and marshy countries, as on the Alps and in Holland; it is found as far south as the Apennines, and as far north as the forests of Lapland; it abounds in most parts of Scandinavia, where it is carefully protected, the males only being killed, great numbers of which are sent to the London market; it is diffused over almost all parts of Russia, and is found in Siberia. The male is much larger than the female, sometimes weighing as much as four pounds, whilst the female weighs only about two pounds; they also differ very much in plumage. The male is of a shining bluish-black color, with a conspicuous white bar on the wings below the ends of the great wing-coverts, and a mixture of black and white on the legs; there is a piece of bare scarlet skin over the eye; the outer feathers on each side of the tail are elongated and curve outwards, giving it a very peculiar appearance. The female, called the *Gray Hen*, is of a rust color, darkest on the upper parts, everywhere barred and mottled with a darker color; the tail is straight and even at the end. The young males resemble the females in plumage. The shank in this species is feathered, but not the toes. It is a gregarious bird, the different sexes, however, in winter, generally keeping in flocks by themselves. In spring, the males resort to elevated and open spots, where they crow, and also make a sound which has been likened to the whetting of a scythe, thus inviting the females to repair to them; they strut and trail their wings like turkey-cocks, and fierce contests often take place among them.

Blackcock (*Tetrao Tetrix*).

They are polygamous, and pay no attention to the females during incubation, nor do they take any part in rearing the young. —The nest is of the simplest construction, a few straws or the like, placed together among tall heath, or under the shelter of a low thick bush. The eggs, six to eight in number, are yellowish-white, speckled with orange-brown, and about two inches long. The food of the B. consists of the seeds of rushes and other plants, berries, insects, the tender shoots of heath, leaves, &c.; it sometimes visits cornfields and stubbles to feed on corn; is frequently to be found in turnip-fields in the neighborhood of plantations in hilly districts; and, at least in winter, eats the young shoots of pines, firs, birches, and alders. It is highly esteemed for the table.

It seems to be well established that hybrids are occasionally produced between the B. and other species of grouse; and also between the B. and the pheasant; but this subject, although regarded with much interest by some of the greatest naturalists, has not yet received the investigation which it deserves, and nothing appears to be known concerning any offspring of such hybrids. See Yarrell's *British Birds*, ii. 289—314. It can only be deemed probable, not certain, that the bird called *Tetrao hybridus*, sometimes found in the Scandinavian peninsula and other parts of Europe, is a hybrid between the B. and the Capercailzie (q. v.).

BLACK DEATH was one of the names given to an oriental plague marked by inflammatory boils and tumors, which in the 14th c. desolated the world. It took this name from the black spots, symptomatic of a putrid decomposition, which, at one of its stages, appeared upon the skin.

Our information as to the symptoms and course of this terrible malady is far from perfect. So much is clear, that they varied somewhat from case to case, and in different countries, and greatly changed towards the close of the period of its ravages in Europe (1348—1351). Among them may be noticed great imposthumes on the thighs and arms—what are called buboes—and smaller boils on the arms and face; in many cases, black spots all over the body; and in some, affection of the head, stupor, and palsy of the tongue, which became black as if suffused with blood; burning and unslakable thirst, putrid inflammation of the lungs, attended by acute pains in the chest, the expectoration of blood, and a fetid pestiferous breath. On the first appearance of the plague in Europe, fever, the evacuation of blood, and carbuncular affection of the lungs, brought death before the other symptoms could be developed; afterwards, boils and buboes characterized its fatal course in Europe as in the East. In almost all cases its victims perished in two or three days after being attacked. Its spots and tumors were the seals of a doom which medicine had no power to avert, and which in despair many anticipated by self-slaughter.

If the symptoms of the B. D. have been only imperfectly handed down to us, the history of its rise and progress is still more obscure. But while fable enters largely into its history, it would seem to be safe to assign its birthplace to China; and there is a strong concurrence of testimony, that the causes which co-operated to produce it are to be sought for as far back as 1333—15 years before its outbreak in Europe—in a series of great convulsions of the earth's structure, which commenced in that year, and which, for 26 years thereafter, continued powerfully to affect the conditions of animal and vegetable life. The precise date of the appearance of the plague in China is unknown, but from 1333 till 1348, that great country suffered a terrible mortality from droughts, famines, floods, and earthquakes which swallowed mountains, and swarms of innumerable locusts; and in the last few years of that period, from the plague. During the same time, Europe manifested sympathy with the changes which affected the East. The order of the seasons seemed at various times to be inverted; storms of thunder and lightning were frequent in the dead of winter, and there occurred great earthquakes and erruptions of volcanoes conceived to have become extinct, The theory is, that this great tellurian activity, accompanied by the decomposition of vast organic masses, myriads of bodies of men, brutes, and locusts, produced some change in the atmosphere unfavorable to life; and some writers, speaking of the established progress of the plague from East to West, say that the impure air was actually visible, as it approached with the burden of death. 'A dense and awful fog was seen in the heavens, rising in the East, and descending upon Italy' *Mansfeld Chronicle in Cyriac Spangenberg*, chap. 287, fol. 336). With this view of the plague is to be conjoined another regarding the causes which produced a predisposition of the inhabitants of Europe to become its victims, and which are referred to the effects on the popular health partly of scarcity, and partly of the prevalent bad habits of living. There is much probability in the theory, that the plague was owing to an atmospheric poison acting on the organs of respiration, which, it will be recollected, were always those first attacked. But while impurity of the air and the state of the public health may have largely contributed to the mortality, it may be doubted whether the disease did not owe its extension almost wholly to infection and contagion, whatever causes may have originally produced it. It appears that the pestilence had in a milder form appeared in Europe in 1342, but it had passed away, and there is little reason for holding that, in the interval, it remained merely latent. The invasion of 1348 may actually be tracked from China in its advance by the various caravan routes towards the West. The northern coast of the Black Sea sent the plague by contagion to Constantinople. By contagion it reached the seaports of Italy, and thence, as from so many foci of contagion, it soon established itself over Europe. Its advance may be traced through Germany

and France to England, from which it was transmitted to Sweden. It was three years from its appearance at Constantinople, before it crept, by a great circle, to the Russian territories. This fact of its spread by contagion has led to speculations as to whether, by rigid rules of quarantine, it might not have been excluded from Europe. Such rules are now at many points in force as securities against oriental plagues.

There are no proper materials for estimating the mortality which this plague produced, for it occurred before the value of statistics was appreciated. But in China, 13,000,000 are said to have died, and in the rest of the East nearly 24,000,000. These numbers appal the imagination. Coming to Europe, the horror is increased by the greater exactness of the details. London alone lost over 100,000 souls; 15 European cities lost among them about 300,000; Germany is calculated to have lost 1,244,434; Italy, one half of its population. On a moderate calculation, it may be assumed that there perished in Europe 25,000,000 human beings. Africa suffered with the rest of the known world. Everywhere was death. All animal life was threatened. Rivers were consecrated to receive corpses, for which none dared perform the rites of burial, and which in other places were cast in thousands into huge pits made for their reception. Death was on the sea, too, as well as on the land, and the imagination is quickened to the realization of the terrible mortality by the accounts of ships without crews—the crews dead and putrefying on the decks of the aimless hulls—drifting through the Mediterranean, the Black and the North Seas, and cursing with the contagion the shores on which winds or the tide chanced to cast them.

The mortality caused by the plague was, however, only one of the evils to which it gave rise. Its moral effects on the survivors and the frame of society were no less momentous. Many died of fear, which among the living dissolved the ties of kindred; mothers forsook their plague-stricken children; the worldly became quickened to a maddening sense of sin; the religious fixed their eyes more steadily on futurity; all rushed to sacrifice their means to the church, while the ecclesiastics drew back from the gold showered over their walls, as being tainted with death. Superstition finally banded multitudes together by common means to work out the common safety. In Hungary, and afterwards in Germany, rose the brotherhood of the Flagellants, who undertook to expatiate the sins of the people, and avert the pestilence by self-imposing sufferings. Originally of the lower classes, they gathered to their order, as it extended, crowds of the highest, both men and women, and marched from city to city, robed in sombre garments, with red crosses on the breast, back, and cap, and with their heads covered as far as the eyes; they went chanting in solemn procession with banners, with down-turned faces, and bearing triple scourges with points of iron, with which, at stated times, they lacerated their bodies. They at last pervaded nearly all Europe; Germany, Hungary, Poland, Bohemia, Silesia, and Flanders did them homage.

This, however, is not the place to give their history, for which the reader will refer to the article under the head FLAGELLANTS. Suffice it that the order was not suppressed till the pope, at the instigation of several crowned heads, prohibited throughout Christendom their pilgrimages, on pain of excommunication. While the wanderings of the Flagellants threw society into confusion, and helped to spread the plague, the horrors of the time were further heightened by the fearful persecutions to which the Jews were subjected, from a popular belief that the pestilence was owing to their poisoning the public wells. The people rose to exterminate the Hebrew race, of whom, in Mayence alone, 12,000 were cruelly murdered. They were killed by fire and by torture wherever they could be found, and for them, to the terrors of the plague were added those of a populace everywhere infuriated against them. In some places, the Jewish people immolated themselves in masses; in others, not a soul of them survived the assaults of their enemies. No adequate notion can be conveyed of these horrors. To aggravate the pestilence, the poison-panic made the people shut up their wells. With terror of poison and of plague in a state of society rude at the best, but now disorganized, what means were available to mitigate or prevent the sufferings of the people were rendered altogether nugatory.

It would be useless to attempt to give any notion of the effects in society of this plague; how during it some, like people in sieges, came to be callous, and some, like thieves under the gallows, to regard the desolation only as it afforded opportunities for plunder and indulgence. The whole phenomena would form a a fine study for the social philosopher and psychologist. We must content ourselves here with referring the reader to the *Decameron* of Boccaccio for a description of the plague at Florence, which, for vividness and particularity of observation, almost equals Thucydides's account of the plague at Athens. In Bulwer's *Rienzi*, also, an account of the plague will be found. The reader should also consult Hecker's *Epidemics of the Middle Ages*, translated for the Sydenham Society. Accounts of the plague have been left us by the physicians Guy de Chauliac and Chalin de Vinario. But perhaps Boccaccio's is the best of the whole. The B. D. afterwards more than once appeared in Europe, but never with the same virulence or duration.

BLACK DEATH, THE RECENT, is the title commonly given to a very fatal disease which occurred in Ireland, in an epidemic form, in the years 1866—1867. It is described under the title of EPIDEMIC CEREBRAL MENINGITIS.

BLA'CKFISH (*Centro'lophus Moris*), a fish of the family of the *Scombe'ridæ* (q. v.), very nearly allied to the beautiful Coryphenes (q. v.), so frequently called dolphins. It is found both in the Mediterranean Sea and on the western coasts of Europe, occasionally on the southern coasts of Britain, but is everywhere rare, perhaps because it is an inhabitant chiefly of deep waters. It is known to attain a length of more than thirty inches, and a weight of fourteen pounds. The general form is not unlike that of a perch; there is a single elongated dorsal fin with short rays, rising from a thin elevated ridge; the body is covered with minute scales, the skin is tough and can be stripped off like that of an eel; there is no air-bladder. The color is black, that of the fins intensely so. The B. is remarkable for great strength and velocity. As an article of food, it is described as delicious.

BLACK FLUX is prepared by heating in a covered crucible ordinary or crude cream of tartar, or the bitartrate of potash ($KO,HO,C_8H_4O_{10}$), when the tartaric acid ($C_8H_4O_{10}$) is decomposed, and charred, forming carbonic acid (CO_2), which remains in combination with the potash (KO) as carbonate of potash (KO,CO_2), accompanied by much free carbon. This very intimate mixture of carbonate of potash and carbon, otherwise called B. F., is a fine black powder of great service in the fluxing of metallic ores, as of lead (q. v.), and the separation of the metal therefrom. The B. F. is likewise employed as the raw material from which, on the application of heat in iron vessels, the metal potassium can be obtained.

BLACK FOREST (Ger. Schwarzwald), a wooded mountain-chain in Baden and Würtemberg, running from south to north along the western side of Swabia, parallel with the course of the Rhine after its great bend near Basel, and often only a few miles distant from it. The Rhine also bounds it on the south, and the level country between the Enz and the confluence of the Neckar with the Rhine borders it on the north; lat. 47° 30'—49° 30' N., long. 7° 40'—9° E. The chief rivers rising in the B. F. are the Danube, Neckar, Murg, Kinzig, Elz, Enz, and Wiessen. The B. F. attains its greatest elevation in the bare and round-topped Feldberg (about 4850 feet high), which rises near the source of the Wiessen and the celebrated Hölle (Hell) Pass, a narrow valley shut in by mountains in the vicinity of Neustadt. The great mass called the Kaiserstuhl (Emperor's Chair), situated near Breisach, is quite isolated. As to the geological character of the B. F., primitive granite and gneiss form its core, porphyry is found on its sides, and sandstone along its highest ridges, as well as at its base. Silver, copper, cobalt, lead, and iron are found in greater or less quantity in its principal chain, which is luxuriantly wooded, its name Schwarzwald being derived from the dark-tinted foliage and immense number of its fir-trees. The B. F. is also rich in mineral waters, as e. g., the baths of Baden-Baden and Wildbad (q. v.).

On the Rhine side, the descent is precipitous, but towards the Danube and the Neckar it is gradual. Among its numerous valleys, the Murgthal is the most famous for its natural beauties. The western slopes are studded with vineyards. Summer rye, oats, and potatoes are cultivated in some parts of the B. F.; but it is with difficulty, and the rearing of cattle is prosecuted with much greater success. This, and the manufacture of articles of wood, forms the chief industry of the inhabitants. The making of wooden clocks and other kinds of time-pieces employs about 40,000 persons; and not less than 600,000 articles of this kind, including music-boxes, are exported annually to all parts of the world, 1000 dealers being engaged in the traffic.

Two of the passes of the B. F., the Kniebis and the Hölle, acquired considerable celebrity during the wars of the French Revolution. The first, situated on the borders between Baden and Würtemberg, at the source of the Murg, was taken by the French in 1796 and in 1797; the Hölle is known in connection with Moreau's retreat in 1796.

BLA'CKHEATH, a high-lying open common, in the county of Kent, five miles south-east of London, near Greenwich Park. It commands a fine view of great extent, and being a healthy tract, many villas have been built on its margin. It is a favorite holiday resort for Londoners. The Roman road to Dover crossed it. B. is one of the few places in England where the ancient Scottish game of golf is practised. On it stands Morden College, founded in 1695 by Sir J. Morden for decayed merchants, and with a revenue of £5000. B. was formerly the scene of several insurrections, including those of Wat Tyler, 1381, and Jack Cade, 1450. Here the Danes encamped in 1011; the Londoners wel-

comed Henry V. from Agincourt; and Charles II., on his way from Dover, met the army of the Restoration. B. was also a noted place for highwaymen.

BLACK HOLE, an appellation familiarly given to a dungeon or dark cell in a prison, and which is associated in the public mind with a horrible catastrophe in the history of British India—namely, the cruel confinement of a party of English in an apartment called the 'Black Hole of Calcutta,' on the night of the 18th of June 1756. The garrison of the fort connected with the English factory at Calcutta, having been captured by the nabob Suraja Dowlah, this barbarian caused the whole of the prisoners taken, 146 in number, to be confined in an apartment 20 feet square. This cell had only two small windows, and these were obstructed by a veranda. The crush of the unhappy sufferers was dreadful; and after a night of excruciating agony from pressure, heat, thirst, and want of air, there were in the morning only 23 survivors, the ghastliest forms ever seen on earth. See HINDUSTAN.

BLACKIE, JOHN STUART, Professor of Greek in the university of Edinburgh, was born in Glasgow in 1809, but received his early education in Aberdeen, where his father was agent for a bank. After going through the usual course of a Scotch university education—partly at Marischal College, Aberdeen, partly at Edinburgh—with a view to the church, he went in 1829 to Germany, and studied for some time both at Göttingen and Berlin. He thus acquired a mastery of German, and an acquaintance more extensive than ordinary with the literature of that language. On his return, having abandoned the thought of entering the church, he began the study of law, and passed as advocate at the Edinburgh bar in 1834. But he soon found the practice of the profession uncongenial, and devoted himself henceforth to literary pursuits. Among his earliest productions was his translation, in English verse, of Goethe's *Faust*, which was preferred by G. H. Lewes to any other of the metrical translations. He wrote also about this period numerous articles in the *Foreign Quarterly Review*, the *Westminster*, *Blackwood*, and *Tait*, chiefly on German subjects. In 1841, he was appointed by the crown to the chair of Humanity in Marischal College, which he held until, in 1852, he was elected to the Greek chair in the university of Edinburgh. Ever since he became professor, he has been incessant in advocating educational reform in Scotland. He took an active part in the movement that led in 1859 to the remodelling of the Scottish universities. During 1874—1876, B. advocated throughout the country, with great enthusiasm, the foundation of a Celtic chair in Edinburgh University, and was successful in raising upwards of £14,000 of endowment. Of works of a professional and philological kind may be mentioned two lectures *On the Studying and Teaching of Languages; On the Rhythmical Declamation of the Ancients; The Pronunciation of Greek; Accent and Quantity*, 1852. Among the most matured and scholarly of B.'s productions is his metrical translation, with notes, of the dramas of Æschylus, published in 1850. In 1853, he spent some time in Athens, acquiring the modern Greek tongue. In 1866, Professor B. published *The Iliad of Homer, translated into English Verse, with Commentary and Introductory Dissertations* (Edin.). Known as a zealous vindicator of Scottish nationality and its characteristic features, B. has also made himself conspicuous as a defender of the principles of the British constitution; and *Democracy*, the substance of his argument in 1867, in public debate with Ernest Jones, a radical champion, was published and largely read. B. has repeatedly traveled abroad, and in 1878 was in Egypt. The versatile activity of Professor B. has further led him into both abstract speculation and poetry. He published in 1858 a treatise on *Beauty*, in refutation of Lord Jeffrey's association theory. Others of his works are *Lays and Legends of Ancient Greece, with other Poems* (1857); *Lyrical Poems* (1860); *Musa Burschicosa* (1869); *War Songs of the Germans* (a translation, 1870); *Four Phases of Morals* (1871); *Songs of the Highlands and Islands* (1872); *Self Culture* (1873); *Horæ Hellenicæ* (1874); *Songs of Religion and Life* (1876); *Altavona: Fact and Fiction from the Highlands* (1882)—a series of dialogues or conversations. In 1882, B. resigned his professorship.

BLACKING is the material employed for producing a black glazed shining surface on leather. The main ingredient in the various kinds of B. is bone-black (q. v.), which is mixed with an oil, some sugar, and a little sulphuric acid. The materials in Day and Martin's B. are finely powdered bone-black ground with sperm-oil, raw sugar or molasses, a little vinegar, and some concentrated sulphuric acid (specific gravity 1850). The substances are incorporated together one by one in the order in which they are stated, and the action of the sulphuric acid is to convert much of the lime in the bone-black into sulphate of lime, which causes a thickening of the mixture, and a tenacious paste results. This paste, diluted with weak vinegar, is put, while warm, in stoneware bottles, and is then ready for the market.

BLACK JACK, the name given by miners to Blende (q. v.). It was also the name applied in former times to a kind of drinking flagon.—B. J. (tree), see OAK.—B. J. or NIGGER CATERPILLAR, see TURNIP SAWFLY.

BLACK LEAD, GRA'PHITE, or PLI'MBA'GO, a mineral consisting chiefly of carbon, but containing also more or less of alumina, silica, lime, iron, &c., to the extent of 1 to 47 per cent., apparently mixed rather than chemically combined. B. L. is the popular name, and that by which it is generally known in the arts; Graphite is that generally preferred by mineralogists.—The name B. L., however, ought, perhaps, to be regarded as an unfortunate one, as no lead enters into the composition of the mineral. It sometimes occurs crystallized in short imbedded hexagonal prisms; but generally massive, and more or less radiated, foliated, scaly, or compact. It is of a grayish-black color, with a somewhat metallic lustre, and is perfectly opaque. It is greasy to the touch, and is a perfect conductor of electricity. It is found in primary and transition rocks, as in gneiss, mica-slate, quartz-rock, greenstone, and clay-slate, and pretty abundantly in various parts of the world. It is much more incombustible than even anthracite (or *blindcoal*), burning with much difficulty even before the blow-pipe, on which account it is much used for the manufacture of crucibles or 'melting-pots,' which withstand a great heat. These are not, however, made of mere B. L., but of B. L. in powder, mixed with half its weight of clay. B. L. is employed for making pencils (q. v.). It is also extensively employed to give a black gloss to iron grates, stoves, railings, &c., and to diminish the friction of the belts and other parts of machinery. Lately it has been suggested as a lubricating agent in the cartridges of rifles, instead of lard or tallow.—Much B. L. is obtained at Borrowdale, in Cumberland; there are also great desposits in Siberia, and in Missouri, U. S.

BLACK LETTER (Black Letter), the name commonly given in this country to the types which on the continent are most generally known as Gothic. The first printed books imitated every peculiarity of the contemporary manuscripts; and as printing was first practised in Germany and the Netherlands, the first types were copied of the letters in use in those countries in the middle of the 15th c. Two sorts of letters have been employed in the writings of Western Christendom. What have been called Roman letters prevailed from the 5th to about the close of the 12th c., when they gradually began to pass into what have been called Gothic letters, which continued till the 16th c., when in most European countries, they were superseded by Roman letters. The first types, as has been said, were Gothic, and they spread with the art of printing into various European states. In France and Italy, they were slightly modified by cutting off some of their rougher points; and when thus trimmed, they came to be known in the former country as *lettres de somme*, being so called, it is said, from their use in an edition of the *Summa* of St. Thomas Aquinas. The classic taste of Italy could not long tolerate the Gothic character even of the *lettres de somme;* and they were still further modified, until they assumed the shape to which the name of Roman letters has since been given. The first works printed with these new types were two beautiful editions of Pliny's *Natural History:* the one by John of Spira at Venice in 1469; and the other by his disciple, Nicholas Jenson, also at Venice, in 1472. Another Venetian printer—the first Aldus Manutius—attempted in 1501 to supersede the Roman letters by what have been called Aldine (q. v.), or Venetian, but are best known as Italic characters. These can scarcely be said to have come into much more than temporary or exceptional use; but the Roman letters in no long time spread from Venice all over the west of Europe. Although thus supplanted in general use, the Gothic or B. L. was long retained for special purposes, such as, in this country, the printing of Bibles, prayer-books, proclamations, and acts of parliament. Books in B. L. being the earliest, are highly prized by antiquaries and bibliomaniacs, who are hence sometimes spoken of as 'black letter' devotees. Thus, Matthias, in his *Pursuits of Literature* (published in 1796), alluding to the commentators on Shakspeare, writes:

> On Avon's banks I heard Actæon mourn,
> By fell *black-letter dogs* in pieces torn;
> Dogs that from Gothic kennels eager start, &c.

A form of the B. L. still continues in general use in Germany; but 40 per cent. of the books printed there in 1880 were in Roman letters.

BLACK LIST. Such is the name familiarly applied to printed lists connected with insolvency, bankruptcy, and other matters affecting the credit of firms and individuals, and which are circulated for the private guidance of the mercantile community. These lists, which serve an important purpose, are well known by commercial men in the United Kingdom. For the most part they are published in London weekly; but some are bi-weekly. In their contents are embraced the English bankruptcies and liquidations by arrangement under the act of 1870; the bankruptcies of Scotland and Ireland; Scottish registers of protested bills; decrees in

absence; judgments for debt in the Irish courts; offers of compositions; dissolutions of partnership; warrants of attorney and cognovits; judges' orders; bills of sale, &c. The legality of issuing information of this kind has been challenged, but it has been determined that it is quite lawful. In point of fact, the lists are only extracts from public registers, as are the ordinary lists of bankruptcies in the newspapers. Private lists of a more searching kind are furnished to subscribers by Mr. Thomas Perry of Cornhill, the proprietor of the 'Original Bankrupt and Insolvent Registry Office, for Protection against Fraud, Swindlers,' &c.; and also by the Scottish Trade Protection Society, Edinburgh. See TRADE PROTECTION SOCIETIES. In the United States printed lists of forgeries of bank-notes are similiarly issued. In one of these *Counterfeit Detectors*—which is certainly *black* enough—may be counted some thousands of varieties of forged bank-notes in circulation; the whole revealing a frightful state of commercial and moral depravity.

BLACKLOCK, THOMAS, D.D., a remarkable example of the power of the mind to overcome the most oppressive disadvantages, was born at Annan in 1721, and died at Edinburgh in 1791. The child of humble parents, and deprived before he was six months old of the power of sight, he won for himself before he reached middle age the designation of an accomplished scholar, a cultivated thinker, and, for those times, a respectable poet. After going through the necessary course of academic study in Edinburgh, he was licensed as a preacher of the Established Church in 1759, and in 1762 was ordained minister of Kirkcudbright. The determined resistance of the congregation to the appointment, based apparently on his too philosophical and 'moderate' style of preaching (joined perhaps to the fact that he was the intimate friend of David Hume), led to a litigation, to his sensitive mind extremely distressing, and he resigned the charge in consideration of a small annuity. After this, he resided in Edinburgh till his death, occupied chiefly in superintending the education of a limited number of boarders, a charge for which his varied accomplishments and benign manners peculiarly qualified him. He will, however, be best remembered in connection with that famous letter of his which happily arrested Robert Burns on the eve of his departure for the West Indies, and thus, to all human appearance, saved from oblivion the greatest lyrist that the world has seen. A collected edition of his poems was published in 1793, with a biographical sketch by Henry Mackenzie.

BLA'CK-MAIL, a scarcely voluntary impost submitted to in the earlier half the 18th c., by the people of the Highlands, and of parts of the Lowlands bordering on the Highlands, as a kind of compromise with robbers. The districts in question being then in an extremely barbarous state, enjoyed but in an imperfect protection from the law. Owing, moreover, in part, to political and social circumstances, theft and robbery were not then regarded in the Highlands as they are now: to carry off the cattle of a neighbor was perhaps only wreaking out an old family quarrel or clan dispute, or making reprisals for some severity of persons in power. Certain it is that men of good standing gave a certain degree of protection to notorious cattle lifters. In these circumstances a class of men rose up who professed to take upon themselves the duty of protecting the property of individuals, on the payment by them of a percentage on their rents, generally 4 per cent. They were not low men who did so; nearly all of them had good Highland pedigrees, and passed externally as honorable persons, though there was only too great reason to suspect that they encouraged and profited by robberies, in order to make the B. a necessity. The celebrated Rob Roy was, about 1730, a notable levier of B. in the southern Highlands and adjacent lowland districts. A little later, Coll M'Donell of Barrisdale, a cadet of the Glengarry family, was equally noted further north. When one of the payers of the B. suffered what was called a *hership*, the levier of the impost, being quickly informed of what had happened, busied himself to recover the lost cattle, and, if he failed, he held himself bound to pay an equivalent. We are informed by Mr. Lapslie, the minister of Campsie, Stirlingshire, in his Statistical Account of the parish, 1795, that his father, John Lapslie, was a farmer who paid B. in 1744 to M'Gregor of Glengyle, the nephew of Rob Roy. The engagement was that he should make good losses, if the number of sheep stolen exceeded seven, for anything less was held as not a *hership* or *lifting*, but merely a *picking*. Early in 1745, fifteen were stolen, and M'Gregor was honorably preparing to replace them, when the breaking out of the rebellion, in which he became involved, deprived him of the power of fulfilling his engagement, and likewise put an end to his self-created wardenship of the Highland borders. After that period, law was vigorously enforced in the Highlands, and B. ceased to be heard of.

BLACKMORE, SIR RICHARD, one of the court physicians in the reigns of William III. and Anne, is remembered as the most heavy and voluminous poetaster of his own or any other age. He appears to have been a good and well-meaning man, and the merciless ridicule of contemporary wits was due, in some part at least, to the moral and religious tone of his works, and to his free censures of the libertinism of the time. But the worthlessness of the poems has been amply confirmed by the judgment of posterity. *The Creation*, considered his best, Addison pronounces 'one of the most useful and noble productions in our English verse;' but few modern readers are likely to examine the grounds of this judgment, still less to agree with it. B. wrote six epics (choosing always the loftiest themes)—viz., *Prince Arthur*, in 10 books; *King Arthur*, in 12; *Eliza*, in 10; *Creation*, in 7; *Redemption*, in 6; *Alfred*, in 12; besides *The Nature of Man*, 3 books; a new version of the Psalms, paraphrases of Job, and other parts of the Bible, and a long list of theological, medical, and miscellaneous treatises.

BLA'CKPOOL, a flourishing town in the township of Layton-cum-Warbreck, in the county of Lancaster, is now a very considerable place, lying on the coast of the Irish Sea, between the estuaries of the Ribble and the Lune, distant from Poulton-le-Fylde 4 miles, and from Preston 18 miles. The population in 1861 was 3506; in 1871, 6100; and in 1881, 14,448; but the numbers who resort here during the bathing-season far exceed the permanently resident inhabitants. Upwards of 100,000 visitors annually come from East Lancashire, Manchester, Yorkshire, and other parts of the kingdom. B. is one of the most frequented bathing-places in the west of England, the sands being excellent. It has a branch railway connecting it with the Preston and Wyre Railway, which affords easy access from Preston, Liverpool, Manchester, and all parts of the kingdom. There is also another railway connecting it with Lytham, another favorite bathing-place on the Ribble, about 7 miles to the south. B. has a fine pier, furnishing sitting accommodation to upwards of 3000 persons, which cost about £25,000; and a second, more recently opened, 500 yards in length. There are three established churches, a Roman Catholic chapel, and five other chapels for the Wesleyans, Independents, &c. Besides excellent streets and terraces of houses elegantly built, it has many large hotels (one of which, recently erected, cost upwards of £12,000); there is also a theater, libraries, news-rooms, &c. There is no trade or manufactures; the lodging-house keepers depend solely on the large concourse of visitors. Fishing is the employment of many during the winter months.

BLACK PRINCE, the name usually given in history to Edward Prince of Wales, son of Edward III. (q. v.)

BLACK QUARTER, syn. *Black Spald*, *Black Leg*, *Quarter Evil*, *Blood Striking*; incorrectly termed by some English writers *Inflammatory Fever*—termed by others *Hæmatosepsis* (Simonds), *Hæmatolysis*.

Definition.—An apoplectic disease peculiar to cattle; a form of carbuncular disease, or anthrax—enzootic, i. e., limited to districts; not spread by contagion, but attended, especially in warm climates, and in Great Britain, in hot weather, with the development of a blood-poison destructive to man and the lower animals. See MALIGNANT PUSTULE.

Causes.—Rich pasture on stiff, retentive, and undrained soil; sudden changes from poor to rich keep, particularly with animals in good health, predisposed to make blood or fatten fast. Youth predisposes to the disease, from the greater activity of the nutritive functions in early life. It is a disease confined almost entirely to yearling and two-year old animals; the writer has, however, seen it in aged cows, &c. A young animal, thriving fast, may suddenly be seized with B. Q., if exposed to cold, showers, or a storm. A check thus induced to the organs of secretion, and particularly to the action of the skin, at once produces the blood-charge and apoplectic effusion peculiar to the disease. In various countries where calves are reared by the hand, and not allowed to suckle their mothers, there are many cases of quarter ill when the young animals are transferred from the stable or bare fields to rich grass-lands. The malady is chiefly witnessed in spring and autumn, particularly when animals are fed on strong autumn grass.

Symptoms.—The premonitory signs are often very insignificant, and usually overlooked. The healthy thriving aspect of a young steer, in a district where the disease prevails excites the suspicion of the farmer. The animal may be observed with a sleek coat, voracious appetite, quick staring look, suddenly to stop feeding; the eyes become bloodshot; there is a slight salivation or foaming at the mouth; and in the space of an hour or less, it will fall helpless, having manifested slight lameness in one of the limbs before dropping. In other cases, the animal suffers from swelling and pains suddenly in one of the joints, whether the fetlocks, knees, or hocks, elbow, shoulder, or stifle. The swelling extends, and the animal falls. In both cases, the limb or *quarter* of the animal affected swells, the skin is bluish, the veins of the part are distended by black blood, and the creature is perfectly helpless. The suffering is unusually acute; but in many instances the respiration is tranquil, the pulse, however, oppressed and frequent. Animals in this state are costive at first, but occasionally violent diarrhœa supervenes, and the excrement is tinged by black extravasated blood. Death almost invariably supervenes in from 4 to 48 hours. Some

cases prove lingering, especially if active and proper treatment be employed early; but recovery is rare. The symptoms of approaching death are convulsive twitchings of the muscles, fixed haggard look, grinding with the teeth, and spasmodic breathing. In some cases, the animal appears quite paralytic, and quietly breathes his last.

Post-mortem Appearances.—The quarter affected is found, when cut into, soaked in black semi-coagulated blood. Similar blood is found in all the vessels of the body, and all the tissues have consequently a black congested appearance, particularly the lungs. The heart, as in all blood-diseases, is stained both externally and internally by black blood, effused beneath its serous covering of lining; and this appearance has led some veterinarians to believe the immediate cause of death to be inflammation of the heart. Such is not the case. The blood extravasations indicate the peculiar condition of the circulating fluid. In some cases in which a joint has been affected some hours before severe constitutional symptons have appeared, the tissues around the joints are infiltrated by a yellow semi-solid exudation or lymph, which is capable of producing maliguant pustule if inoculated in man or animals. Abscesses and sloughs are occasionally met with in and around the diseased joints.

Treatment.—In the earliest stage, blood-letting to the extent of 5 or 6 quarts. Administer half-ounce doses of nitre in solution every half-hour for 4 or 5 hours. Give the animal much water to drink, and if chances of recovery are observed, 4-ounce doses of Mindererus's spirit, or solution of the acetate of ammonia, must be given every 4 hours. As the animal rallies, it may be desirable to administer a mild purge of Epsom or Glauber salts. The local treatment consists in incisions into the swollen parts, eare being taken that the joints are not penetrated. The incisions must be washed with the following lotion: Chloride of zinc, 1 drachm; water, 12 ounces; dissolve and apply with linen rag or lint, confining the moisture by gutta-percha or oil-silk. Treatment is not often successful, but we have the greatest facilities for

Prevention by deep draining, whereby many pasture-lands have been rendered perfectly safe—after having repeatedly ruined tenant-farmers—from distruction by black quarter. In some hill-lands, where drainage does not appear the cause, the malady may be prevented by giving to all the eattle on the farm a weekly dose of an ounce of nitre. The animals that thrive most rapidly should have the medicine rather more frequently, though not to such an extent as to reduce their condition.

The flesh of animals dying from this disease should not be used for human food. It has destroyed whole families, and though in this cold climate accidents are rare, nevertheless they have occurred. Butchers have lost their arms, and persons have lost their lives from being inoculated in cutting up meat from oxen that have died of quarter ill.

BLACK ROD, USHER OF THE, an officer of the House of Lords, appointed by letters-patent. He is chief gentleman-usher to the sovereign, and belongs to the order of the Garter. His principal duty is (himself, or by his deputy the yeoman-usher) to summon the House of Commons to the Peers when the royal assent is given to bills, or when royal speeches are read; and to take into custody any peer guilty of breach of privilege. His income is derived from certain fees under the regulation of the House; and the appointment of messengers, door-keepers, servants, &c., rests with him. This patronage was at one time very lucrative, but new arrangements have made it much less so.

BLACK ROOD OF SCOTLAND. When the Anglo-Saxon princess who became the wife of King Malcolm Ceanmohr landed in Scotland, about the year 1070, she brought with her what was regarded as a priceless relic—a cross of gold, elaborately wrought, in the form of a casket, about a span long, eontaining what was believed to be a piece of the true cross, set in an ebony figure of the Saviour, richly decorated with gold. Of its earlier history, nothing is known; but St. Margaret bequeathed it as an inheritance to her children, and as she herself was at the point of death, we are told by her confessor, that she had it brought to her bedside, when she pressed it to her eyes and lips, and expired clasping it with both her hands. The contemporary biographer of her son, King David I., relates that 'the Black Rood of Scotland,' as it was called, reeeived the dying adoration of that saintly prince, and that it had then (in the middle of the 12th c.) come to be regarded by the whole nation of the Scots with mingled feelings of love and awe. It was kept as an heirloom of the kingdom, in the royal treasury in the castle of Edinburgh, and along with the other regalia and muniments of Scotland, was delivered up to King Edward I. in 1291. The irreverent scrutiny of the officers of the English king discovered that the outer case, which to the eyes of St. Aelred, in the previous century, seemed to be of the purest gold, was only silver gilt. But the relic itself was not the less venerable on that account; and it was used by King Edward to give increased solemnity to the oaths of fealty which he exacted from the magnates of Scotland. Thus, when the bishops of St. Andrews and of Glasgow sided with Bruce, it was urged as a heinous aggravation of their guilt, that they had sworn 'upon the body of Christ (i. e., the sacrament of the eucharist), and upon the holy gospels, and upon the cross of St. Neot, and upon the B. R. of S.,' to be true and faithful to the English king and his heirs for ever. When the long struggle between England and Scotland was at last ended by the peace of Northampton in 1328, the B. R. was restored to Scotland as one of the national treasures. But it was not destined to remain long in the north. When the hapless King David II. invaded England in 1346, he carried the B. R. with him, in the belief (common in that age) that such a holy relic would insure safety to his person or victory to his arms. On his defeat and capture under the walls of Durham, the B. R. of S. became the prize of his conqueror, Sir Ralph de Neville, Lord of Raby, by whom, along with other spoils of the battle, it was offered up at the shrine of St. Cuthbert, in the cathedral of Durham. There it hung till the Reformation, when all trace of it disappears.

BLACK or EUXINE SEA (the *Pontus Euxinus*, or 'hospitable sea,' of the ancients, the Kara Deniz of the Turks, the Mauri Thalassa of the modern Greeks, and the Tschernoje Moré of the Russians) is an inland sea lying between Europe and Asia, extending from lat. 40° 45′ to 46° 45′ N., and from long. 27° 30′ to 41° 50′ E. In shape it bears a certain resemblance to the human foot. Its greatest length from east to west, on the 42d parallel, is about 700 miles, and its greatest breadth, near the west end, about 380 miles. Area, 172,000 square miles. On the south-western extremity it communicates by the Bosporus, the Sea of Marmora, and the Dardanelles, with the Mediterranean, and on the north-east by the Straits of Yenikale with the Sea of Azof. The B. S. drains nearly one-fourth of the surface of Europe, and also about 100,000 square miles of Asia. Throughout its whole extent it has but one island, and that a small one, lying opposite the mouths of the Danube, called *Adassi*, or Isle of Serpents, on which is a light-house. The continued occupation of this island by the Russians, in defiance of the stipulations of the treaty signed at Paris after the termination of the Crimean war, occasioned considerable uneasiness in Turkey, and detained a British fleet in the B. S. for several months. In the center of the B. S. there are no soundings at 150 fathoms, nor are there shoals along the shores, except at the entrance of the Bosporus; the navigation of the B. S. ought, therefore, to be particularly easy and safe. It is so in summer; but in winter, being enclosed on every side, it becomes the scene of conflicting winds, and of storms which, though of short duration, are terrible while they last. Such a storm it was on the 14th of November 1854, in which about forty vessels of the allies were either totally wrecked or very seriously injured, nearly 1000 lives were lost, and property worth some millions destroyed.

All the coasts are high, with good harbors, except between the mouths of the Danube and the Crimea; there the land is low, and the danger of navigation greatly increased in winter by the presence of floating ice; for, from the many large rivers which flow into the B. S. and Sea of Azof (Danube, Dniester, Bug, Dnieper, Don, and Kuban, in Europe; and the Kizil-Irmak and Sakara in Asia), the waters are fresher, and consequently more easily frozen than those of the Mediterranean. The specific gravity of the water of the B. S. is 1014 (water being = 1000), while that of the Mediterranean is 1028. The shores from Odessa to the Crimea are ice-bound during January and February; and although the harbor of Odessa is never frozen up, yet the drift-ice frequently renders the entrance to it dangerous.

There is no tide in the B. S., but the large rivers flowing into it give rise to currents, which are particularly strong in spring when the snows melt, and the accumulated moisture of the whole winter is drained off the land. The great current which, passing out of the Sea of Azof round the Crimea, flows first in a south-westerly, then in a north-westerly direction, and again due west, is turned southwards by a current from the Dnieper and Dniester; the two currents are afterwards met by another from the Danube, and then, all united, rush towards the the Bosporus. The Bosporus, however, is not wide enough to admit the entire volume of water pressing into it; and a portion of the main current is consequently diverted to the coast of Asia, where it is strengthened by new accessions. This, which is the normal course of the currents in the B. S., is modified by the winds, and by local circumstances. In some bays of Roumelia and Bulgaria counter-currents have been observed.

The most important ports on the B. S. are those of Odessa, Kherson, Eupatoria, Sebastopol, Batum, Trebizond, Samsun, Sinope, Varna, &c.

The depth of the water is unfavorable to the extensive establishment of fisheries, but several kinds of sturgeon are caught in considerable quantities in the straits of Yenikale. Other fish of various kinds are said to be abundant.

The ancients believed that the B. S. was at one time much more extensive, and that it had no connection with the Mediterranean. They accounted for its decrease and communication

with the larger sea by the supposition that the Thracian Bosporus had been burst through by an earthquake, or by the great deluge known as the Deucalion deluge, which inundated Greece. The B. S. being higher than the Mediterranean, the latter, of course, through the newly created channel, became the basin for much of its waters. Certain geological and other appearances have led some modern geographers to entertain an opinion similar to that of the old Greeks, which, however, is not shared in by others.

The B. S. has been navigated from a very early period. Its original name (supposed to have arisen from the dangers such an expanse of sea offered to early navigation, as well as from the fact that savage tribes dwelt upon its coast) was *Axine*, or 'inhospitable' sea, afterwards changed by the Greeks to *Euxinus*. In the time of Xerxes, large quantities of corn were exported from its ports to Athens and the Peloponnesus. The Romans and Byzantine emperors, and also the Genoese, had large traffic on the Black Sea. When the Turks captured Constantinople, all but their own ships were excluded from its waters until the treaty of Kinarji, 1774, when the Russians obtained the right to trade in it. Ten years after, Austrian ships were privileged to trade here; and by the Peace of Amiens, in 1802, British and French ships were admitted. The undue preponderance of Russia in the B. S. was the main cause of the Crimean war.

BLACK SNAKE (*Coluber constrictor*, see COLUBER), a species of snake common in the United States of America from Louisiana to Connecticut. It is of an almost uniform leaden color, is one of the largest serpents in North America, and is remarkable for its great agility. It moves along the ground with a swiftness equal to that of a horse, glides over bushes, and climbs trees. It feeds on small quadrupeds, birds, frogs, &c.; frequently plunders poultry-yards of eggs; and enters dairies to drink milk or cream, of which it is very fond, but compensates for these depredations by killing rats and mice. It has no poison-fangs, but is not slow to bite. It is very capable of domestication.

BLACKSTONE, SIR WILLIAM, a commentator on English law, was the posthumous son of a silk-mercer in London, and was born there on the 10th of July, 1723. At the age of 15, having obtained a scholarship from the Charterhouse school, where he was educated, he was sent to Pembroke Hall, Oxford. There he was fortunate enough to obtain a second scholarship, and remained till, in 1744, he was admitted a fellow of All Soul's College, when he removed to London, to attend the courts of law with the view of qualifying himself for his future profession. In 1746, at the age of 23, he was called to the bar, but failed to attract either notice or practice. Upon the death of an uncle in 1749, he was appointed recorder of Wallingford, in Berkshire; but in 1753 he went to Oxford, where he delivered a course of academic lectures, upon the law of England. A few years later, a Mr. Viner having left a sum of money to endow a chair of English law in the university of Oxford, B. was, in 1758, appointed first Vinerian professor. The following year, B. returned to Westminster; and as the doctrines which he had taught as a lecturer had been such as to commend him to the notice of the Tory government of that day, he obtained its patronage, and in 1761 was made a king's counsel. Shortly after, he was appointed principal of New Inn Hall, Oxford. Other honors followed fast, and he became successively member of parliament, bencher of the Middle Temple, and solicitor-general to the Queen. In 1765, B. published the first volume of his lectures, and the remaining three volumes between that date and 1769. These lectures form his celebrated *Commentaries on the Laws of England*. His practice continuing to increase, he resigned, in 1766, his Oxford appointments. Four years later, he was offered the solicitor-generalship, and after declining it, was knighted, and made a justice of the Court of Common Pleas. The remaining years of his life were spent in the discharge of his duties as a judge. He died on the 14th of Febraary, 1780, at the age of fifty-seven.

The fame of B. rests entirely upon his *Commentaries*. His other literary works were inconsiderable, and his merits as a pleader or judge were not such as, of themselves, to have made his reputation outlive himself. As a commentator, he had many excellences. His style was in general clear and gracefully ornate, and his illustrations pleasing and felicitous. While he confined himself to exposition—to the accurate statement in scholarlike English of what had heretofore lain buried in the cumbrous language of lawyers like Littleton—B. was unsurpassed, and rendered an important service to the country. But he was ambitious of combining with this exposition the higher task of explaining the reasons for the law, as well as its merits and defects. For this survey of the law, from the legislator's point of view, he had not the requisite qualifications. His knowledge of English history was, as Hallam tells us, superficial, and his study of the philosophy of law had been imperfect. With the works, indeed, of Montesquieu and Beccaria he was acquainted; but the mode in which he quotes them shows that he had imbibed nothing of their spirit. The method followed in the *Commentaries* was as unscientific as could be imagined, and had not even the merit of originality. It was taken, with little alteration and no improvement, from Sir Matthew Hale's *Analysis of the English Law*. Possibly the haste with which the *Commentaries* must have been composed, being originally in the form of lectures, may have led to some of their imperfections. Since B.'s death, the *Commentaries* have been very frequently reprinted, perhaps the best editions being those of Christian. As a century has elapsed since they were composed, so many alterations are requisite to adapt them to the existing state of the law, that it may be said that their purpose has been served, and that they are now valuable chiefly as materials for history.

BLACK STONE EXAMINATION. See GLASGOW UNIVERSITY.

BLACK WAD is a name given by miners to the native black oxide of manganese, and principally to an impure and earthy variety of the ore. See MANGANESE.

BLA'CKWALL, a suburb of London, in Middlesex, at the junction of the Lee with the Thames, four miles east-south-east of the metropolis. It has foundries, ship-building yards, and the East and West India Docks. A railway, four miles long, mostly on a brick viaduct above the streets, connects B. with the city of London. To avoid the dangers and delay of the 'Pool,' many passengers proceed by this railway to embark in steamers at B., instead of going on board at London Bridge.

BLACK WA'RRIOR, a river formed in the north of Alabama, by the junction of the Mulberry and the Locust. Almost from the very point of confluence it is navigable for steam-boats, till, after a course of more than 150 miles, it enters the Tombigbee, which, again, is navigable for large vessels all the way to Mobile on the Gulf of Mexico, a stretch of nearly 200 miles more. Its banks yield coal, iron, and other valuable minerals.

BLACK WATCH, the appellation given to certain armed companies employed to watch the Highlands of Scotland. The term *black* arose from the dress of this species of militia, which was composed of tartans of dark colors. Some Highlanders had been armed by government as early as 1725, when General Wade was appointed commander-in-chief in Scotland; but it was not till about 1729 or 1730 that the companies assumed a regular form. The companies were six in number—three comprising 100 men each, commanded by a captain; and three of 70 men each, commanded by captain-lieutenants. Stationed in different parts of the Highlands, and acting independently of each other, they were styled the Independent Companies of the Black Watch. The body was raised chiefly from the Whig or loyal clans—Campbells, Grants, Munros, &c.—and many men of good station in society joined it, not only for the sake of good pay, but the valued privilege of bearing arms. The duties of the B. W. were to enforce the disarming act, to overawe the disaffected, to prevent political meetings of a seditious kind, and to check depredations among the clans, or on the Lowland frontier. After being of considerable use for these local purposes, the whole of the companies were formed into the 42d Regiment, under the command of the Earl of Crawford, in 1739—their removal giving facility, no doubt, for the outbreak of the rebellion in 1745. Retaining its original Highland character, the 42d Regiment became one of the most distinguished corps in the British army. As it was embodied under the Earl of Crawford, a Lowlander, it was necessary to adopt an arbitrary pattern of tartan, which has ever since been known as the 42d or B. W. tartan. When in 1881 the numerical designations of the British foot regiments were dropped, the former 42d and 73d regiments were made respectively first and second battalions of the 'B. W. (Royal Highlanders).' See HIGHLAND REGIMENTS; TARTAN.

BLA'CK-WATER, a disease in cattle. See DARN.

BLA'CKWATER, the name of five Irish rivers, two of which deserve notice.—1. The B. of Cork county rises in the west of Kerry county; runs east across Cork county and the west part of Waterford county, in a carboniferous limestone basin, past Millstreet, Mallow, Fermoy, Lismore, and Cappoquin, and enters the sea at Youghal harbor. High mountains bound it on the south, and its chief feeders come from the north. It has a course of 100 miles, and is the seventh in size of the Irish rivers. The scenery along its banks is highly beautiful and picturesque, with ruins, mansions, and woods. It is navigable for barges for the last 15 miles of its course. It abounds in salmon.—2. The B. of Ulster rises on the confines of Tyrone and Fermanagh counties; runs first south-east, and then north-west through Tyrone; and then between Tyrone, Monaghan, and Armagh, past Caledon and Charlemont, and falls into the south-west corner of Lough Neagh.

BLACKWELL, ELIZABETH, M.D., a medical practitioner in New York, U.S.—the first woman that ever obtained a medical diploma—was born at Bristol, where her father carried on an extensive business as a sugar-refiner, in the year 1821. Circum-

stances afterwards induced the family to emigrate to New York, and then to push west to Cincinnati, where in 1838 the father died, leaving a widow and family of nine children but scantily provided for. Miss B., who was at this time in her 18th year, and who had already been distinguished by unusual decision of character, immediately, along with two elder sisters, opened a boarding-school, which soon gained a reputation, and had a large attendance. But the spirit of Miss B. chafed at the limitations which society had imposed on the energies of woman, and she often took counsel with her sisters as to the practicability of storming the learned professions, and thus enlarging woman's sphere. At length, in 1844, the school was given up, Miss B. determining to become the medical apostle of her sex. After three years' further work as a salaried teacher, which she undertook in order that she might have the pecuniary means wherewith to prosecute her medical studies, and during which time she devoted the whole of her leisure to the study of medical and anatomical books, she went to Philadelphia where she applied in vain for admission into the medical schools. Failing this, she entered on a course of private anatomical study and dissection and of midwifery with Professor Allen and Dr. Warrington of Philadelphia. After strenuous efforts, she at last obtained admission to a university—that of Geneva, in New York State—and thither she accordingly repaired in the November of 1847. Here she remained until January 1849, when she graduated with the highest honor. During the two years of her study, she conducted herself with a propriety and discretion that gained for her the esteem and respect of all her fellow-students. Only once was an insult offered to her. It was in the class-room, and she repelled it with so quiet a dignity as to bring down the applause of the students on herself, and their hisses on her despicable assailant.

Her presence had a beneficial effect upon the students; her 'brilliant example,' as the president called it, had stimulated them to greater effort, and their general conduct and attainments during the sessions she was at college were better than usual. Shortly after her graduation, Miss B. visited Europe, in order to the further prosecution of her medical studies. At Paris she was told that it would be impossible for her to gain entrance to the schools or hospitals there, unless she adopted male attire; a suggestion which she refused to act on, as it was alike repugnant to her taste, and to the great object she had in view—viz., the recognition of female doctors. After much perseverance, she was at length admitted into the extensive lying-in hospital of the *Maternité*, and was permitted to visit other hospitals. After studying at St. Bartholomew's Hospital, and the Woman's Hospital, London, she returned to New York in 1851, and there established herself in practice. At first difficulties were thrown in her way by physicians of the opposite sex refusing to meet her in consultation; but these were soon overcome, and Miss B. was soon established in excellent practice. In 1852, she delivered a series of lectures to ladies on health and physical development; in the following year she published a work, entitled *The Laws of Life, considered with Reference to the Physical Education of Girls*, and also established a dispensary for women and children, which proved so successful that she was induced, in 1857, to open a small hospital for women. Miss B.'s sister, now Dr. Emily B., had followed in the footsteps of Elizabeth.

BLACKWELL, ALEXANDER, a physician of great natural genius, son of the Rev. Thomas B., one of the ministers of Aberdeen and Principal of Marischal College, was born in that city in the beginning of the 18th c. He studied physic under Boerhaave at Leyden, where he took the degree of M.D. He was afterwards a printer in London, but becoming bankrupt in 1734, was supported in prison by his wife, who prepared and published a *Herbal* (2 vols. folio, 1737—1739) with 500 cuts of plants, drawn, engraved, and colored by herself, her husband adding their Latin names, with a brief description of each. The work, patronized by the College of Physicians, met with great success, and B. obtained his release. A work on Agriculture, published by him, falling under the notice of the king of Sweden, B. was invited to Stockholm in 1740, and received apartments in the house of the prime minister, with a pension. Having cured the king of a dangerous illness, he was appointed one of the royal physicians; but while in the full enjoyment of court favor, he was charged with being concerned in a plot with Count Tessin against the king and government, and after being subjected to the torture, was broken on the wheel, August 9, 1748, protesting his innocence to the last. A genus of plants, *Blackwellia*, is named in honor of Mrs. Blackwell.

BLACKWELL, THOMAS, a scholar of some eminence, brother of Alexander B. (q. v.), born at Aberdeen, August 4, 1701, studied Greek and philosophy in Marischal College, and took the degree of M.A. in 1718. In December 1723, he was appointed professor of Greek in Marischal College, and in 1737 published anonymously at London an *Inquiry into the Life and Writings of Homer*, 8vo, 2d edition, 1746, and shortly afterwards, *Proofs of the Inquiry into Homer's Life and Writings*. In 1748 he published, also anonymously, *Letters concerning Mythology*, 8vo. The same year he was made principal of Marischal College; and at the commencement of the session 1752, on his recommendation, a new order in teaching the sciences was introduced into the college. In 1753 he published the first volume of his *Memoirs of the Court of Augustus*, 4to. The second volume appeared in 1755; and the third, left unfinished by him, was completed by John Mills in 1764. He died March 8, 1757. A chemical professorship was founded by his widow in Marischal College in 1793, and also a biennial award of £20 (the 'Blackwell Prize'), open to any one, for the best essay on a subject proposed by the principal and professors of Marischal College.

BLACKWOOD, WILLIAM, a distinguished Edinburgh publisher, the originator of *Blackwood's Magazine*, was born in Edinburgh, November 20, 1776. After serving his apprenticeship to the book-selling business in his native city, and prosecuting his calling in Glasgow and London, he settled in Edinburgh as a bookseller—principally of old books—in 1804. In 1817, at which time he had become a publisher on his own account, he issued the first number of *Blackwood's Magazine*. The literary ability displayed in this periodical was so much in advance of the monthly magazines then existing, that from the first it was a great success. Its remarkable popularity was sustained by the papers of John Wilson (q. v.) and J. G. Lockhart (q. v.), also of James Hogg (q. v.), and other spirits, whom B. had the liberality and tact to attract to his standard. Overwhelming its political and literary opponents, now with the most farcical humor, and now with the bitterest sarcasm—sometimes with reckless injustice—the Magazine secured for itself a prodigious reputation, more particularly among the Tories, of whose political creed it has always been a resolute adherent. We believe it can hardly be said that *Blackwood's Magazine* has ever had any distinct editor. William Blackwood himself, who added literary tastes and acquirements to his profession of a bookseller, was the chief manager of his Magazine, and conducted the whole of the correspondence connected with it until his death, which took place September 16, 1834. Under his sons, the Messrs. B., who succeeded him in the business, *Maga* not only sustained but increased its reputation; and under his grandson the places of its old contributors are still supplied by many of the most distinguished men of letters in the country. In the conduct of the Magazine, Professor Aytoun was understood to occupy, in relation to the publishers, a position somewhat analogous to that which Wilson had formerly held. The publishing business, which includes that of printing the works issued, has been greatly extended since the days of the founder of the house.

BLA'CKWOOD RIVER, in West Australia, enters the Hardy Inlet, 6 miles to the north-east of Augusta, in lat. 34° 14′ S., and long. 115° 12′ E. It flows through the counties Durham and Nelson, first to the west, and then to the south, traversing a district of wood and pasturage. It is navigable for boats to a distance of 20 miles from the sea.

BLA'DDER (urinary) is a bag formed of fibrous membrane externally, muscular fibres in the middle, and mucous membrane for an internal lining. The peritoneum (see ABDOMEN) covers its back. The shape of the B. is somewhat conical, the *apex* being upwards, and the anterior part of the *base* constricted at the commencement of the urethra, called the *neck* of the bladder. On each side, rather below its middle, open the two ducts from the kidneys (the ureters); an imaginary line drawn between them, and from each end of this line others drawn to the neck of the bladder include an equilateral triangle, In this space, which is called the *trigone*, the mucous membrane is not thrown into folds, but is smooth and very sensitive, the slightest touch upon it giving rise to a desire for micturition. The habit of some children to empty their bladders when sleeping on their backs, is supposed to be due to the urine accumulating in this part, as is also the distressing pain of stone.

The B. is situated in the pelvis in adults, but much higher in the young. It is kept in position by four true or membranous ligaments, and false ligaments formed of folds of the peritoneum. The neck of the B. is surrounded by the prostate gland, and here the urethra (q. v.) begins. Like all cavities lined by mucous membrane, the B, is subject to catarrhal inflammations, which are accompanied by an increased secretion of mucus, rendering the urine turbid, frequent and painful desire to micturate, and very great constitutional disturbance. The symptoms may be acute, and must be relieved by local bleeding, and hot fomentations along with opiates; or they may be chronic, when some medicines, as the *Uva-ursi* (see ARBUTUS), bucku (q. v.), the preparations of iron, and the mineral acids, are found useful. If there is much mucus, or decomposed urine in the B., it may be washed out with warm water, in which a minute quantity of nitric acid has been dropped. Of course, if there is any known cause for this inflammation, as a stone, it must be removed.

Irritable B. resembles the former disease, but is produced by

various causes unaccompanied by inflammation. Some persons, from mere nervousness, are frequently troubled with a desire to pass water; and strange as it may seem, many in this condition never effectually empty their bladders, always leaving a portion, which keeps up the irritation. This condition frequently arises from the habit of retaining the urine so long as to over-distend and weaken the muscular walls of the B.; but it may be induced by general debility, the irritation of worms, cold, or an irritating state of the urine itself. The best treatment is tonics, and soothing the irritability with sedatives. When this irritability is nocturnal, it may be from the patient lying on the back, as explained above; it generally occurs in delicate children, and is more a habit than a disease.

Paralysis of the B. may be the result of accident, or disease of the nervous centers, or over distention; in this condition the urine accumulates and dribbles away, and must be drawn of by the catheter (q. v.). This dribbling, or *incontinence*, must be carefully distinguished from irritable B., as it is in nearly every case the sign of a distended bladder. *Retention* of the urine may be caused by mechanical obstacles to its exit, by paralysis, or by an absence of volitional power over the muscles. This last is termed *Hysterical* retention, and is common in young girls, in persons suffering from sea-sickness, from being in a strange place, an accident, such as a broken leg, &c. If the affection is not encouraged by an officious use of the catheter, the power generally soon returns. Any long continued difficulty in passing water is generally followed by a thickening of the walls of the B. itself, or *Hypertrophy*. The mucous membrane may form pouches in these thickened walls, which is called *Sacculated* B., and cancerous diseases, and tubercle, may also attack this organ.

The B is liable to be ruptured by accident from without, as, for instance, by a blow or hurt from a saddle; and as this accident is usually fatal, it cannot be too carefully guarded against. If the B. is ruptured posteriorly, the accident is always fatal.

BLA'DDER CAMPION. See SILENE.

BLA'DDER GREEN. See BUCKTHORN.

BLA'DDER-NUT (*Staphyle'a*), a genus of plants which, according to some botanists, is the type of a small natural order, *Staphyleaceæ*, by others, united with *Celastraceæ*. See SPINDLE TREE. The *Staphyleaceæ* have usually opposite pinnate leaves, the leaflets of which, as well as the leaves themselves, have deciduous stipules. The sepals, petals, and stamens are equal (five) in number. Only about fourteen species are known, which are found in very different climates, and scattered over the world. They are mostly small trees of rather elegant appearance. The seeds contain a considerable quantity of a fixed oil, which is slightly purgative. The common B. (*Staphylea pinnata*) is a native of the east of Europe, and of temperate parts of Asia, which has been admitted into the British flora, but has in all probability been introduced as an ornamental tree. It is frequently planted in shrubberies, as is also *S. trifolia*, a North American species with ternate leaves. The wood of both is firm and white, well suited for the purposes of the turner. The seeds may be eaten, but act as a mild aperient. The flower-buds are pickled as capers. The name B. has reference to the curious inflated membranous capsule, and the hard bony *testa* of the seed. The name *Staphylea* is from the Greek *staphylè*, a bunch of grapes, and has reference to the racemed flowers.

Bladder-nut (*Staphylea pinnata*): *a*, a branch with leaves and raceme; *b*, fruit.

BLA'DDERWORT (*Utricularia*), a genus of plants of the natural order *Lentibulariaceæ* (q. v.), containing a large number of species, the bright blossoms of which, along with those of water-lilies, &c., adorn the surface of lakes, ditches, and marshes in almost all parts of the world. They are particularly abundant within the tropics, and many are natives of Australia. Britain produces only three species, all of which have yellow flowers. These plants are very interesting from the provision made for the expansion of their flowers above water, although the whole plant is ordinarily submerged. The roots, stems, and even leaves, are furnished with numerous little bladders or vesicles, which are filled with water till it is necessary that the plant should rise for the expansion of the flowers, when they become filled with air; and this again gives place to water after flowering is over, so that the seeds are ripened at the bottom. The bladders, at least of *U. vulgaris*, have an orifice closed by a very thin elastic valve opening inwards. Aquatic insects sometimes enter them, and are imprisoned.

BLA'DENSBURG, a post-town of Maryland, on the east branch of the Potomac, and on the Washington and Baltimore Railway. It is six miles to the north-east of Washington; and it was here that the battle which decided the fate of that city was won by the British on the 24th August 1814.

BLAE'BERRY. See WHORTLEBERRY.

BLAES, a Scottish colliers' name for the shale of the coal-measures, originating apparently from the 'blae' or bluish color sometimes noticed in the shale. The term is occasionally used by geologists.

BLAEU, also BLAEUW and BLAUW (Lat. *Cæsius*), the name of a family of learned Dutch publishers who have rendered as important services to literature and art as Aldus, Giunti, Stephanus, or Elzevir, and whose activity spread itself over Europe for a century.

BLAEU, WILH., a mathematician, map-drawer, and publisher, was born at Alkmaar, in Holland, in 1571. He belonged to the school of Tycho Brahé, and secured a considerable reputation by publishing a Terrestrial and a Celestial Globe, excelling in beauty and accuracy everything that had preceded them; and also several maps, which indicated a comparatively precise knowledge of geography. As a printer, he did not attain the elegance and completeness of Elzevir, but nevertheless his chief publications are marked by a fine external finish, and a praiseworty correctness. He died 21st October 1638, and left two sons, John and Cornelius, who carried on the business together until the death of the latter in 1650.

BLAEU, JOH., the son of the preceding, was born at Amsterdam about the beginning of the 17th c. He commenced business on his own account at Amsterdam, but afterwards entered into company with his father. His *Atlas Major*, in eleven volumes of the size in which atlases are published at the present day, is a splendid work. It is full of archæological and geographical information, supplied for each country, by men of eminence connected with it. There are many curious plates—among them a representation of Tycho in his observatory—and the maps are extremely valuable from the light they throw on local history. Besides this, he published a series of singularly rich topographical plates and views of towns, which are consulted even to the present day. He died about 1680, leaving three sons, Joh., Wilh., and Peter, the second of whom became a member of the Amsterdam council, while the other two carried on with distinction and success the paternal business. Some of their classical publications, especially Cicero's *Orationes* (1699), are still highly prized.

BLAINVILLE, HENRI MARIE DUCROTAY DE, a distinguished French zoologist and anatomist, was born 12th September 1778, at Arques, near Dieppe. At an early period, he went to Paris, where he devoted himself to the study of medicine and the physical sciences, and took the degree of doctor in 1808. Through Cuvier chiefly, he was induced to study natural history and comparative anatomy. In 1812, he was appointed assistant-professor of Comparative Zoology, Anatomy, and Physiology, in the university of Paris, as well as Professor of Natural History at the Athenæum; in 1825, a member of the Institute; and in 1832, successor of Cuvier in the chair of Comparative Anatomy in the Museum of Natural History. He died May 1, 1850. B. achieved great success, not only as a teacher, but as an author. Besides various small treatises which appeared in scientific journals, he published many large and valuable works, all of which have greatly advanced our knowledge of the various sciences they treat of; such as *Faune Française* (1821—1830), *De l'Organisation des Animaux* (1822), *Cours de Physiologie Générale et Comparée* (1833), *Ostéographie* (1839—1849), *Manuel de Malacologie et de Conchyliologie* (1825—1827), *Manuel d'Actinologie et de Zoophytologie* (1834—1837).

BLAIR, HUGH, an eminent Scotch divine and man of letters, was born at Edinburgh, April 7, 1718. He entered the university of his native city in 1730, where he soon became noted for his diligence; and an *Essay on the Beautiful*, which he wrote when a student, gave his preceptors a high idea of his ability and taste. In October 1741, B. was licensed as a preacher of the Established Church; and after occupying successively the churches of Colessie in Fifeshire, Canongate Church in Edinburgh, and Lady Yester's, he was promoted in 1758 to the highest position attainable by a Scotch clergyman—one of the charges of the High Church, Edinburgh. His discourses, which display little power or originality of thought, and which derived nothing from the delivery of their author, were greatly admired by 'persons of the most distinguished character and eminent rank' in Scotland on account of their polished style. In 1759, B. commenced a series of lectures on *Composition* to classes in the university; and three years afterwards, a new chair of Rhetoric and Belles-lettres, with a salary of

£70 a year, being created by the crown, B. was made professor. He held this appointment until 1783, when he resigned; and in the same year published his *Lectures*, which obtained a reputation far beyond their merits, and one that time has by no means sanctioned. His first volume of *Sermons* appeared in 1777, with the approval of Dr. Johnson, who had read them, and proved a great success. George III. showed his appreciation of them by bestowing on B., in 1780, a pension of £200 a year. B. also published three other volumes of *Sermons*, and prepared a fourth, which was printed after his death, which took place December 27, 1799. They were all as successful as the first one. Opinion about their merits has much changed since the date of their publication; they are now considered as moral essays rather than sermons. B.'s critical acumen was not great; he believed in the authenticity of Ossian's poems, which he strenuously defended.

BLAIR, Robert, author of *The Grave*, was born at Edinburgh, where his father was a clergyman, in 1699. After completing his education for the church, and traveling on the continent, he received license, and in 1731 was ordained minister of Athelstaneford, Haddingtonshire, where he lived in easy circumstances till his death, in 1746. He was an accomplished and thoughtful man, devoted considerable attention to natural science, particularly botany, and corresponded on friendly terms with several eminent contemporaries, among others, Watts and Doddridge. To them he submitted the MS. of his poem, which he had written before his ordination. Watts offered it to two publishers, who thought it too heavy for the times, and it remained several years unprinted. It afterwards attained an honorable place in the esteem of those capable of appreciating a masculine, though somewhat gloomy force of thought and imagery, applied to a profoundly suggestive and serious theme. It found a congenial illustrator in William Blake (q. v.). B. was succeeded in his ministerial charge by the author of *Douglas*. His son, Robert Blair, of Avontoun, became Lord President of the Court of Session.

BLAIR-A'THOL, a village in the county of Perth, Scotland, situated at the confluence of the Tilt and Garry, about 30 miles north-north-west of the city of Perth. Blair Castle, the seat of the Duke of Athol, is situated here. The larch-trees surrounding it are remarkable alike for their enormous size, and for the fact of their being among the first planted in Scotland.

BLAIR-GOW'RIE, a village in Perthshire, very picturesquely situated on the east side of a range of hills, on the right banks of the Ericht, 16 miles north-north-east of Perth. It consists chiefly of one winding street. Pop. in 1881, 3455. It has flax-spinning and weaving factories, driven by the Ericht. Pure white marble is found in the vicinity. There is a branch railway from Cupar-Angus.

BLAKE, Robert, a celebrated English admiral, who, more than any other, contributed to render England mistress of the sea, was born at Bridgewater, in Somersetshire, where his father was a merchant, in 1598. An ardent republican, and a man of blunt, straightforward manners, singularly devoid of fear, and of inflexible character, he was much respected by Cromwell, with whom, however, he had no very intimate intercourse. When the civil war broke out, he raised a troop in Somersetshire, and took part in all important actions fought against the royalists in the western counties. In 1644, he surprised Taunton, of which place he was made governor, and in that capacity gave proof of no mean military skill. In 1649, in conjunction with two other officers of equal rank, he was appointed General of the Sea, the two services at that time not being distinct, as they are now. This was B.'s true sphere, and in it he soon exhibited transcendent ability. After destroying, with the exception of two vessels, the squadron of Prince Rupert, which had sought safety in the Tagus in 1651, B. forced the royalists to surrender Guernsey, Jersey, and the Scilly Isles. In March 1652, he was made sole admiral of the fleet for nine months, and during this year he fought four engagements with Dutch fleets under Tromp, Ruyter, and De Witt. In the first, on the 19th May, the Dutch retreated under cover of darkness, with the loss of one man-of-war captured, and another sunk. In the next engagement, a squadron of 12 ships, sent to protect the herring-vessels from the attacks of B., were captured; and in the third, on the 28th September, 3 Dutch vessels were destroyed, and the rear-admiral taken. On the 29th November, a fleet of 80 vessels, under the command of Van Tromp, encountered B. with only 40 off the Goodwin Sands.

The courageous Englishman scorned to fly even from odds so overwhelming, and the result of the action was the loss of 6 of his ships—2 captured, and 4 destroyed; the rest, in a shattered condition, sought safety in the Thames. Van Tromp now had recourse to that foolish act of bravado with which his name is associated: he tied a broom to the mast-head of his vessel, and sailed through the Channel, thus intimating that he had swept English vessels clean out of it. Tromp little knew the indomitable character of B., or of the nation of which he was the worthy representative on the seas. By February 1653, B. was at sea again with 80 ships, and falling in with Van Tromp with about an equal force, he at once attacked him, and after a three days' running-fight, the Dutchman was fain to seek shelter in the shallow waters of Calais—where the greater draught of the English ships did not admit of their following—with a loss of 11 men-of-war, and 30 of a fleet of merchantmen he had in convoy. The English lost only one ship. On the 3d and 4th of June, B. and his coadjutors, Deane and Monk, won another victory over Van Tromp; but ill-health prevented B. from taking part in the engagement of the 29th July, which finally shattered the naval supremacy of Holland. In 1654, B. was appointed by Cromwell to command an English fleet in the Mediterranean, where he soon made the British flag respected by Dutch, Spanish, and French alike. The Dey of Tunis refused to do it reverence. B. attacked his capital, burned the Turkish fleet of nine ships which lay before it, accomplished a landing, and with a body of about 1000 men, annihilated an army of 3000 Turks. He next sailed to Algiers and Tripoli, landed, and set free all the English who were detained as slaves. He concluded alliances highly favorable to England with Venice and Tuscany. In 1657, he defeated the Spaniards at Santa Cruz. This was perhaps one of the most daring actions in B.'s memorable career. With a wind blowing right into the bay—which was very strongly defended—B. dashed in, attacked and destroyed the Spanish galleons and shipping in the harbor, and, the wind fortunately changing, sailed out again with the loss of only one ship and 200 men. The Spanish loss in men and property was immense, and the terror the action inspired insured increased respect to the English flag. His health now failed; he returned to England, and died, as his ship entered the harbor of Plymouth, in the year 1657. Cromwell honored his memory by a solemn funeral procession, and caused him to be interred in Westminster Abbey. His skill and courage were equalled only by his disinterested patriotism, sterling honesty, and love of justice; he not only gained decided superiority over England's mightiest naval opponent, but, by the bold tactics he introduced, infused that spirit of enterprise which has ever since distinguished the British navy.

BLAKE, William, a celebrated engraver and poet, born in London, 28th Nov. 1757. In 1789, he published *Songs of Innocence and of Experience, showing the Two Contrary States of the Human Soul*, with about 60 etchings, remarkable for their peculiar and original manner. The poems were equally singular, but many of them exhibited true pathos. Some marginal designs for Young's *Night Thoughts*, executed by B., were greatly admired by Flaxman. B. lived in the full belief that he held converse with the spirits of the departed great—among others, with those of Moses, Homer, Virgil, Dante, and Milton. He published numerous etchings, chiefly of religious and cognate subjects, among the best of which are his *Illustrations of the Book of Job*, and the illustrations of Blair's *Grave*. He died (August 12, 1827) in poverty and obscurity, with the conviction that he was a martyr to poetic art. Charles Lamb regarded him as 'one of the most extraordinary persons of the age;' and A. C. Swinburne said of him that he was 'the single Englishman of supreme and simple poetic genius of his time.' See *Life of B.*, by Alex. Gilchrist (1863); *William B.*, by Swinburne (1868); and *Poetical Works*, edited by W. M. Rossetti (1874).

BLANC, Le, a town of France, in the department of the Indre, with a beautiful situation on the Creuse, which divides the town into two parts, about 32 miles west-south-west of Châteauroux. Above B., the river expands so as to form a lake, but at the town it contracts, and breaks into cascades with sufficient fall to turn the machinery of several manufactories. B. is a thriving place, with cloth and linen yarn mills, potteries, tanneries, vinegar-works, forges, &c. It is very ancient, having been frequented by the Romans. Pop. (1876) 4724.

BLANC, Mont. See Mont Blanc.

BLANC, Jean Joseph Louis, a celebrated French Socialist and historian, was born at Madrid, 28th October, 1813. In 1820, he was placed in the college at Rhodez; in 1830, he went to Paris, and became a clerk in an attorney's office for a short time; but in 1832 he was intrusted with the education of the son of M. Hallette, mechanist of Arras. Here he resided for two years, contributing largely, on literary and political subjects, to the *Progrès du Pas-de-Calais*. He afterwards went to Paris, where he contributed to various political papers, and where in 1838 he founded the *Revue du Progrès Politique, Social et Littéraire*, in which he laid down in a more quiet and leisurely way his Socialistic theory. In this he brought out his chief work on Socialism, the *Organization du Travail*, which, in 1840, appeared in a separate form. The book obtained for its author a wide, enthusiastic popularity among the French *ouvriers*, who were captivated by the brilliancy of the writing, the symmetrical simplicity of the scheme, and the freshness of the views advocated. The book denounces the doctrine of individualism—i. e., individual and competitive efforts in labor—and advocates the absorption of the individual in a vast 'solidarity,' where 'each would receive according to his needs, and con-

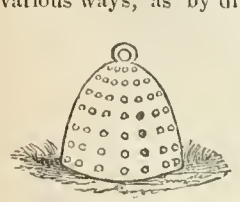
tribute according to his abilities.' B. next published (in 1841—1844) a historical work, entitled *Révolution Française: Histoire de Dix Ans*, 1830—1840, which produced a deadly effect on the Orleans dynasty.

Louis Philippe afterwards declared that 'it acted like a battering ram against the bulwarks of loyalty in France.' It owed its success partly to the exposure it gave of the scandalous jobbery and immorality of the crown and its advisers, partly to that passionate ardor which changed the tranquillity of history into the vehemence of a pamphlet, and partly to its academic pomp of style. This was followed by the first volume of a *Histoire de la Révolution Française*, in which the author's aim was not only to describe, from his own point of view, the incidents of the first revolution, but the social history of the 18th c. On the breaking out of the February revolution of 1848, B. seemed likely to play an important part. His connection with the party of the *Réforme* journal, and his popularity with the working-classes, led to his being appointed a member of the Provisional Government. He was placed by government at the head of the great commission for discussing the problem of labor. At the same time, Marie, Minister of Public Works, began—but without B's co-operation—to establish the so-called national workshops, which were to bring about the realization of the Socialistic principle but which only proved the hazardous and impracticable character of B.'s doctrines. The national workshops led to the arrest of the 15th May 1848, when B. nominally, if not actually, again played a prominent part. A proposal was made to prosecute him, but it was negatived by the National Assembly. After the June insurrection he was again accused, and prosecuted for conspiracy, but contrived to escape to London, where he spent many years. During his exile, he devoted himself to political and historical literature. In 1849 appeared his *Appel aux Honnêtes Gens*, and *Catéchisme des Socialistes;* in 1850, *Pages d'Histoire de la Révolution de Février;* and in 1851, *Plus de Girondins; la République Une et Indivisible.* The work which has secured him the most enduring reputation is his *History of the French Revolution*, written during his residence in England. It is characterized by extensive and original research, which has frequently enabled the author to reverse the common verdicts on historical personages, and to explode many of the extravagant stories of the stormy period of which it treats. In style, it is eloquent, bold, and dignified; and if its sentiments do not always commend themselves to the sober judgment of English readers, there can be but one opinion in regard to its candor, impartiality, and power. On the fall of the Empire, B. returned to France, was returned to the National Assembly in 1880, and sat for Paris till his death, 6th Dec. 1882. He voted usually on the extreme left.

BLANCH or BLENCH HOLDING is one of the ancient feudal tenures in the law of Scotland relating to land, the duty payable to the superior or lord being in general a trifling sum, as a penny Scots, or merely illusory, as a pepercorn, 'if asked only,' although it may happen that the duty is of greater value. Anciently, many estates in Scotland were held, both of the crown and other superiors, by this tenure; but it is now seldom adopted in the constitution of an original right of property. See CHARTER, TENURE.

BLANCHE-LYON, the title of one of the English pursuivants-at-arms. See PURSUIVANT.

BLA'NCHING is a process resorted to by gardeners, to prevent certain secretions which in ordinary circumstances take place in the leaves of plants, and to render them more pleasant and wholesome for food. The action of light is indispensable to the decomposition of carbonic acid by the leaves of plants, and, consequently, to the elaboration of many of the substances from which they derive their peculiar qualities: the exclusion of light, therefore, renders them white, or nearly so, and deprives them of much of their natural coarseness and bitterness—as in the familiar examples of lettuce, celery, sea-kale, &c. B. is accomplished in various ways, as by drawing up earth to the plants, when the lower part of the leaf or leaf-stalk alone is to be blanched; tying the whole leaves together, by which the inner ones are blanched in a somewhat imperfect way, as is commonly done with lettuce; covering with boxes, pots, or the like, as the practice is with sea-kale; causing the leaves to grow up through litter, &c. The figure represents a very convenient B.-pot, of French invention; it is made of earthenware, and perforated with many holes. B., although so simple and easy, is of great importance in the art of gardening, and the usefulness of many plants very much depends upon it. In cabbage, and some other cultivated plants whose leaves form themselves into compact heads, there is a natural B. or etiolation.



Blanching-pot.

BLANC-MA'NGE, so called from its white appearance, is a jelly made of isinglass and milk. The following is the ordinary recipe for making it. Take a quart of sweet milk or cream, and put in it two ounces of the best isinglass, with the rind of a lemon, a blade of mace, and white sugar to taste. Put the whole in a saucepan, and let it boil a quarter of an hour; then mix with 6 bitter almonds and 24 sweet ones, beaten into a paste with a little water; strain through a piece of muslin; and having let the composition settle a little, pour into a mould, and turn it out when cold. Soyer gives one ounce of isinglass to a quart of milk, a quarter of a pound of sugar, a quarter of an ounce of cinnamon, a little grated nutmeg, half of the peel of a lemon, and a bay-leaf, prepared as above. B. is also made of calf's-foot jelly and eggs, of arrow-root and milk, &c.; and the flavor is modified to taste.

BLA'NCO, CAPE, a remarkable headland on the west coast of Africa, in lat. 20° 47' N., and long. 16° 58' W., the extremity of a rocky ridge (called Jebel-el-Bied, or White Mountain) which projects from the Sahara in a westerly direction, and then bending southward, forms a commodious harbor called the Great Bay. The bay and town of Arguin, which is supposed to have been the limit of ancient navigation in this direction, lie some miles to the southward. Southward to the mouth of the Rio Grande the shores are of a low sandy character, with a current tending south-west, and prevalent north-east trade-wind; northward from Cape B. to Cape Geer, the coast is rocky, with a moderate elevation. On account of the deficiency of good harbors, the prevalence of west winds, and other causes, the casualties to shipping are very numerous. The constancy of west wind on a coast almost wholly within the sphere of the trade-winds, is very remarkable, and is accounted for by the rarefaction of the air by the heat of the sands of the Sahara. The natives of the Canary Islands carry on a pretty lucrative fishery in the bay in boats of from 100 to 150 tons burden. Cape B., which is composed of mixed calcareous and silicious sandstone, was first discovered by the Portuguese in 1441.—Cape B. is also the name of several less important headlands in Spain, Greece, America, and the Philippines.

BLAND, a beverage which is—or formerly was—a common drink among the inhabitants of the Shetland Islands during the summer months. It is prepared from the whey or serum of churned milk, and is said to be an agreeable beverage. Dr. Edmonston, in his *View of the Zetland Islands*, describes B. as being, when twelve months old, perfectly good and transparent, its flavor then bearing a strong resemblance to lemon-juice.

BLA'NDFORD-FO'RUM, or MARKET BLANDFORD, a town in Dorsetshire, on the right bank of the Stour, 16 miles north-east of Dorchester. It lies in a fine tract of pasture-land, famed for its multitude of cows. It suffered much in 1579, 1677, 1713, and 1731, from fire. It is built of brick, and is neat and regular. It was formerly famed for its manufactures of bandstrings and lace, the point-lace bringing £30 a yard. Shirt-buttons are made here. Pop. in 1871, 4011; in 1881, 3753.

BLANDRATA, GIORGIO, the founder of Unitarianism in Poland and Transylvania, was a native of Saluzzo, in Italy. He had established himself as a physician at Pavia, when he was compelled, on account of his heretical opinions, to fly to Geneva in 1556, where at first, and to avoid further molestation, he feigned to agree with Calvin. In 1558, he went to Poland, hoping to find there greater freedom of thought and speech; and in 1563 he betook himself to the court of John Sigismund, Prince of Transylvania, whose favorite physician he became. Here he exerted himself prudently but assiduously to spread his doctrines, and succeeded in forming a considerable party. In his old age, however, the heat of his proselytizing zeal died out; and it is asserted that, to preserve his worldly interests, he even forsook the cause of the Unitarians, and favored that of the Jesuits, who were in high esteem with the prince. He was murdered in 1590 by his nephew, whom he had threatened to disinherit on account of his attachment to the Catholic Church. B.'s religious treatises are entirely destitute of importance.

BLANE, SIR GILBERT, a distinguished physician, was born at Blanefield, Ayrshire, August 29, 1749. He studied at Edinburgh University, and afterwards became private physician to Lord Rodney, whom in that capacity he accompanied in 1780, when Rodney assumed the command of the West Indian squadron. On one occasion, when all the officers were wounded, B.'s bravery was so conspicuous, that Lord Rodney immediately obtained for him the appointment of physician to the fleet. In 1785, he was elected physician to St. Thomas's Hospital, London, having previously been appointed physician-extraordinary to the Prince of Wales. In 1795, he was chosen head of the Navy Medical Board, and was greatly instrumental in introducing the use of lemon-juice, so effective in preventing scurvy, into every vessel in the navy; and in many other ways he was active in promoting measures for the prevention or remedy of diseases on board ship. In 1809, he was employed to report on the cause of the unhealthiness of the

Walcheren army, and the following year he was sent to inquire into the expediency of establishing a naval arsenal and dockyard at Northfleet. In 1812, he had a baronetcy conferred upon him, and in the same year the Prince Regent made him his physician in ordinary. When the Duke of Clarence ascended the throne as William IV. in 1830, he made B., then 81 years old, his first physician. B. died June 26, 1834. He published several valuable works, characterized by varied knowledge and originality of thought, the most popular and useful of which are, *Observations on the Diseases of Seamen*, a lecture on *Muscular Motion*, and *Elements of Medical Logic*.

BLA'NÉS, a town of Spain, in the province of Gerona, and 22 miles south of the city of that name, with a port on the Mediterranean. Pop. 5000.

BLANK BONDS were Scotch securities, in which the creditor's name was left blank, and which passed by mere delivery, the bearer or holder being at liberty to insert his name in the blank space, and sue for payment. The intention originally was to save the expense of conveyances, and to facilitate the transmission of the obligation; but experience having proved that they were capable of being used for fradulent purposes, these bonds were, by a Scottish act, passed in 1696, declared void. The act, however, excepts from its provisions the notes of trading companies, and indorsements of bills of exchange. See BOND, SECURITY.

BLANK CA'RTRIDGES. The distinction between *blank* and *ball* cartridges will be found noticed under CARTRIDGES

BLA'NKENBURG, a town in the duchy of Brunswick, 37 miles S.S.E of the capital, is situated on the borders of the Harz Mountains, at an elevation of 732 feet above the sea. It has a gymnasium, and several charitable and educational institutions. Pop. (1880) 5117, chiefly engaged in mining; iron, marble, and dye-earths being plentiful in the surrounding districts. On the Blankenstein, a rocky height immediately adjoining the town, there is a palace belonging to the Duke of Brunswick; and on the lofty summit of the Regenstein, about half a mile distant, there are the remains of a large castle, with many chambers, hewn out of the rock by Henry the Fowler in 919. Louis XVIII. resided at B. as Comte de Lille, 1796—1798.

BLANK VERSE is verse without rhyme (q. v.), and depending upon meter (q. v.) alone. The classical productions of the Greek and Roman poets—at least such of them as have come down to us—are composed on this principle; and, accordingly, when the passion for imitating classical models set in, rhyme came to be looked upon as an invention of Gothic barbarism, and attempts were made in most countries to shake it off. The first specimen of blank verse in English is a translation of the Second and Fourth Books of Virgil's *Æneid*, by the Earl of Surrey, who was executed in 1547; but it had been used by Italian and Spanish writers as early as about the beginning of that century. In England, its adaptation to the drama was at once felt, and in that department of poetry it soon became and has continued dominant—if we except the effort made by Dryden and others, after the Restoration, to return to rhymed plays; but in other kinds of poetry, it was not till the appearance of *Paradise Lost* (1667) that it could be said to have taken root; and even then the want of rhymes was felt, as the poet expected it would. Many poets have since followed Milton's example; and English narrative, didactic, and descriptive poetry, is partly in B. V., partly in rhymed couplets. It is chiefly in 'heroic' meter, as it is called—that is, in verses or lines of ten syllables—that blank verse has found a firm footing. Some in fact, would restrict the name blank verse to lines of ten syllables, not considering it applicable to such meters as those of Southey's *Thalaba* and Longfellow's *Hiawatha*.—Dramatic B. V. is characterized by the frequent occurrence of a supernumerary syllable at the end of the line:

To be | or not | to be, | that is | the quest*ion:*
Whether | 'tis no|bler in | the mind | to suf*fer.*

In Italian and Spanish, B. V. never became popular, and still less in French. The German language seems to admit every variety of blank meter.

BLANQUI, JÉROME ADOLPHE, one of the first French economists, was born at Nice, 28th November 1798, and educated at the Lyceum of that city. In 1814, his family quitted Nice, and young B. went to complete his studies at Paris, where he became acquainted with J. B. Say, who induced him to turn his attention to the study of political economy. In 1825, by Say's recommendation, he was appointed Professor of History and of Industrial Economy in the Commercial School at Paris. On the death of Say, he was appointed Professor of Industrial Economy in the Conservatoire des Arts et Métiers, and was one of the editors of the *Dictionnaire de l'Industrie Manufacturière, Commerciale, et Agricole*. In June 1838, he became a member of the Academy of Moral and Political Science. The Academy sent him to Corsica, to study the condition of that country, and in 1839, to Algiers for the same purpose. In 1841, he visited Turkey. In 1851, the Academy, which highly valued his abilities, requested him to furnish a complete account of London in its financial and other aspects. This task he executed to the satisfaction of the *savans* who employed him. He died at Paris on the 28th January 1854. B., as a national economist, was somewhat inclined to Socialism. Like his master, Say, he was in favor of free-trade. In method, he is ingenious; in style, transparent; and even the dryest discussions become interesting, from his lively mode of treating them. His principal works are—*Voyage d'un Jeune Français en Angleterre et en Ecosse* (Paris, 1824); *Résumé de l'Histoire du Commerce et de l'Industrie* (Paris, 1826); *Précis Elémentaire d'Economie Politique, précédé d'une Introduction Historique, et suivi d'une Biographie des Economistes*, &c. (Paris, 1826); and, most important of all, the *Histoire de l'Economie Politique en Europe, depuis les Anciens jusqu'à nos jours, suivie d'une Bibliographie raisonnée des Principaux Ouvrages d'Economie Politique*.

BLANQUI, LOUIS AUGUSTE, the brother of the economist, was born at Nice in 1805. He has made himself conspicuous chiefly by his rabid advocacy of the most extreme political opinions. From an early age, he dabbled in conspiracy, and submitted to its penalties with the pride of a martyr. After the revolution of February, he formed the Central Republican Society, which menaced the very existence of the Provisional Government. He it was also who organized the revolutionary *attentat* of the 15th May, the aim of which was to overthrow the Constituent Assembly. At the head of an excited mass, he made his appearance before the national representatives, and with that meladramatic love of liberty which makes a French patriot fancy it to be his first and most sacred function to emancipate the world, demanded the *resuscitation of the Polish nationality!* His coadjutor, M. Huber, went a step further, and pronounced the dissolution of the assembly. The latter fortunately proved itself strong enough to crush this insolence. B. was arrested, and condemned to ten years' imprisonment in Belleisle. In 1861 he was sentenced to other four years' imprisonment. He appeared again as one of the most active spirits in the Red Republican movement of 1870—1871, and once more became a prisoner of state. He died 1st Jan. 1881.

BLAPS, a genus of insects, of the order *Colcoptera*, the type of a tribe called *Blapsides*, the species of which are numerous, all of a dark color, destitute of wings, and having the elytra or wing-cases united together. They run slowly, however, in comparison with many kinds of beetles, and inhabit dark and damp situations, feeding chiefly on dead vegetable matter. They have the power of secreting and emitting a brownish, acrid, irritating fluid, of a peculiar and penetrating odor, with which they appear to be furnished for the purpose of self-defence, and which some of them are capable of throwing to a distance of six or eight inches. *Blaps mortisaga* is a common British species, of about an inch long, and of a shining black color. It is sometimes called DARKLING BEETLE, and CHURCH-YARD BEETLE, sometimes shares with the Cockroach (q. v.) the appellation of BLACK BEETLE. It is a frequent companion of the cockroach in pantries and cellars.—*Blaps sulcata* is cooked with butter and eaten by Turkish women in Egypt, under the notion that it will make them fat, this being in their estimation, one of the chief points of beauty.

Blaps mortisaga.

BLA'SIUS, a saint and martyr, was Bishop of Sebaste, in Cappadocia, when Licinius began a bloody persecution of the Christians. B. left the town, and concealed himself in an unknown chasm in the rocks, but his abode was discovered by Agricola while out hunting. The saint was conveyed to Sebaste, and as he steadfastly refused to deny Christ and worship the heathen gods, he was put to death (316 A.D.) with circumstances of the most horrid cruelty. At one period his worship must have been widely diffused, judging from the extent of territory over which his relics were scattered. The wool-combers claim him as their patron, for the singular reason that he was tortured, among other instruments, with a wool-comb. At Bradford, in Yorkshire, there is a septennial procession of that craft on his day. The practice of invoking St. B. in cases of sore throats, is said to have originated in the circumstances that, when young, he saved the only son of a rich widow from being choked by a fish-bone. It has been conjectured, however, that the wool-comb has probably been mistaken for a fish-bone, and that the story of the rich widow's only son is simply a myth elaborated in explanation of the circumstance. St. B.'s day is the 3d February.

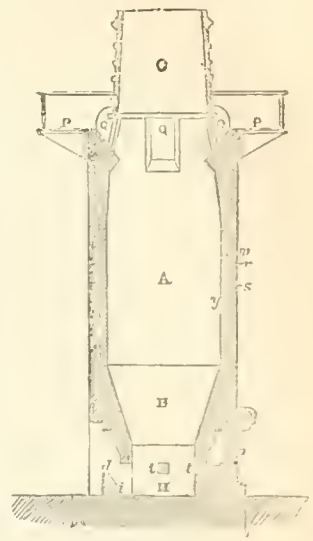
BLA'SPHEMY is an offence against God and religion, by denying to the Almighty his being and providence; or by contumelius reproaches of our Lord and Saviour Jesus Christ; also all profane scoffing at the Holy Scriptures, or exposing them to ridi-

cule and contempt. Seditious words, moreover, in derogation of the established religion may be proved under a charge of blasphemy. These all are offences punishable at common law by fine and imprisonment, or other infamous corporal punishment; for Christianity is held to be part of the laws of England; and a blasphemous libel may be prosecuted as an offence at common law, and punished with fine and imprisonment. In Gathercole's case, tried at York in 1838, where the defendant, a clergyman of the Church of England, was prosecuted for a libel on a Roman Roman Catholic nunnery, and in which he also made a violent attack on the tenets and the morality of the Roman Catholic Church, it was laid down by the judge who tried the case (the late Baron Alderson), that a person may, without being liable to prosecution for it, attack Judaism, or Mohammedanism, or even any sect of the Christian religion, save the established religion of the country; and the only reason why the latter is in a different situation from the others is, because it is *the form established by law*, and is therefore a part of the constitution of the country. But any general attack on *Christianity* is also the subject of criminal prosecution, because Christianity is the public religion of the country. Thus, as an offence against religion, B. may assume one of two forms: first, either as against the articles and creeds of the Established Church; or secondly, as against a dissenting community, in the libel against whom, a general attack on the Christian religion is involved. The B. must in some manner have been overtly and publicly declared, either by a speech on some public occasion, or by the act of publication in print.

The Scotch law regarding this offence is now very much the same. The old severe Scotch acts, one passed 1661, and in another in 1695, which provided capital punishment for offences of this description, were repealed by the 53 Geo. III. c. 160. The punishment is now arbitrary at common law; and by the 6 Geo. IV. c. 47, the punishment of B. is further restricted, and made the same as in England. It is also enacted by the second section of that act, that a person convicted of a second offence may be adjudged, at the discretion of the court, either to suffer the punishment of fine or imprisonment, or both, or to be *banished* the country; but the provision as to the punishment of banishment is repealed by the 7 Will. IV. c. 5. The latest and most remarkable illustration of the Scotch law regarding this offence, is a case that was tried before the High Court of Justiciary in 1843. The prisoner, who defended himself was accused, convicted, and sentenced to imprisonment for fifteen months, for publishing profane, impious, and blasphemous books, containing a denial of the truth and authority of the Holy Scriptures and of the Christian religion; and devised, contrived, and intended to ridicule and bring into contempt the same.

In the course of the trial, the prisoner endeavored to justify his conduct by quotations from the Bible, which, he maintained, warranted the language of the blasphemous works in question. But the court would not allow such a line of defence, and the Lord Justice-clerk (the late Right Honorable John Pope) in charging the jury, pointed out that the indictment charged, that the wicked and felonious publication of such works *is* a crime, and that therefore the jury were not to consider themselves engaged in any theological discussion, but simply in trying whether a known and recognized offence against the law had been committed. His lordship proceeded further to expound the law as follows: 'Now, the law of Scotland, apart from all questions of church establishment or church government, has declared that the Holy Scriptures are of supreme authority. It gives every man the right of regulating his faith or not by the standard of the Holy Scriptures, and gives full scope to private judgment, regarding the doctrines contained therein; but it expressly provides, that all 'blasphemies shall be suppressed," and that they who publish opinions "contrary to the known principles of Christianity," may be lawfully called to account, and proceeded against by the civil magistrate. This law does not impose upon individuals any obligations as to their belief. It leaves free and independent the right of private belief, but it carefully protects that which was established as part of the law, from being brought into contempt.' The learned judge also observed: 'I think it also my duty to add—as a part of the [prisoner's] address was directed against the policy and expediency of this prosecution—that I think it was a most proper and fit prosecution. I have no doubt of the effect that will result from this prosecution; because, though, in his advertisement and address, this individual declares that he addresses himself chiefly to the working-classes of Scotland, yet I am sure that he deceives himself if he imagines that that is a class which would easily part with their belief in those truths, which are perhaps more valuable to them in this life than to any other class in the community. There may, indeed, be a class of persons, like the prisoner at the bar, in situations above that of the working-classes, young men whose education is imperfect, and their reading misdirected; and it is to save them from the mischief of these opinions that it is necessary the law should take its course.' See RELIGION, OFFENCES AGAINST.

BLAST FU'RNACE. Many costly experiments have been tried of late years in order to determine, along with other related questions, the best form of the blast furnace in which iron is smelted. Which is the most serviceable form is as yet a very much disputed point, but according to the published accounts, furnaces of the unusual height of 80 to 100 feet give, as a rule, the best results. There are two types of blast furnaces, irrespective of differences in their forms, as regards the way in which they are constructed. Some are built with thick walls, either entirely of brick or of brick and stone, hooped with iron, forming massive towers. Others, again, are formed of comparatively thin brick walls, and depend for their strength on an outer malleable iron casing, in which case they are called *cupola* furnaces. The furnace A, in fig. 1, article IRON, is an example of the former, and the annexed figure represents one of the latter kind.



Blast Furnace.

The various parts of the furnace are distinguished as follow: A is the *shaft* or *body*, generally either in the form of a cone or cylinder, or somewhat barrel-shaped, in which case, the portion marked B is not distinguishable from the shaft. B. is called the *boshes*, and is the part of the furnace which, from the high heat to which it is exposed, usually gives way first. H is the *hearth*, and C is the *tunnel-head*, which, however, is usually wanting when the mouth is closed by a bell and cone to save the gases generated in the furnace. P is the charging platform, and Q, Q, the opening through which the ore, fuel, &c., are fed. These materials are brought to the platform by hoists, inclines, or level gangways, according to the situation of the furnace. Just below the boshes there are four or five openings in the circumference for the *tuyeres t*, and another for the arrangements required for tapping the furnace As respects the latter, *a* is called the tymp-arch, immediately below which is placed the *tymp* itself, consisting of a rectangular iron box containing water in a coiled pipe. The hearth is prolonged in the direction of the *dam-plate d*, and the space between it and the tymp is filled up with sand or clay, in which there is a channel for the escape of slag. In the damp-plate is placed the *tapping-hole*, *i*, through which the molten iron is run off. The pipe at *p* conveys the blast, produced by a powerful blowing-engine, and heated to between 600° and 1400° F. The B. F may be used with the Siemens Gas Furnace. See IRON and GLASS.

BLASTING. Before gunpowder was invented, the separation of masses of stone from their native rock could only be effected by means of the hammer and wedge, or by the still slower method of fire and water. In soft and stratified rock, wedges are still used for quarrying stones for building purposes; but in hard rock, or where regularity of fracture is no object, gunpowder is ordinarily employed. There are two kinds of B.—first, the small shot system; and second, that of large blasts or 'mines.'

The small-shot system consists of boring holes into the rock, of from one to six inches in diameter, and of various depths, according to circumstances. In hard rock, this is done by a steel-pointed drill, struck by a hammer, and turned partly round after each blow, to make the hole cylindrical. The addition of a little water serves to preserve the temper of the boring tool, and makes the rock more easy to cut. In soft rock, whenever the hole is to be vertical, a 'jumper' is used; this is a weighted drill, which acts merely by its own weight, when let fall from about a foot in height. The powdered stone is removed at intervals by a 'scraper.' The rate of progress varies, of course, with the hardness of the rock.

At Holyhead, the average work done by three men in hard quartz rock, with 1½ inch drills, is 14 inches in depth per hour; one man holding the drill, and two striking. After the hole is bored, it is cleaned out, and the powder poured down. A wad of dry turf or hay is put over the charge, and the rest of the hole 'tamped,' or filled with broken stone, clay, or sand. The shot is fired by a length of Bickford's patent fuse. When it is desirable to prevent the stones from flying about, when the shot is fired, a shield of boiler-plate, or of brushwood weighted, may be laid over the hole.

Small shots may be fired, even under water, by enclosing the charge in a tin case, with a tube of powder reaching to the surface; or in a canvas bag, well tarred, tied at the neck round a length of Bickford's fuse, which burns under water. The charge is inserted in

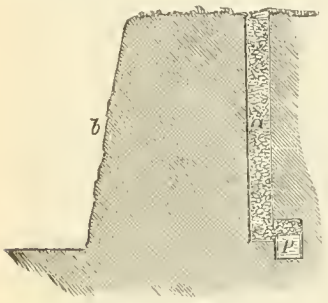
the drill-hole; and the weight of the superincumbent water acts as tamping.

In removing the wall between the old and new Shadwell basins of the London Docks, shots were fired under water within a few yards of vessels lying in the basin, by using moderate charges, and by keeping a raft of timber floating over the hole, as a shield to prevent anything flying upwards.

The voltaic battery has been used for firing shots, chiefly under water, since 1839, in which year it was employed at the wreck of the Royal George and at the Skerryvore Light-house.

When a large mass of rock has to be removed at once, or where a steady supply has to be daily furnished of irregularly broken stone, for breakwater or other purposes, recourse must be had to large blasts, or 'mines.' The greatest isolated example of this kind of blasting was the overthrow, in 1843, of the Rounddown cliff at Dover, by 18,500 lbs. of powder, in three separate charges, fired simultaneously by voltaic electricity. But by far the grandest system of B. by mines is to be seen at quarries for supplying stone to the Breakwater at Holyhead, where small shots having been found inadequate, large mines were introduced in 1850. These large blasts are of two kinds—'shafts' sunk from the top of the rock; and 'headings,' or galleries driven in from the face.

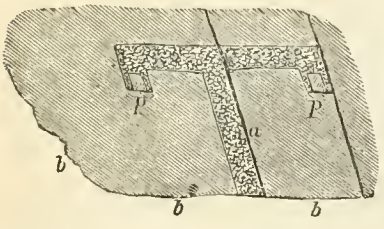
The shaft-holes are 6 feet long by 4 feet wide, of various depths, according to the height of the rock, but seldom much exceeding 60 feet. The deal-box, with the charge of powder, *p*, is placed in a chamber cut at one side of the shaft, so that the tamping may not be in the direct upward line of fire. The tamping consists of the stone and débris which have come out of the shaft; and the wires from the battery are protected from injury by being laid in a groove cut in a batten placed up one angle of the shaft.



Vertical Section of Shaft: *a*, tamping; *b*, face of the rock; *p*, box for charge.

It is evident that the same point, *p*, in the rock may be reached as well by a heading or gallery driven in from the face of the rock, as by a shaft from the top, and often by a shorter route. Headings are made 5 feet high by 3 feet 6 inches wide, and are driven, if possible, along a natural joint in the rock. The direction of the gallery is changed and sunk at parts, to prevent the tamping from being blown out. Four men can, on the average, drive 5 feet run of heading per week; but cannot sink above 3 or 4 feet of shaft, which has a greater sectional area, and is more inconvenient to work in.

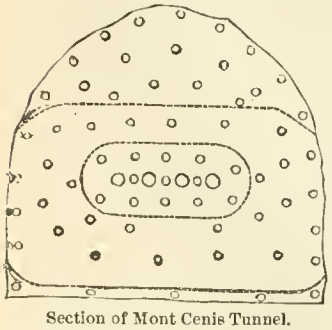
The charge of powder may be divided and placed in two or more separate chambers, as *p*, and *p'*; and it is better thus to spread a heavy charge over a length of face, than to have it in one spot, at a greater distance from the face than about 30 feet.



Sectional Plan of a Double Heading.

The charges for these mines vary from 600 lbs. to 13,000, and even more, pounds of powder; and the produce is from 2 to 6 tons of stone to the pound of powder, according to the density of the rock and the position of the mine.

Besides the quarrying of stone, B. is used for military objects, or where total destruction is aimed at, and an excess of powder is little or no objection.


Section of Mont Cenis Tunnel.

Of late years great improvements have been effected in the production and application of explosive agents other than gunpowder, which latter, until lately, may be said to have been exclusively used for the purpose of blasting. Nitroglycerine (q. v.) and gun cotton (q. v.) were discovered within two years of each other; but while gun cotton was immediately applied to industrial purposes, nitroglycerine was destined to remain a chemical curiosity for about 16 years.

Dynamite is a preparation of nitroglycerine and porous earth, in the form of a pasty mass, which, without materially impairing its explosive properties, has the effect of rendering it perfectly safe to handle.

One of the most celebrated applications of boring and blasting to modern engineering was the driving of the Mont Cenis tunnel. See TUNNEL.

BLATTA. See COCKROACH.

BLAYE (ancient *Blavia*), a fortified seaport of France, in the department of the Gironde, 20 miles north-north-west of Bordeaux. It is built on the right bank of the river Gironde, which at this point is about 2½ miles in breadth, at the base of a rocky eminence crowned with a strong citadel. The town is further defended by the two forts of Paté and Médoc, which command the passage of the river. The port of B. is a very busy one, all inward vessels being required to anchor and deliver the manifests of their cargoes; and many outward-bound vessels lay in their provisions here. B. has manufactures of linen and woollen, glass and earthenware; a considerable export-trade in corn, wine, brandy, oil, fruits, soap, &c., and tribunals of jurisdiction and of commerce. Pop. (1876), exclusive of garrison, 3801.

BLA'ZON, BLA'ZONRY (Ger. *Blasen*, to blow, as with a horn). These heraldic terms originated in the custom of blowing a trumpet to announce the arrival of a knight, or his entrance into the lists at a joust or tournament. The blast was answered by the heralds, who described aloud and explained the arms borne by the knight. B. and B. thus came to signify the art of describing, in technical terms, the objects (or charges, as they are called) borne in arms—their positions, gestures, tinctures, &c., and the manner of arranging them on the shield.

Rules of Blazoning.—As heraldry, though an entirely arbitrary, is a very accurate science, the rules of blazoning are observed on all occasions with the most rigid precision. The following are the most important: 1. In blazoning or describing a coat of arms, it is necessary to begin with the field, mentioning the lines by which it is divided—*per pale, per fess*, &c., if such there be—and noticing if they are *indented, engrailed*, or the like, it being taken for granted that they are straight, unless the contrary be mentioned. 2. There must be no unnecessary repetition in blazoning; thus, where the field is blue, and the charges yellow, we should say, *azure, a crescent between three stars, or*, thereby implying that both the crescent and the stars are *or*. 3. For the same reason, where a color has been already mentioned, and it is necessary, in order to avoid ambiguity, to repeat it in describing a subsequent charge, we say, *of the first*, or *of the second*, as the case may be. Thus, we should say, *azure, on a saltire argent, three water bougets of the first*, thus avoiding the repetition of the word azure. 4. Again, recurring to our first example, it would be an error to say, *three stars with a crescent between them*, because we must always begin with the charge which lies nearest the center of the shield. 5. Where the charges are of the natural color of the objects or animals represented, in place of describing the color, you simply say *proper*—i. e., of the proper or natural color. 6. Another general rule in blazoning, or rather in marshaling coat-armor, is, that *metal shall never be placed upon metal, nor color upon color.*

The rules for blazoning separate charges, whether animate or inanimate, are indicated in the descriptions which will be found of them under their respective heads. See ORDINARIES; also BAR, BEND, &c.

BLEACHING (Ang-Sax. *blœcan*, from *blœc*, pale, bleak) is generally understood to mean the process of whitening or decolorizing cloth; but the term is also applied to the decolorizing of such substances as the fixed oils, Irish moss, &c. Until about the close of the 18th c., B. depended upon the natural bleaching agencies present in the atmosphere and in the sun's rays. The usual plan was to spread out the cloth on a grass field, called a bleaching-green, and to continue sprinkling it with water several times a day. After being thus exposed for several months to the action of air, light, and moisture, the cloth was rendered white. The process was necessarily tedious and occupied much valuable land, and for this reason a large quantity of the cloth required to be bleached was sent to Holland for that purpose. A particular kind of linen, which was regularly sent to Holland, received on that account the name of *Hollands;* and another variety of linen, which, from its fineness, was generally spread on the better grass-fields or lawns, received the title of *lawn.* An improvement in the preceding process was to dip the cloth occasionally in a weak *alkaline lye*, or solution of an alkali, such as soda in water, which step was called *bucking;* after which the cloth was spread out on the grass for some weeks, and regularly moistened with water, this stage being styled *crofting;* the cloth was then soaked in sour milk and water, which was called *souring*, and again exposed on grass to the action of air and sunlight. By repeating the bucking, crofting, and souring operations several times, the bleaching was very much hastened, and the amount of land occupied in bleaching-greens lessened. The next improvement was the introduction of dilute sulphuric acid instead of sour milk, as the souring agent; and this was so effectual, that it lessened the time required for B. from about eight months, which was the original time, to about four months.

Till very recently, it was thought that the agent in this natural

mode of B. was entirely resident in the sun's rays, but the discovery of the substance called Ozone (q. v.), which possesses very powerful B. properties, and which in greater or less quantity exists in the air of country districts at all times, has led to the opinion, now held by chemists, that the B. which takes place when cloth is moistened and exposed to the air is mainly due to the ozone present therein; though the chemical rays which accompany the luminous rays of the sun may assist in the B., and also aid in the formation of the ozone. That the ozone has very much to do in open- ir B., is observable from the fact that in town districts, where little or no ozone exists in the air, cloth is never bleached white.

In the year 1785, Berthollet, a distinguished French chemist, discovered the B. properties of *Chlorine* (q. v.), and immediately thereafter it was suggested that chlorine would be useful in the B. of cloth. At the first, the gas chlorine was employed, and being diffused in the atmosphere of a vessel or small apartment, cloth hung therein was speedily bleached. It was found, however, that the chlorine, which bleaches, or destroys color by uniting with the hydrogen of the coloring principle and thus decomposing the color, could also unite with the hydrogen of the fiber (see LIGNIN) and destroy or render tender the textile fabric. So long as chlorine was employed in the gaseous state, it was very difficult to use it of such strength as only to destroy the color, without also rotting the cloth. It was then suggested, that as chlorine was soluble in water, to the extent of two volumes of chlorine gas in one volume of cold water, the solution of chlorine might be employed. But although chlorine water was found to act efficiently and safely when the solution was of the proper strength, it was very difficult always to make it of the same strength, and more so to preserve it when made; as the least exposure to light causes more or less of the chlorine to unite with the hydrogen of the water, forming hydrochloric acid, which does not possess B. properties. After attempts to fix the chlorine in alkaline solutions, it was found that dry slaked lime was an admirable absorber of chlorine gas. The material produced from the union of chlorine with dry slaked lime is known as the *chloride of lime* or *Bleaching powder* (q. v.), and this is the substance which has continued from 1799 up to the present time to be the great artificial bleacher of cotton and linen fabrics. It is not serviceable in the destruction of the color of wool, silk, or the oils and fats; such materials being bleached by the employment of other agents, as will be afterwards noticed.

BLEACHING OF COTTON AND LINEN FABRICS.—The substances requiring to be got rid of in the purification of cotton and linen cloth, are (1) the organic coloring matter naturally present in the fibre; (2) resinous and fatty bodies also inherent in the fibre; (3) weavers' dressing and perspiration taken up during the process of spinning; and (4) certain saline or earthy substances. The *first stage* in the B. is the singeing of the cloth, which is accomplished by drawing the cloth rapidly over a red-hot iron cylinder, or a numerous series of gas jets, which burn off the minute particles of fibre, resembling in appearance short hairs or down, and leave the cloth perfectly smooth. The *second stage* is the washing or scouring of the cloth, which consists in rolling up the pieces of calico or linen into bundles like coils of rope, and throwing a number of pieces into a large vat among lukewarm water, allowing them to lie till fermentation begins, and proceeds some length, when the cloth is taken out, and thoroughly washed in the dash-wheels; which are large horizontal cylinders divided into several compartments, into each of which a stream of water keeps running while the wheel is turning. The *third stage* is boiling with lime-water, or *bucking*. The apparatus employed is called the *Bouking* or *Bucking Kier*, and consists of two compartments. The lower part is a boiler containing the lime-water, and the upper part is a capacious circular tank, into which the cloth in bundles, as it comes from the dash-wheels, is placed. By an ingenious arrangement, the lime-water is alternately forced up, by the compression of the steam, through a pipe into the upper compartment, and falls in a shower upon the cloth, through which it percolates and sinks again through perforations into the boiler, to be again propelled into the upper compartment.

Instead of using lime alone, a mixture of lime and carbonate of soda ($NaOCO_2$) is occasionally employed, which acts by forming the inert carbonate of lime or chalk ($CaOCO_2$) and caustic soda (NaO), which possesses high detergent properties. The chemical action which the boiling lye exerts on the cloth is in the formation of a soap with the resinous and fatty substances naturally inherent in the cotton or linen fibre, or communicated to it in the process of weaving, the greater portion of which is detached by the lye in the *bucking kier* and ultimately removed by a subsequent washing with water. This takes place either in the dash-wheels, or in a more effectual washing arrangement, consisting of a series of boxes or vats of different depths, placed side by side, into which the cloth is made to dip successively by passing over and under two sets of rollers. As the cloth moves on from the lower vats to the higher, it is passing from the soiled water to the more pure, as a stream of pure water is kept constantly running through the vats from the higher to the lower. The *fourth stage* in B. is the *souring* or *chemicking* in dilute sulphuric acid, of the strength of one gallon of the acid to from 25 to 30 gallons of water. The weak acid liquid is put into a large stone vat, and the goods are steeped in it. The acid acts beneficially in removing the remaining traces of the lime-soap which have adhered to the cloth, and a second washing in water, followed by bucking or scouring in soda lye, and a third washing in water are generally found necessary to obtain the cloth in the condition best suited for the subsequent operations. The *fifth stage* is *chemicking with B. liquor*, obtained by dissolving *B. powder* (q. v.) in water, and allowing the impurities or insoluble matter to subside. The B. liquor is much diluted with water, and the cloth is steeped in it for about six hours, then taken out, and allowed to soak for other six hours in a second vat containing water, after which it is drawn out and exposed to the atmosphere, when the carbonic acid of the air sets free a portion of the chlorine from the B. powder, imbibed by the cloth. The *sixth stage* is another *souring* process, during which the cloth is immersed for about four hours in a steeping vat, containing dilute sulphuric acid of the strength ranging from 1 to 8 gallons of acid in 200 gallons of water. This acid liquid, as it soaks the cloth, encounters the B. liquid which previously saturated the fibre of the cloth, and the acid combining with the lime of the B. liquid, liberates the chlorine, which attacks the remaining traces of color and removes them from the cloth.

The cloth, on being removed from the souring-vat, is boiled with soda lye, washed, and again treated with dilute sulphuric acid, which more effectually removes the decomposed coloring matter. It is thereafter thoroughly washed, passed through rollers to remove some of the water; then introduced into the *Hydro-extractor*, to get rid of the water more effectually; and lastly, the cloth is dried by being suspended in the air, or by being passed over a series of heated tin rollers, called *Steam Cans*. In the ordinary course of B., cotton loses about one-twentieth of its weight, and linen about one-third.

After the B. operations have been successfully performed, it is customary to proceed to the *finishing* of the cloth, which consists in, firstly, passing it through a large mangle, where the crumpled piece of cloth becomes smooth; secondly, drawing the cloth over rollers, which cause it to dip in a trough containing starch; thirdly, drying the starched cloth; and, fourthly, passing it through a large mangle or calender, consisting of a series of rollers, alternately of polished cast iron and solid paper, and which not only smooth out the cloth, but communicate a fine glazed surface, such as is generally exhibited in bleached cloth when purchased. The cloth intended to be printed upon or to be dyed is not starched or calendered.—The operations connected with the B. of cloth by chlorine exert no injurious effect on the health of men and women engaged in them. Some of the bleach-works near Glasgow are of long standing, and give regular employment to several hundred women. The rapidity with which the B. by chlorine can be carried on, may be understood from the fact, that when pressed for time, it is no uncommon thing to bleach, finish, and return to town 1000 pieces of cloth within 48 hours. Valuable in many respects, however, as is the rapidity of B. by means of chemical agents, it must be admitted that the process exerts a certain weakening effect on the cloth, and that, after all, B. according to the old method on the grass is preferable. Grass-B. is therefore still in use where time admits, as also for clearing linen and cotton apparel in domestic washing. See WASHING.

BLEACHING OF WOOL is never accomplished by B. powder, but recourse is had to sulphurous acid, which disguises the color of the wool by combining with it to form a colorless compound. Originally the wool is contaminated with a greasy substance called the *yolk*, which naturally exudes from the skin of the sheep, and this unctuous matter mainly consists of a kind of soap soluble in water. The *first stage* in the B. of W. is to get rid of the yolk, which can be done by long-continued washing in water; but as this is tedious, the general plan is to steep the wool in a vat containing one part of stale urine and five parts of water, then boil for some time, and ultimately strain the wool and wash well. The agent in the stale urine which acts upon the yolk is carbonate of ammonia, and this acting upon the oily matters forms a soap which can be readily washed away. When woollen cloth is to be bleached, it is customary to substitute carbonate of soda (washing soda) for the stale urine, and this forms an alkaline lye, which performs the same part as the carbonate of ammonia. Soap is sometimes used as an auxiliary. The *second stage* of bleaching wool is the *sulphuring*, which takes place in a small wooden apartment, in which the damp cloth is suspended in regular folds from the roof to the floor, and a small pan of ignited sulphur being introduced, the doors, &c., are firmly closed. There are little openings round the sides of the chamber, for the admission of air, which can be closed at pleasure. The sulphur (S) in burning takes up two atoms of oxygen from the air, forming sulphurous acid (SO_2), which is the bleaching agent; and in about 24 hours the operation is finished,

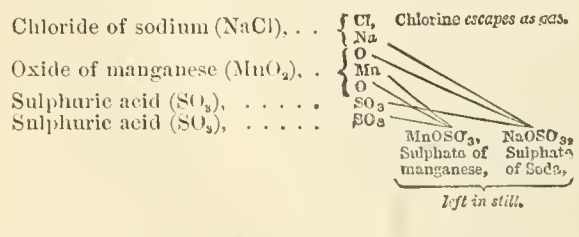
and the woollen material only requires to be thoroughly washed with water, which may contain a little potash or soda. Where the wool is naturally high-colored, it is necessary to repeat the various stages of the process several times before the bleaching is complete. Instead of applying sulphurous acid in the gaseous form, a solution of it in water is sometimes used.

An economical method of preparing the solution of sulphurous acid is to introduce a mixture of sulphate of iron and sublimed sulphur into an earthenware retort, and apply a low red heat, when sulphurous acid is disengaged, which is passed through a vessel containing some porous matter, such as moss, to retain mechanical impurities, and then transmitted through a series of bottles containing water, where it is dissolved to the extent of forty volumes of the gas for every one volume of the water. The bleaching of wool by sulphurous acid is not so complete as the bleaching of cotton or linen by chlorine. In the latter case, the color is destroyed, but in the former, the sulphurous acid merely combines with the coloring matter to produce a colorless compound, from which the color can again be revived, either by soaking the wool in a dilute acid, such as sulphuric acid, or a dilute alkali, such as soda. Hence it is that new woollen cloth or garments, such as flannel, blankets, and underclothing, though almost colorless when purchased, yet after being washed several times, return to their natural yellow; for the soda used, as well as the soap which contains potash or soda, destroys the colorless compound formed in the texture of the wool during the sulphuring, and resuscitates the original color.

BLEACHING OF SILK is carried on in a manner very similar to that pursued in the bleaching of wool. The silk has naturally a good deal of wax, accompanied by oil and coloring matter, enveloping the fibre, and the silk stuffs are repeatedly boiled in water containing a little soap or carbonate of soda, the alkaline nature of the solution being occasionally tempered by the admixture of some bran, which contains an acid. When well scoured and washed, the silk is obtained white enough for many kinds of printing; but where it is desirable that a pure white be obtained, the silken stuffs are introduced into a very weak solution of sulphurous acid, and thereafter thoroughly washed.

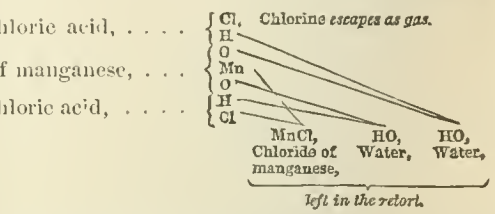
Other substances employed in the arts and manufactures are subjected to a process of bleaching; as the rags which are being manufactured into PAPER (q. v.), the palm-oil which is being converted into CANDLES (q. v.) and night-lights and the STRAW (q. v.) of which hats or bonnets are made; but the details of the processes followed in these and other operations, will be described more properly under their respective headings.

BLEACHING POWDER, a combination of chlorine and dry slaked lime (see BLEACHING), was first manufactured on a large scale in Glasgow by Mr. Charles Tennant, who obtained a patent for its preparation in 1799. The substances employed in preparing the chlorine are common salt (chloride of sodium), black oxide of manganese, and sulphuric acid. The operation may be conducted in one or in two stages. The vessel used is a still. The whole apparatus is made of strong sheet lead, or of cast iron, or of grooved stones fitting closely. The more general plan is to have the upper part of lead, and the under part of cast iron. The lower third of the still has usually a double jacket, or double walls, between which steam is admitted through a pipe for heating the contents of the still. In using the apparatus, 100 parts of black oxide of manganese (MnO_2) and 150 parts of common salt (NaCl) are introduced by an opening in the top, which is closed by a water-joint; 185 parts of sulphuric acid (SO_3), of specific gravity 1600, are then poured in by a funnel, and on the admission of steam into the jacket, chlorine is evolved, and issues by a tube at the head of the still. The theory of the changes that occur in the still is represented in the following table, there being two equivalents or atomic weights of sulphuric acid for one equivalent of each of the other ingredients:


Chloride of sodium (NaCl), . .
Cl, Na
Chlorine escapes as gas.
Oxide of manganese (MnO_2), .
O, Mn, O
Sulphuric acid (SO_3), ...
Sulphuric acid (SO_3), ...
SO_3
SO_3
$MnOSO_3$, Sulphate of manganese,
$NaOSO_3$, Sulphate of Soda,
left in still.

The pipe which carries away the chlorine gas is connected with a stone or leaden chamber, into which it enters at one or more points, and the chlorine entering, comes in contact with dry slacked lime in fine powder, with which the floor of the chamber is covered to the depth of some inches. The chlorine is rapidly absorbed by the lime, which, when the absorption flags, is stirred from time to time by wooden rakes. The process must not be allowed to proceed too quickly, as much heat is evolved during the combination of the chlorine with the lime; and if the temperature of the chamber rises beyond 110° F., the power of combination is very much lessened.

The material which is left in the still as a residuum, consisting of the sulphate of manganese and the sulphate of soda mixed together, is comparatively worthless, and accordingly it is found more economical in large chemical works to divide the process of the manufacture of B. P. into two stages, at each of which the residuum is of commercial use, and can be worked up into marketable products. The first stage is to heat the common salt and sulphuric acid together, when hydrochloric acid (q. v.) is disengaged in the gaseous state, and is received in proper vessels, and the sulphate of soda—from which common soda (q. v.) is prepared—is left in the retort or still. The hydrochloric acid thus obtained, is then placed along with the black oxide of manganese in the still, and on the steam-heat being applied, chlorine is evolved and is conducted to the lime chamber, while chloride of manganese and water are left in the still. The decomposition is stated thus:



The chloride of manganese can be returned to the condition of black oxide of manganese, used again and again. See MANGANESE. The B. P., prepared either in one or two stages, contains, when freshly and fully manufactured, generally between 30 and 40 per cent. of chlorine, and the strength of any sample is determined by the process of Chlorimetry (q. v.). The composition of B. P. is expressed by the formula $CaCl+CaOClO$, and it is regarded as a double salt of the chloride of calcium and hypochlorite of lime. For its employment as a decolorizing agent, see BLEACHING.

BLEAK (*Leuciscus Alburnus*), a small fresh-water fish of the family of *Cyprinidæ* (q. v.), of the same genus with the Roach, Dace, Minnow, &c. See LEUCISCUS. It is seldom more than six or seven inches long; in general form it resembles the dace, but

Bleak (*Leuciscus Alburnus*).

is more elongated; the dorsal fin is placed further back, and the base of the anal fin is longer; the nose is pointed, the under jaw the longest; the scales are of moderate size, and beautifully striated; the back is of an olivaceous green color; the sides, belly, cheeks, and gill-covers, shining silvery white; all the fins nearly white. The tail is forked for half its length. The B. is found in many of the rivers of Europe. On the inner surface of the scales of the B., as of white-bait, roach, dace, &c., a silvery substance from which they derive their beautiful lustre, is found in such abundance as to be much used for making artificial pearls (q. v.), the white beads so common in ladies' head-dresses and similar ornaments. That obtained from the scales of the B. is preferred to that of the roach and dace, but is inferior to that of the white-bait. It readily separates from the scales when they are soaked for a time in water, and settles to the bottom of the vessel. Small glass tubes are then dipped in it, and it is injected into thin hollow glass beads of the requisite forms and sizes, which are placed in a current of air to dry, and are sometimes further filled with wax.—The B. is singularly liable to be infested by a species of tape-worm.

The B. is an inhabitant of most of the English rivers which contain roach and dace. It is a very restless, active, little fish, constantly playing about the top of the water, in search of small flies or other food. A small piece of bread cast into the water becomes speedily surrounded by a shoal of them, and it is amusing to watch them darting to and fro at it with increasing pertinacity. It is not only a pretty little fish, but is, withal, delicate eating; and a dish of well cooked B. is scarcely inferior to gudgeons. They should be cooked in the same manner as sprats, which they rather resemble in shape and appearance. The best way to catch B. is to angle for them with a single gentle and a light quill float, the bait being about a foot under water; they may be caught with very small flies, and all the more easily, if the hook be pointed with a gentle. They are so active, that the angler cannot strike too quickly, and where they abound, they form good preliminary practice for the young fly-fisher. The neighborhood of running drains are very favorite resorts for B., and the angler can soon

determine if there be any about, by casting on the water a handful of bran, when, if there be any, they will immediately rise at it.

BLEBS (allied to *bulb*—Lat. *bulla*, a bubble) are transparent bladders or blisters of the cuticle, which make their appearance in some forms of fever, in erysipelas, and in disorders of the digestive apparatus. There are three varieties of B. recognized by physicians: 1. The mild B., which vary in size from a pea to a hazel-nut, occur on the face, neck or arms, and legs of teething infants, and of young persons who have indulged in unripe fruit. They generally burst, discharge the clear fluid they contain, and heal up again in three or four days. 2. The tedious B., which most commonly affect aged and weakly persons, are seen as an eruption of numerous red elevations, which enlarge to the size of a pea, containing pale yellow serous fluid. These vesicles multiply to such an extent that the sufferer is disturbed at night from the irritation, and slight febrile attacks further debilitate him. 3. The solitary bleb generally selects old women for its victims, and appears, after much tingling of the skin, as one large vesication, and bursts in 48 hours, leaving a superficial sore.

The treatment consists in correcting the secretions, limiting the diet to what is farinaceous and easy of digestion, cooling drinks and tonics. For local treatment, the irritated surfaces are to be soothed by poultices and water-dressings.

BLEEDING (*hæmorrhage*) is one of the most serious accidents which can happen to an animal, and constitutes the most anxious complication in surgical operations. As there is but a limited quantity of blood in the body, and as the sudden escape of a large portion of it is sufficient to cause death, every one should be instructed as to the measures which experience has shown to be the most efficient for preventing a dangerous loss of blood.

B. may be either from a wounded artery or vein, or from a raw surface; and it may be in the form of a general oozing from the surface of a sore or a mucous membrane. We shall consider these varieties separately.

Arterial B. is recognized by the florid redness of the blood, and by its issuing from the cut vessel *per saltum* or by jerks. There are exceptions to this, however. When an artery has been tied, and bleeding occurs from below the ligature, the flow of blood is continuous and of a dark color.

If a large artery be wounded, the first gush of blood may prove fatal, but in general the patient faints, and nature takes advantage of the respite to place the cut artery in circumstances as favorable as possible to the preservation of life; viz, the artery draws up within its sheath (see ARTERY); the blood, no longer impelled vigorously by the heart, clots between the cut end and the cellular tissue surrounding it; the inner and middle coats not only *retract* but *contract*, and another clot forms within the arterial tube. These clots—which, with the faintness and the contraction and retraction of the artery, are termed natural *hæmostatics* (blood-stoppers)—are sufficient in many cases to prevent a recurrence of the B.; but such a happy concurrence is not to be depended on, and we must be prepared to adopt some of the many surgical or artificial means for restraining the flow of blood till adhesion (q. v.) can occur between the cut surfaces of the coats of the artery. The principal surgical means are:

Immediate pressure, which may be applied by pressing the finger-tip on the place whence the blood is seen to flow, and may be kept up by pads of lint, or a coin of convenient size wrapped in cloth, and secured with a bandage to the part.

Pressure on the artery above, or as it comes to the cut part. This requires some knowledge of anatomy, but not more than any intelligent person may easily acquire. Thus, pressure on the inside of the arm, about midway between its front and back, will press the brachial artery (q. v.) against the bone, and arrest any bleeding from wounds of the forearm and hand. Pressure on the middle of the groin with a thumb placed crosswise will control the stream of blood in the femoral artery, so that none can escape from any wound below where the pressure is made.

Pressure on the course of the vessel may be very efficiently effected by tying a handkerchief round the limb above where it is injured, and then inserting a stick, and twisting it sufficiently tight. This is the principle of the original tourniquet, which was invented by Morel, a French surgeon, at the siege of Besançon in 1674. He got the idea from seeing how carriers tightened the ropes which secured bales of goods on their carts. It has been modified from time to time. At present it consists of a strap and buckle, a pad which may be adjusted over the course of the artery wounded, or likely to be cut in an operation, and a screw by which the strap may be tightened as the surgeon may deem necessary. See TOURNIQUET. The objections to *pressure* as a means of arresting hæmorrhage, are, that it is very painful, that it includes the vein, and thereby engorges the limb with blood, and may cause mortification, if continued for any length of time.

'Actual' cautery, or hot iron, is occasionally useful in bleeding from a bone, or at some points where pressure cannot be efficiently applied. It is the oldest method of stopping bleeding, and until the 18th c. was much in use; but its abuse, and the natural horror felt for it by both patient and surgeon, have almost banished it from the list of surgical hæmostatics. If used, the iron should be at a white heat, the wound pressed for an instant, and then the iron should be held in contact with the bleeding vessel. It causes an eschar or slough, with shrivelling of the artery; and if the latter be small, it effectually stops the bleeding, until the eschar drops off, when the vessel may be found still pervious at the wounded part, and the danger of bleeding be as great as at first.

Ligature, or tying the artery, is a very old method of arresting hæmorrhage, and certainly the best. It was not used generally, however, in operations until improved anatomical knowledge and more efficient tourniquets allowed surgeons the time necessary for its application. See LIGATURE.

Another method was introduced by the late Sir James Y. Simpson of Edinburgh, and has been already extensively used. He termed it acû-pressure, or pressure from a long needle or pin inserted from without, so as to press the artery between it and the tissues. The pins are removed after twenty-four or forty-eight hours, the period being proportioned to the size of the artery to be secured. This new plan promises to supersede the ligature, in amputations especially, where the vessels can be easily secured, and where occasionally they are found to be so brittle from disease (see ATHEROMA) as to break under the pressure of a thread.

Venous B. is recognized by the dark color of the blood, and its continuous flow. Pressure is generally found sufficient to arrest it, and it should be applied directly over the wounded part. Ligatures are not used to secure cut ends of veins, as inflammation of the lining membrane of these vessels is apt to spread along them towards the heart (see PHLEBITIS), and produce dangerous symptoms, and very frequently fatal results. There is not the same objection to the use of acû-pressure pins. Of course, if a large vein is wounded in a part where compression cannot be readily applied, the surgeon should have no hesitation as to tying it; and if it is not cut quite through, he may pick up the cut edges in a forceps, and tie them so as to still permit a flow of blood through the vein.

Oozing from cut surfaces of course partakes of the characters of venous and arterial B., but there is no vessel sufficiently large to demand a ligature pressure. The actual cautery and cold may then be used, or one of the many styptics, the strong perchloride of iron may be specially recommended; it may be applied on lint or a sponge; or astringents, such as alum and tannin; there are also the puff-ball, mushroom, agaric, and matico leaves, cob-webs, felt, &c., which act mechanically, and owe their reputation chiefly to the pressure used in their application. Some persons have a congenital tendency to bleed (the hæmorrhagic diathesis); if such a one have a trifling cut, or have a tooth pulled, he bleeds perhaps to death. A prudent surgeon will not perform cutting operations on one of a hæmorrhagic family.

B. from the free surfaces of mucous membranes occurs when they are much congested. One may have fatal hæmorrhage from the stomach, and yet no open vessel may be found after death, even on the most careful examination. In such a case, we must trust to cold and internal remedies, such as acetate of lead combined with opium.

BLEEDING or BLOODLETTING.—Blood may be drawn from a vein (phlebotomy—venæsectio), or from an artery (arteriotomy) The veins most commonly opened for this purpose are those at the bend of the elbow (see ARM), but those of the lower limbs are occasionally selected. The patient should be placed sitting up in bed, as he may lose a dangerous amount of blood without showing the usual premonitory symptoms, if his head be kept low.

The venous return should now be obstructed by a bandage, and when the veins swell, one should be selected, steadied with the left thumb, and slit obliquely with a lancet; the blood allowed to flow till the desired quantity has escaped, or till faintness comes on. The surgeon's thumb should now be replaced on the cut in the vein, and kept there till the bandage is removed, when a small pad of lint and figure of 8 bandage will sufficiently prevent the bleeding, and the wound will speedily heal.

Phlebotomy was at one time habitually resorted to in inflammatory diseases, or such as were thought so; and even when there was no positive disease, it was often applied periodically at particular seasons, as spring and autumn, as a hygienic precaution. A great change in this respect has taken place in medical practice; as physiological knowledge advances, the opinion seems gaining ground that abstracting blood from a sick man gives him but temporary relief, and renders him less able to combat with the disease. When there is a wound of the cavities of the body with internal hæmorrhage, venesection is very useful in lowering the heart's action, and, perhaps, according to the old theory, in exercising a *derivative* influence on the wounded vessels. Local B. is effected by cupping and leeches. See articles on these.

Arteriotomy is generally performed on the temporal artery, by a transverse cut about half-way through the vessel. When the

required amount of blood has been abstracted, it ought to be completely cut across, to allow of its ends retracting and healing. If this precaution is neglected, an Aneurism (q. v.) would form. A compress and bandage should be put on the head for a day or two.

BLEI'BERG, a town of Austria, province of Carinthia, in the circle of, and about 8 miles west of Villach, pleasantly situated in the valley of the Drau, or Drave, near the celebrated Bleiberg (Lead Mountain). The pop. (1880), 2657 in number, are chiefly engaged in the mines of the Bleiberg—from which 1500 to 1800 tons of lead are annually obtained—and in washing and smelting the ore.

BLENDE (Ger. *blenden*, to dazzle), a name given to a number of minerals composed chiefly of sulphur and of certain metals, all or almost all of splendent lustre, at least in fractures and the faces of crystals. It is also very often popularly applied more exclusively to one of these minerals, to which alone, perhaps, it originally belonged, ZINC B., or GARNET B.; also called, according to its chemical composition, *Sulphuret of Zinc*. Among English miners, it is known as *Black Jack*. It is abundant both in primitive and in secondary rocks in many parts of the world, and is often associated with Galena (q. v.), or Lead-glance. It contains about 66 parts of zinc and 33 of sulphur, and is used as an ore of Zinc (q. v.); but the reduction of it is attended with difficulty, which much diminishes its value. It is usually brown or black, sometimes red, yellow, or green. It occurs both massive and crystallized in rhomboidal dodecahedrons, octahedrons, and tetrahedrons. Macles, or twin crystals, are remarkably common. It is very brittle; before the blow-pipe, it decrepitates violently, but only fuses on thin edges.—MANGANESE B. is a rare mineral, composed of sulphur and manganese.—ANTIMONY B., or *Red Antimony*, is also a rare mineral, composed of sulphur and antimony. —RUBY B. is a name sometimes limited to Pyrargyrite, or Red Silver (see SILVER, ORES OF); sometimes extended as a sort of generic term to include a number of other minerals composed of sulphur and metals, among which are Cinnabar (q. v.), Realgar (q. v.), and Orpiment (q. v.).

BLÉNEAU, a village of France, in the department of the Yonne, about 29 miles west-south-west of Auxerre, celebrated as the place where Turenne gained a victory over the Prince de Condé in 1652. Pop. (1876) 1433.

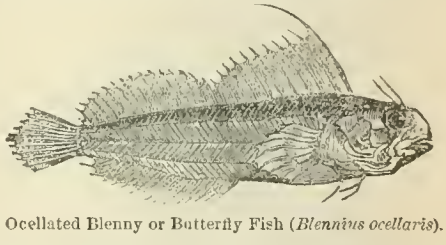
BLE'NHEIM (Ger. *Blindheim*), a village of Bavaria, 23 miles north-north-west of Augsburg, memorable in connection with Marlborough's great victory over the French and Bavarians, August 13, 1704. The battle, however, did not actually take place here, but at a village in the vicinity called Höchstädt, and it is known to the Germans by that name. France and Bavaria, on the one hand, stood opposed to Holland, England, Austria, Savoy, Portugal, and the German empire, on the other. The French and Bavarian army consisted of 56,000 men, commanded by Tallard, Marsin, and the Elector of Bavaria. Opposed to it was an army of 52,000 men, under the command of Marlborough and Prince Eugene. The French and Bavarian generals had no idea that the allies would act on the offensive, and accordingly, when, about two o'clock in the morning, on the 13th August, the line of the allies put itself in motion, they believed that it was about to retreat. Even at seven o'clock, when the heads of the eight columns advancing under Eugene and Marlborough became visible, Tallard regarded the whole proceeding as a stratagem to cover the retreat. When the mistake was discovered, the army was hastily drawn up in battle-array, and fought with dauntless courage; but at five in the afternoon Marlborough broke through the line of battle, and won a victory most complete and decisive. The French and Bavarians left about 10,000 killed and wounded on the field, vast numbers were drowned in the Danube, and about 13,000, including Tallard, were taken prisoners. Altogether their loss was estimated at between 30,000 and 40,000; 120 pieces of cannon, and 300 standards, were captured. The loss of the victors amounted to about 5000 killed and 8000 wounded. Near to B., also, the French defeated the Austrians in 1800.

BLE'NHEIM DOG, or MA'RLBOROUGH DOG, a small and very beautiful variety of spaniel, much resembling the King Charles spaniel (q. v.) in form and general appearance, but differing in the color, which is white, with orange or flame-colored markings. In weight it should not exceed five pounds. The B. spaniel is the *Pyrame* of Buffon. It derives its English name from Blenheim Palace in Oxfordshire, the seat of the Dukes of Marlborough, where the breed has been preserved since the beginning of the 18th c These dogs are sometimes sold at an enormous price.

BLE'NHEIM HOUSE, near Oxford, the seat of the Duke of Marlborough, erected at the public expense in the reign of Queen Anne as a testimony of gratitude to the victor of Blenheim (q. v.). £500,000 was voted for the purpose, but that sum did not suffice for the completion of the work. The royal estate of Woodstock, in which it stands, was granted at the same time. The building was designed by Sir John Vanbrugh, and is a grand though heavy monument of his powers as an architect. The length of the principal front from wing to wing is 348 feet. The interior is proportionally magnificent, and the collection of paintings is one of the most valuable in Britain. Among the objects of interest in the grounds are a triumphal arch, and a column 130 feet high, surmounted by a statue of Marlborough. An inscription on the pedestal, written by Bolingbroke, recites the public services of the hero. The manor of Blenheim Park embraces a circuit of about 12 miles.

BLENNORRHŒ'A (*blenna*, mucus; *rheo*, to flow) is a medical term for an unusual copious discharge from any mucous membrane; but as it does not completely express the nature of such fluids, modern writers do not often make use of it. *Mucus* is a pellucid, ropy substance, which, according to Sir James Paget, 'has no corpuscles or organized particles' of its own. In those discharges termed blennorrhœal, on the other hand, there is a mixture of epithelial scales shed in large quantities from the mucous membrane (mucus cells), and occasionally pus cells. In B. of the lachrymal sac, or what is called 'watery eye,' if the inner corner of the eye be pressed by the fingers, an opaque, milky fluid will appear between the lids, instead of the transparent tears which are present when the lachrymal apparatus is in health. After inflammations of the genito-urinary mucous membrane, a gleety discharge frequently occurs, and continues for a long period. The treatment consists in establishing a robust state of health by tonics and the preparations of iron, fresh air, and careful regimen, with astringent lotions applied directly to the mucous membrane, such as alum, tannin, &c., to lessen the quantity of the secretion, and occasional caustic stimulants, as the nitrate of silver, to alter the depraved condition of the secreting membrane.

BLE'NNY (*Blennius*), a genus of Acanthopterygious (q. v.) fishes, the type of a family, *Blenniidæ*, very nearly allied to the family of *Gobiidæ* (see GOBY), and by many naturalists included in it. To the B. family, the Wolf-fish (q. v.) and the Gunnel (q. v.) or Butterfish are referred. The fishes of this family are generally remarkable for the abundance of slimy matter with which their skin is covered. Many are destitute of scales. The body is gen-



Ocellated Blenny or Butterfly Fish (*Blennius ocellaris*).

erally of an elongated form. They have only one dorsal fin, which, however, seems in many of them as if composed of two parts. They are distributed in the seas of all parts of the world. —The true blennies are small fishes, living in shoals, which do not consist of great numbers, frequenting rocky coasts, and often found in pools left dry by the tide, or even among the wet sea-weeds, among which they are capable of subsisting for a much longer time than that of the absence of the tide. They possess the power of using their ventral fins to aid them in moving among rocks and sea-weeds. They have a fringed appendage over each eye. They are seldom thought of as an article of food, but are much in request for the aquarium, on account of their tenacity of life and their activity. They feed chiefly on small crustaceans. Several species are found on the British coasts.—Many of the B. family retain their eggs within the oviduct until they are hatched, so that the young are produced alive, and capable of seeking food for themselves. An example of this is found in the Viviparous B. (*Zoarces vivipara*) of the British coasts.

BLÉRÉ, a town in the department of the Indre-et-Loire, France, is situated on the left bank of the Cher, which is here crossed by a bridge, said to owe its origin to Henry II. of England, about 15 miles east-south-east of Tours. B. is the entrepôt for most of the traffic on the Cher. Pop. (1876) 2043. In its vicinity is the castle of Chenonceaux, the residence purchased by Henry II. of France for the celebrated Diana of Poitiers, who lavished much money on its embellishment, as did also Catharine de' Medici, after she had dispossessed Diana. In 1733, it became the property of M. Dupin, whose wife, by her beauty and wit, attracted to the castle almost all the distinguished literary and scientific men of the day, including Montesquieu, Voltaire, Fontenelle, Buffon, Bolingbroke, and Rousseau. The castle escaped the fury of the revolution, and is still in a good state of preservation. Among the curiosities shown to the visitor is the mirror used by Mary Stuart (Queen of Scots) on her marriage with the Dauphin.

BLE'SSÉD THI'STLE. See THISTLE.

BLE'SSINGTON, Margaret, Countess of, born September 1, 1789, at Knockwiet, near Clonmel, Tipperary county, Ireland, where her father, Edward Power, was settled. At the early age of fifteen she was married to Captain Farmer, and shortly after his death, to Charles John Gardiner, Earl of Blessington. With him she took several extensive journeys on the continent, where, as well as in London, she gathered around her all the most distinguished men of the time. In Genoa, she formed an intellectual friendship with Lord Byron, and afterwards resided in Paris, until the death of her husband, in 1829. The latter left her a good fortune, which enabled her to gratify her literary tastes. She held a little court of her own, at her family mansion, Gore House, Kensington, a suburb of the west end of London. Her celebrated soirées were frequented by many of her distinguished contemporaries. Her subsequent connection with Count d'Orsay placed her in an equivocal position as regards society, and consequently, on the accession to power of Louis Napoleon, with whom both were intimate, they left England for France. Her ladyship died at Paris, 4th June 1849. She was the authoress of two works of little importance, the *Idler in France*, and the *Idler in Italy*. Her only valuable production is her *Conversations with Lord Byron* (1834), which helped to place the poet in a more favorable light before his countrymen.

BLE'TCHINGLEY, a town in the south-east of Surrey, 20 miles south of London. Pop. about 2000, chiefly agriculturists. Many Roman coins have been found in the vicinity. Near B., 2000—3000 tons of Fuller's earth are raised annually. In cutting the B. railway tunnel, the fossil bones of the iguanodon, an extinct reptile, were found.

BLETS, rotten spots in apples, pears, and other fruits. The rotting of such fruits is often called *bletting*. It takes place chiefly by the decomposition of the protein (q. v.) compounds which the fruits contain, and the fermentation of the sugar; carbonic acid is formed; and the fibres of a fungus can be discovered by the microscope pervading the bletted part, to the rapid extension of which they no doubt greatly contribute, although it by no means follows that the presence of the spores or seeds of the fungus should be regarded as the original cause of the decay.

BLICHER, Steen Steensen, one of the most distinguished of modern Danish poets and novelists, was born in 1782, at a village of Viborg; and took his theological degree at Copenhagen in 1809. He remained with his father, himself a pastor in Jutland, till 1819, when he obtained a living, which he exchanged, in 1825, for a better. Independent in character, and belonging neither to the poetical nor scientific circles of the capital, he was long known only as the successful translator of Ossian, 2 vols. (1807—1809). His *Snecklokken* (1826), and still more, his contributions to the monthly periodical *Nordlyset*, brought him into fuller notice; and in 1829, his *Jydske Romanzer* had a great measure of success, and his *National Noveller*, giving a poetical and faithful picture of country life in Jutland, were even better received. As a poet, B. is thoughtful, tender, and eminently national, but he lacks objectivity. His novels appeared in 5 vols. (Copen. 1833—1836), his poems in 2 vols. (1835—1836), and these were followed by *Samlede Noveller og Dichte* (1840), and *Gamle og nye Noveller* (1847—1848), &c. He died in 1848. Specimens of B. are given in *The Danes sketched by Themselves*, by Mrs. Bushby (1864).

BLI'DAH, a town of Algeria, in the province of Algiers, about 30 miles south-west of the city of that name. It is beautifully situated on the borders of the fine plain of Metidjah, is surrounded by gardens, and is a prosperous and rapidly growing place. It was occupied by the French in 1838. Pop. about 9000. It is a station on the first line of railway in Algeria. The foundation-stone of the railway station was laid in 1859, in the presence of a large number of Arabs, who regarded the ceremony with intense interest.

BLIGH, William, an English admiral, born 1753, celebrated in connection with the mutiny of the *Bounty*. Having made a voyage round the world under Captain Cook, he was sent out, December 23, 1787, by the British government, as commander of the ship *Bounty*, to Tahiti, there to collect bread-fruit-tree plants, and thence sail with them to the West India colonies, where government was anxious to introduce them. The ship arrived at her destination in October of the following year, and in six months after was ready to sail for Jamaica, with 1015 plants on board. Partly on account of their demoralization by their lengthened residence on so charming and productive an island, and partly owing to the harsh and tyrannical treatment they met with from their commander, a part of the crew mutinied, after they had been twenty-four days out, on the 28th April, and forced the captain and eighteen men into the ship's launch, which they cast adrift, turning their own course back to Tahiti, and ultimately settling on Pitcairn's Island (q. v.). The captain and his companions, who had very little provision, and no sextant or map, arrived after almost incredible hardship, at the island of Timor, on the 14th June, a distance of 3600 nautical miles from the point where they were abandoned. To the skill and prudence of B., the fact that not a single life was lost, is chiefly to be attributed. On B.'s arrival in England, a man-of-war, under Captain Edwards, was sent, at his instance, to capture the mutineers. Some of them were seized; the rest had escaped to Pitcairn's Island, with Fletcher Christian, the leader of the mutiny. Their place of refuge, however, was not discovered until 1808, when an American ship accidently touched at the island. At that time, drunkenness, debauchery, and unbridled passion had left only one of the mutineers, John Adams, remaining. Their fortunes here was made the subject of a poem by Byron, entitled *The Island; or Christian and his Comrades*. B. was again sent out to collect bread-fruit trees, and convey them to the West Indies, in which he was completely successful. In the French revolutionary war, B. commanded a ship of the line, but again exciting the disaffection of his men by his harshness, they mutinied, and ran the ship into a French harbor. In 1806, B. was appointed governor of New South Wales, but his conduct here was so tyrannical as to cause universal dissatisfaction; and in 1808, unable to tolerate his rule, the civil and military officers of the colony summarily terminated his government by arresting him. He died in 1817.

BLI'GHIA. See Akee.

BLIGH ISLANDS, that portion of the Feejee Archipelago originally discovered by Tasman, in 1643, which was seen by Captain Bligh of the *Bounty*, during his wonderful voyage in an open boat. The group lies in nearly 180° of long. and 15° 30′—19° 30′ S. lat.

BLIGHT, a diseased state of the cultivated grasses, especially of the cerealia. The term has been very vaguely and variously used, having, in fact, been applied to almost every disease of plants caused by the condition of the atmosphere, or of the soil, the attacks of insects, parasitic fungi, &c. It is frequently limited to the disease in wheat and other grains, which is called Smut-balls, Bunt, Pepper Brand, or Stinking Rust, in which, while the grain retains its usual form and appearance, the interior of it is filled with a powder of a very fetid odor, consisting of balls so minute that it is calculated that four millions of them may exist in a single grain. These are a parasitic fungus, *Uredo caries* (*U. fœtida* of some botanists). See Smut.—The name B. has been frequently applied to diseases which seem to be caused by errors in the manuring of land, by which crops are often seriously injured. Unhealthy plants are most liable to be attacked by parasitic fungi, and by aphides and other insects, to which the origin of the evil has often been, in all probability, erroneously ascribed. Mr. Berkely, a high authority on such subjects, also states that 'there is a kind of B. sometimes very prevalent, which has been referred to fungi, but which is, in fact, nothing more than an excessive development of the epidermal cells, which are no longer kept within bounds by the real cuticle,' but become 'elongated and frequently branched in various ways, so as to form spongy or mealy patches, which are sometimes in such abundance as from their bright color or peculiar aspect to attract general notice.' He adds that this is most common on woody plants, as vines and hawthornes, but that something analogous is to be seen on a few herbaceous species, 'a mere hypertrophy of the epidermal cells, or indeed, mere fascicles of pubescence.' This kind of B., however, does comparatively little injury.

BLIND, The, those who are either partially or totally deprived of the sense of sight. Only a few are born blind, the greater number becoming so by accidents, small-pox, or diseases of the Eye (q. v.), so that more than one half are above the age of fifty. Blindness prevails most in tropical, and least in temperate countries; more in the eastern than the western hemisphere. There are about 30,000 in the British Isles. The balance between the outer and the inner world being disturbed, there is a tendency among the blind to self-consciousness self-opinionativeness, and a desire to become the objects of attention, and, if possible, surprise, if not admiration; hence there is more avowed infidelity than in any other class, although probably much of it is assumed, to attract attention, and display their controversial powers. As these tendencies are not strong in individuals, but become intensified when they are congregated together, it is now generally admitted that the more they associate with the seeing, and the less with one another, the better.

The first institution for the blind was founded in Memmingen by Weef VI., in 1178; the second, in Paris, by St. Luis, in 1260; the first for the employment of the adult blind was opened in Edinburgh by Dr. Johnston, in 1793. There were in 1879 about 150 institutions for the blind in the world, two-thirds of which have only recently been established. Though the blind, in general, are more or less dependent, yet many have earned a comfortable living, and even attained distinction in departments generally supposed to be to them inaccessible. The employments most adapted to their abilities are the making of baskets, brushes, mattresses, rugs, and such-like; and for the women, sewing, knit-

ing and hair-plaiting. Many also have successfully competed with the seeing as musicians, music-teachers, and piano-tuners.

PRINTING FOR THE BLIND.—The first embossed book for the use of the blind was printed in Paris in 1784, by M. Valentine Houy, from flat movable letters, which his pupils had been previously taught to put together and read. Founts of types were cast and books printed; and having been approved by the Academy of Sciences, and exhibited before the royal family at Versailles, the art created at the time a great sensation. Large editions of a few volumes were printed at great expense; but as they were not easily read, and were used only for exhibition in the Paris Institution, the interest soon died away, and the greater part of the editions was long after sold for waste paper.

Printing can never be to the B. what it is to the seeing, and is chiefly of use for those gems of literature which can be read and re-read with interest. It is questionable, therefore, whether the art, after falling into abeyance for about forty years, would have been permanently revived, had it not been for the Bible, the book least wanted in Paris, but most wanted in Britain and America.

The merit of reviving it in this country is due to Mr. James Gall, of Edinburgh, who having in 1826 seen specimens of the Parisian books, and obtained a box of the types, was deeply impressed with the importance of putting the Bible into the hands of the blind, to employ their vacant hours. Being himself a printer and publisher, he at once saw the cause of the failure in France, and set himself to improve the alphabet, so as to make it more sensible to the touch. The following is a specimen of the Parisian type at that time :*

King of Jerusalem

The principles which he laid down for his guidance were these : *First*, that the common alphabet (modified so as to be easily felt) is the only safe basis on which a literature for the blind can rest. He did not believe that any arbitrary character would be universally adopted or permanently adhered to; and as he looked forward to the blind being taught in common schools, not only to read, but to communicate with their seeing friends, he thought it indispensable that the books should be legible to all. *Second*, that the printing should be so large and legible that the adult blind should be able to read it *fluently*. It would have been easy to print books in a small type, which could be read by children only, and which, besides being much cheapeer, would have astonished the public more; but he was of opinion that unless the adults were able to read easily, the books would not be read in private, and the object he had in view would not be attained. He also unhesitatingly preferred the common (low-case) alphabet to the capitals, which, though sufficiently well known, are not fitted for the use of the blind. Their symmetry and general uniformity, which specially adapt them for titles and inscriptions, render them unsuited for common and easy reading, either for the blind or those who see. They are even less adapted for the finger than the eye, because the eye can see the interior parts of the letters by which they are distinguished; whereas the finger can feel only the exterior form. Thus **EHKMNXZ** appear to the finger as a succession of squares, **OCGQ** as a succession of rounds.

In 1827 Mr. Gall printed his 'First Book' for teaching the blind to read in a triangular modification of the common alphabet. The embossing was in high relief, and although it presented rather a rude appearance, being printed from wooden types, it excited great interest and wonder when it was found that the blind could read it easily with their fingers. This was followed by other little volumes, including a series of *Scripture Statements*, and a condensed *Epitome of Old Testament History*. These were received with so much favor, that in 1829 he issued a prospectus for the publication of the gospel by St. John at one guinea, which was to pay not only for the copies, but preliminary expenses.

This work was printed in 1832, but was not published till 1834; the delay being caused by the efforts of some zealous friends to induce him to adopt some arbitrary alphabet before printing the Bible, which, however, he firmly declined to do. The consequence was that, in 1832, the Scottish Society of Arts offered a gold medal, value £20, for the best alphabet for the blind; and this, although it increased the public interest in the newly revived art, had also the effect of paralyzing Mr. Gall's efforts, by preventing the public from giving him support until the result of the competition thus created had been ascertained. It would have greatly strengthened his hands if, as he hoped, they had awarded him the prize, for there was no other in the field; but after waiting two years, he could wait no longer, and in 1834,† he published his great work, *The Gospel by St. John*, which was the first book of the Bible which had ever been printed for the blind in any language. This volume was printed in a type so large and legible, that some of those whom he taught, were able at the public meetings to read any passage put before them through six plies of silk between the book and their fingers.

ᗷᕮᒪᗝᒪᔆ ᖵᕮᕮ ᒪᗩᗰᗷ ᗝᖴ ᖘᗝᔆ

To make known the literature thus provided for the blind, Mr. Gall visited England and Ireland, as well as different parts of Scotland, teaching the blind who were brought to him to read and write in a few lessons. The writing apparatus will be described hereafter. Letters thus written were transmitted by post, and as the same alphabet was used both inside and without, not only were the sealed contents read by the blind to whom they were sent, but the adresses also were read by the post-men who delivered them. Great interest began to be excited throughout Britain, and extended even to foreign countries. Abbé Carton was sent by the Belgian government to visit Mr. Gall's establishment, and returned to set up a printing-press in Brussels which has continued to supply books for that kingdom. Dr. Howe also, from Boston visited Scotland, and having received from Mr. Gall all the information which he could supply, established on his return to America a printing-press in the Perkins Institution. In 1834 he published the Acts of the Apostles, and completed the New Testament in 1836. About the same time, Mr. Jacob Snider of Philadelphia, not knowing what had been done elsewhere, published the gospel by St. Mark in 1834; but as he had unfortunately adopted the capital alphabet, his books could not compete with Dr. Howe's; and after printing the gospels and a few other volumes his press ceased to be used. Dr. Howe, on the contrary, had adopted an angular modification of the common alphabet, similar to, but much smaller than Mr. Gall's, and with that printed the whole Bible, besides an ever-increasing number of other volumes in all departments, with which he continues to supply the whole of the United States. In Paris, also, the art was revived with great vigor, and a number of printing-presses were established in different parts of the continent.

Having thus succeeded so far as the blind were concerned, Mr. Gall was next anxious to improve the printing and lessen the cost, so that any village printer could make it part of his ordinary trade, without requiring subscriptions from the public. By careful experiment, and with the help of his son, he was enabled to make the alphabet assume more of its usual form without losing its tangibility, and to enrich the sentences by the introduction of initial capitals for proper names, &c., as in common books. But the most important improvement consisted in the use of serrated types, by which the letters were formed of dots instead of lines. By this means the impression was not only sharper and more easily felt, but also more permanent, being better supported, as if by a series of arches, like corrugated zinc roofs. It was also found that when the paper was thus semi-punctured instead of being embossed, the common printing-press could print the sheets with half the pressure, and in half the time: and as the paper did not need to be nearly so thick as formerly, the books could be produced at one half of their former cost. In 1836, therefore, he offered to societies and publishers, to print books for the blind in the improved type at so much per sheet, as an ordinary business transaction, without either subscriptions or donations. Of this offer the London Sunday-School Union, the Religious Tract Society, and the British and Foreign Bible Society availed themselves in 1837; and in 1838 he printed for the British and Foreign Bible Society the gospel by Luke and the Acts of the Apostles (two of the eight volumes of the New Testament), which they were able to sell at 4*s.* each: and here ended Mr. Gall's labors for the blind, extending over a period of twelve years, during eleven of which (1826—1837) he had been alone in the field.

As the Institutions for the blind in those days 'had not hitherto (as they expressed it) patronized any device of this kind,' Mr. Gall had to contend single-handed with all the apathy and incredulity which every new thing has to encounter. But now the tide had turned, readers were multiplying over the country, schools for the blind were beginning to be formed, the institutions abroad had all patronized the device,' and printing-presses were busy both in America and on the continent; so that when the Sunday-School Union, the London Tract Society, and the British and Foreign Bible Society began to publish class-books, tracts, and Bibles for the blind, they all at once became convinced of its importance, and took it up with so much energy, that there was now no longer any danger of its being abandoned; and as Mr. Gall's work was thus practically accomplished, it was neither his interest nor his inclination to compete with them.

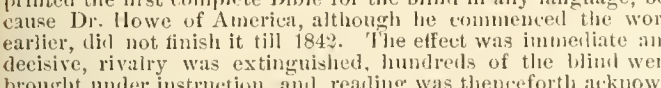
The first, and by far the most energetic, of the number was Mr. John Alston of Glasgow, who, having established a printing-press in the Blind Asylum, of which he was treasurer, printed in

* In this, as in all the specimens which follow, the size is reduced to one quarter —that is to say, they are half the length, and half the breadth of the originals.

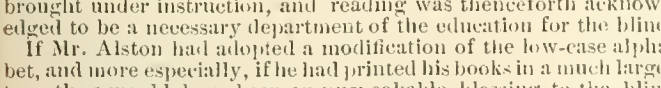
† The award was not made till 1837. Sixteen arbitrary alphabets had been sent in, all of which were rejected, and the prize was awarded to a Dr. Fry, of London, who had suggested the use of Roman capitals, which, in 1834, had already been tried in America.

1837 the gospel of St. Mark in the same type in which (unknown to him) it had been printed in 1834 by Mr. Snider in Philadelphia. Through his influence it was at once adopted in the other institutions throughout the kingdom; and, having thrown himself with much enthusiasm into the work, he very soon raised funds by which he completed the New Testament in 1838, and the whole Bible in 1840. To him, therefore, belongs the honor of having printed the first complete Bible for the blind in any language, because Dr. Howe of America, although he commenced the work earlier, did not finish it till 1842. The effect was immediate and decisive, rivalry was extinguished, hundreds of the blind were brought under instruction, and reading was thenceforth acknowledged to be a necessary department of the education for the blind.

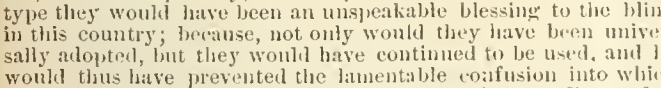
If Mr. Alston had adopted a modification of the low-case alphabet, and more especially, if he had printed his books in a much larger type they would have been an unspeakable blessing to the blind in this country; because, not only would they have been universally adopted, but they would have continued to be used, and he would thus have prevented the lamentable confusion into which the printing for the blind in this country has fallen. But unfortunately, Mr. Alston being encouraged by the decision of the Scottish Society of Arts, which he himself had very much helped to influence, fell into the double error of adopting the Roman capitals for his alphabet, and making his type too small. The consequence was, that a reaction very soon took place, the blind themselves being the first to rebel. The want of sufficient legibility was in their judgment a fatal objection, and outweighed all other considerations. Even the large amount of money that had been expended, and the extensive libraries that had been formed through Mr. Alston's energetic labors, they were prepared to sacrifice, in order to obtain books which they could read with ease.



Gall's Serrated Type (*New Testament*, £1, 12*s*.)

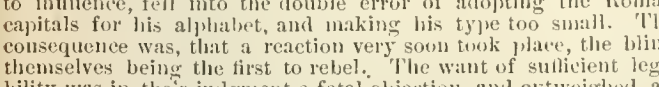


Howe's American Type (*New Testament*, 16*s*.)



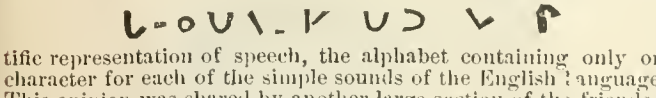
Alston's Glasgow Type (*New Testament*. £2.)

The second in the field, or rather simultaneously with Mr. Alston, was Mr. Lucas of the Bristol Institution, who invented a most ingenious system of stenographic printing with arbitrary characters and numberless contractions, by which he secured



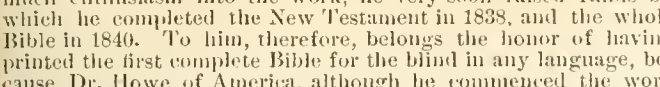
largeness of type and at the same time diminished the size of the books. He had in 1837 printed the gospel by St. John, and in 1838 the Acts of the Apostles, but during the triumph and rapid multiplication of Mr. Alston's books little attention was paid either to him or his system; but when the tide turned, and legibility became the great desideratum, the value of his invention became apparent, and in 1839 a society was formed to aid Mr. Lucas in printing the Bible and teaching the blind to read upon his system. The blind were delighted with his books; his printing establishment was removed to London; large funds were collected; and the whole Bible and many other books were printed. (*Price of the New Testament*, £2.)

The third competitor was Mr. Frere of London, whose objections to Mr. Lucas's system were so strong, that he was induced to devise another, which was (as he himself described it) 'a scien-



tific representation of speech, the alphabet containing only one character for each of the simple sounds of the English language.' This opinion was shared by another large section of the friends of the blind; and accordingly, in 1839, another society was formed, another Bible was printed, another literature was created, and another illustration was supplied of the difficulty of securing the universal and permanent adoption of any arbitrary character for the blind. Mr. Frere had also the merit of inventing the 'return lines'—that is to say, the lines in his books are read from left to right, and from right to left alternately, the letters themselves being reversed in the return lines. He also devised a cheap and very ingenious method of setting up and stereotyping his books, the letters being formed of small bits of bent wire laid on a tin plate, and fastened with heat. (*New Testament*, £2, 10*s*.)

The fourth competitor was Dr. Moon, of Brighton. He, too, uses an arbitrary alphabet, some of the characters resembling or suggesting the letters which they represent. He has also adopted Mr. Frere's 'return lines,' but does not reverse the letters as Mr. Frere does. Mr. Moon's printing is larger than any other, and therefore more easily felt. This is a great advantage to beginners, and to those whose touch is very obtuse, although no doubt his books are on that account both bulky and expensive.

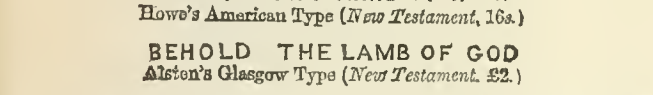


Nevertheless, this is by far the safest side on which to err, and therefore Mr. Moon's books are great favorites with the blind. A society having numerous branches, has been formed to extend this system, and the blind are sought out and taught in their homes. Many more blind persons can read on Dr. Moon's system than on any other. Besides the Bible, Dr. Moon has printed (embossed) an extensive literature, both in English and in many foreign languages.

A fifth system has been recently imported from Paris, invented by M. Braille, which consists of the sixty-two varieties of form which six dots, ⁘, can be made to assume by the omission of one or more of them. This supplies not only letters of the alphabet, but numerous other signs, of which he makes valuable use. There

are two advantages which it possesses over all the others, and which it is supposed will cause it to supersede them. The first is, that it can be written easily by the blind themselves, by an apparatus to be afterwards described. The other is, that it affords the best method of writing and printing music for the blind which has yet been discovered.

A sixth system is an improvement on Braille, by Mr. Wait of New York, which, it is confidently predicted, will supersede all the others. The signs, like M. Braille's, are produced by six dots, but they are placed horizontally, thus,

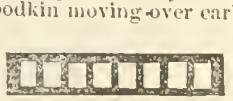


At present, it is impossible to predict the triumph of any of these systems, as their respective advocates are not only determined, but able to keep their ground. But as recent legislation has made provision for the education of the blind in common schools, where the influence of rival societies and extraordinary geniuses, who are not the best guides for their less talented brethern, will not be felt, it is not improbable that some common system will gradually come into general use. In the Report of the Royal Commissioners of the Exhibition of 1851, surprise is expressed that Mr. Gall's labors should have been so summarily set aside, and they recommend now the universal adoption of Dr. Howe's books.

WRITING FOR THE BLIND.—This is of two kinds; first, writing to be read *by the blind*; and, second, writing by the blind, to be read *by the seeing*. Messrs. Milne and M'Baine of the Edinburgh Asylum invented the 'string alphabet,' by which they were enabled to communicate with one another. The letters were represented by different kinds of knots tied upon a cord singly or combined. This was superseded in 1838 by Mr. Gall's writing stamps, which, as they can be made to any pattern, have been much used. The paper is placed on a cushion frame, and a barred guide placed over it. The stamps are made of pins fixed in wood, and when pressed through thick writing-paper, produce a raised letter on the other side.

M. Braille's system of writing corresponds with his alphabet. Cartridge paper is placed over a grooved plate, with a guide having two rows of oblong holes. A blunt point forces the paper into the grooves, so as to produce the dots which form the letters on the other side. This is by far the most legible writing which has yet been provided for the blind, and is a strong recommendation of his alphabet for printing.

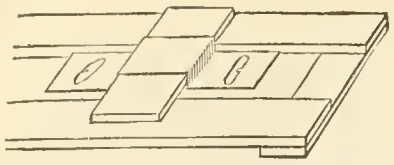
There are two methods of writing by the blind to be read by the seeing. The first is by Mr. St. Clair, a teacher of music in Edinburgh; the other is Mr. Gall's Typhlograph. In both processes, the writing is produced by a hard pencil with a fine point, or by a blunt bodkin moving over carbonized paper, which deposits the



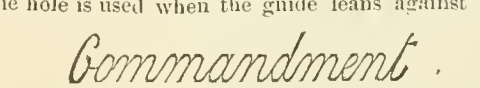
blacking on the paper wherever it is pressed. Mr. St. Clair's guide consists of a line of small square holes, each of which represents

* In this, as well as in the specimens which follow the words are: 'BEHOLD THE LAMB OF GOD.'

a letter or a space. The steel point enters each hole, and makes a letter, guided by the four sides. Mr. Gall's Typhlograph is a much more perfect instrument, and can be made to imitate any



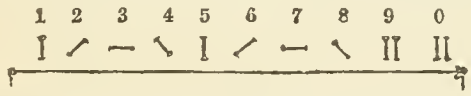
size or style of writing; but it is not so easily made. It consists of a hole of this shape, ○, cut in a thin brass guide, which slides freely between two wooden fillets, united at each end. The upper half of the hole is used when the guide leans against the lower



fillet, and the lower half is used when the guide leans against the upper fillet. When the steel point has traced a line round the upper or lower half of the hole, it is stopped by the small projection in the middle of the right side—thus:

ARITHMETIC FOR THE BLIND.—There are three methods: 1. The *Parisian*. Embossed types are dropped into square holes in a perforated board, and read by the finger. 2. *Saunderson's*. Angular pins are dropped into angular holes, and indicate the figures according to their position. The pentagonal is the most convenient form, because one pin having the two ends ◇ ◇ different can represent ten ciphers. 3. *Gall's* requires no apparatus at all, the ciphers being represented by common pins stuck into a quilted cushion or cloth of any kind, and the lines by twine stretched across—thus:

Although reading, writing, and tangible arithmetic are of great importance to the B., yet oral instruction is that upon which we must chiefly rely for their education. For that reason, the recent Education Act for Scotland, under which blind children may be educated in common schools, will be a great blessing to them.



BLI'NDAGE. When a besieged town has little or no bomb-proof shelter, screens are sometimes used called B., made of timber and earth; or of trees inclined towards each other, or placed in an inclined position against walls.

BLIND COAL. See ANTHRACITE.

BLI'NDNESS may arise from any cause intercepting the rays of light on their way to the optic nerve, or from disease of the optic nerve, or of that part of the brain connected with it. B. may vary in degree; it may exist from birth, or be the result of extreme old age. It may only be present during the day or the night, or a few weeks of the year, or it may be permanent.

Congenital B. is generally from some deficient development of the nervous apparatus, and is detected by the child being indifferent to light, and throwing its head from side to side. Occasionally, but very rarely, the power of vision is subsequently developed. Amaurosis has been already described.

Opacity of the vitreous humor, or of the crystalline lens—the latter is generally known as cataract—causes B., which comes on gradually. The patient with cataract can see best in the evening, or when the pupil is dilated, as then some rays of light are able to enter by the side of the opacity. The B. from cataract is seldom so complete as to prevent the person from distinguishing day from night, or from being aware of opaque bodies passing between him and the light (see CATARACT). Opacities of the cornea, if extensive, or in the axis of vision, produce some degree of B., whether they are on or in its substance. In general, these are irremediable; but if there is a spot, an artificial pupil may be made. Some years ago, Mr. Bowman, of London, met with a case in which the opacity consisted of a layer of phosphate and carbonate of lime: he removed it, and restored the vision, which had been totally lost for several years.

Night B. is a rare condition, in which a person finds, towards evening, that objects are becoming less and less distinct, and at last that he is totally blind. This may occur without previous warning, and cause great alarm, but next morning he finds that his sight is restored. This is repeated every night, but at last the eyes become weak during the day also, and may finally become amaurotic. This strange affection may be epidemic; it has attacked bodies of troops exposed to great fatigues and the glare of the sun's rays. If there are no symptoms of disease within the brain, recovery generally results from protecting the eyes from the light, entire repose, such remedies as correct any constitutional defect in the individual attacked, and repeated blistering.

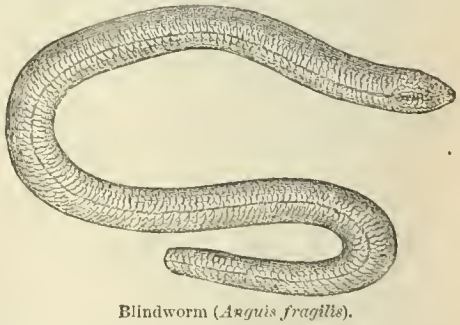
Day B. is characterized by inability to see in a bright light; the subjects of it see more than usually well at night, but during the day have to be led about. Captives who have been long immured in dark cells are often affected with it, as a galley-slave mentioned by Larrey, who had for thirty-three years been shut up in a subterraneous dungeon, and when liberated could only see by night.

The structural causes of B. will be better understood when the eye (q. v.) is described, when it will be seen that advances in our knowledge of its anatomy have enabled surgeons to restore sight in cases which some years ago, would have been considered hopeless; but it can never be too strongly impressed, especially on the young, that overwork wears out the eyes, whatever be the pursuit, and that, without being wholly dark, a degree of blindness may be induced, such as to render the eyes useless for practical purposes. This condition, asthenopia or weak sight, is frequently met with in young lads with sedentary occupations, students, dressmakers; and, says Dr. Mackenzie, of Glasgow, 'what may be called the hot-house education of modern times is a fruitful source of it.' The only cure is avoiding the evident causes.

BLI'NDNESS, COLOR. See COLOR BLINDNESS.

BLI'NDSTORY, another name for the *triforium* (q. v.), the second or middle arcade in the wall which separates the body from the aisles of a church. It is so called obviously as opposed to the *clearstory* or *clerestory* (q. v.), the third and uppermost arcade, the apertures of which admitted light into the church, while the apertures of the triforium were dark—*obscuræ fenestræ*, as they are termed by Gervase of Canterbury. The B. which is most common in cathedral, conventual, and collegiate churches, served to give access to the various parts of the building, and to suspend tapestry and banners on high holidays. Viewed aesthetically, the gloom of the B. contrasts well with the lustre of the clerestory.

BLI'NDWORM (*Anguis fragilis*), a small reptile, which, although it has commonly been ranked among serpents by naturalists, in consequence of agreement in general form, exhibits remarkable points of difference from the true serpents, and constitutes one of an interesting series of links by which they are connected with lizards. Mr. Gray has therefore recently united this, and other nearly allied genera, with the Scink and Seps family of saurian reptiles under the name of *Saurophidia* (Lizard-serpents), amongst which the gradation from the lizard to the serpent structure is marked by the more and more complete disappearance of limbs, and the increasing elongation of the body. In the genus *Anguis* there is no trace of limbs externally, but the



Blindworm (*Anguis fragilis*).

bones of the shoulder, the sternum or breast-bone, and the pelvis still exist in a rudimentary condition: the bones of the head, also, connect with lizards, and do not admit of that dilatation of the gape which characterizes true serpents. The common B. is the only species of this genus known in Britain. It is found also in almost all parts of Europe. In some districts of Britain it is plentiful; in others, it is very rare or even unknown. It is a perfectly inoffensive creature, although it has very generally been persecuted by the ignorant as extremely venemous. Its teeth are so small that even when it attempts to bite, which it only does upon much irritation, it cannot pierce the skin. No species of the group to which it belongs has poison-fangs. It is very timid, and when alarmed, contracts itself forcibly, and then becomes remarkably brittle, so as to be easily broken in two by a blow or an attempt to bend it. This character of fragility is found also in other

animals of this group. The name B. has apparently originated in a mistake caused by the smallness of the eyes, which, however, are very quick and brilliant. Another common name, *Slow-worm*, is more accurately characteristic. The length varies from 11 to 15 inches, and sometimes even exceeds this; the thickness is almost equal throughout, the tail is blunt at the end; the scales are small, and nearly equal; the tongue is notched at the extremity, but not bifid as in snakes; the color is generally silvery gray, a dark line runs along the back, and frequently rows of dark spots along the sides. The food of the B. consists of slugs and insects. It retires in autumn under masses of decayed wood and leaves, or into soft dry soil. It changes its skin. It is viviparous (ovoviviparous), the number of young varying from 7 to 12 or 13 at a birth. The name B. is sometimes given to *Cæcilia* (q. v.).

BLI'STERED or BLISTER STEEL. This is the kind of steel from which, by hammering, rolling, &c., certain qualities of tools and files are fashioned. When broken up, piled, and wielded under the hammer, it forms *shear steel* (see IRON), from which a finer class of tools is made, and when melted in crucibles it forms the finest kind of *cast steel* (q. v.) for cutlery. Blister steel is made from bar iron of superior quality by a process of *cementation;* and the furnace employed for the purpose is termed a converting furnace. It consists of two fire-brick rectangular chests or troughs, each being sixteen feet long and three feet deep by three feet wide, as a maximum size, placed alongside each other in an arched chamber, and surrounded by a wide conical chimney. One long fire-place, with a suitable arrangement of flues, heats both chests. Into each chest the iron bars are laid embedded in charcoal, about half an inch of which intervenes between each layer of iron bars. The whole is then plastered over with clay or grindstone-dust, and kept at a glowing red heat from seven to ten days, according to the purpose for which the blister steel is intended. When the bars are removed after cooling, they are found to have undergone a remarkable change. They are no longer tough, but quite brittle and fusible, and covered over with blisters. During the process, the iron absorbs and combines with from one to one and a half per cent. of carbon. The blisters are supposed to be due to the evolution of carbonic oxide arising from the combination of carbon with a trace of oxygen existing in the iron.

BLI'STERING FLIES. See CANTHARIDES.

BLI'STERS are medicinal agents, which, when applied to the skin, raise the cuticle into small vesicles filled with serous fluid. They are applied either in the form of plasters, or in a fluid state, as suits the convenience of the person or part, and have for their object the establishing of a counter-irritation or diversion of inflammatory action from a part in which it cannot be reached by remedies, or from some organ where it may do permanent mischief, to some more superficial part of the body.

The most common blister in use is made of cantharides (q. v.) or Spanish fly (*Cantharis vesicatoria*). Cantharides, mixed with a convenient proportion of lard and wax, form the blistering ointment of ordinary use; the only objection to this preparation being that if applied too long it produces distressing affections of the urinary bladder. In young children and very thin-skinned persons, a layer of silver paper, or thin gauze wet with vinegar, may be laid between the blister and the skin. But under no circumstances should a blister be left long upon children, as it may produce sores which are apt to take on an unhealthy action, and are difficult to heal.

Mustard (*Sinapis nigra*) is frequently used, but seldom left on sufficiently long to produce blistering. Tincture of cantharides, croton oil, and strong liquor ammoniæ, tartar emetic ointment, and many others are used in practice.

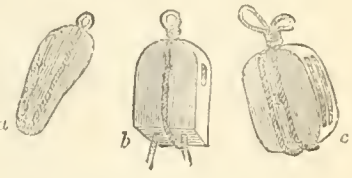
If the occasion of the blister passes off, the vesicles should be pricked and their fluid contents allowed to trickle away, the vesicated surface being then dressed with some cold cream or lard. But if it should appear desirable to promote a discharge from the skin, the raised cuticles may be snipped off, and the blister either applied again at intervals, or some stimulating ointment as the savine (*Juniperus sabina*) made use of. Great cleanliness should be observed in dressing the part.

Of late years B. has been much used for the dispersion of glandular tumors, and are also applied over the surface of indolent ulcers, with the view of increasing the vascularity of the part. For old diseases of joints, B. ought to be placed at a little distance from the affected joint.

BLOCH, MARCUS ELIESER, a celebrated ichthyologist, born of poor Jewish parents, at Anspach, in Bavaria, 1723. He was allowed to grow up in extreme ignorance. At 19, he had read nothing except a few useless rabbinical treatises. About that age, however, he became assistant to a Jewish surgeon at Hamburg, where he took the opportunity of learning German and Latin. A slight knowledge which he had acquired of anatomy inspired him with an extraordinary desire to study that science thoroughly. For this purpose he went to Berlin, and devoted himself to it and other branches of natural history with indefatigable zeal. He took the degree of Doctor of Medicine at Frankfort-on-the-Oder; and returned to Berlin to practise his profession, where he died 6th August 1799. His great work is the *Allgemeine Naturgeschichte der Fische* (12 vols., Berlin, 1782—1795, with 432 colored plates), long the most comprehensive work on ichthyology, and still valuable especially for its pictures. His *Systema ichthyologiæ iconibus CX illustratum*, which was left in an unfinished state, was published by Schneider (Berlin, 1801). After his death, his collection of fishes was purchased by government, and forms a part of the Berlin zoological museum.

BLOCK, in the rigging of a ship, is an important part of the apparatus necessary for raising sails and yards, tightening ropes, &c. The B. comprises both the frame or shell, and the pulley or pulleys contained within it. In seamen's language, a *tackle* includes the rope as well as the B. through which it works. The uses of blocks are very numerous on shipboard; and to subserve these uses, they are distributed about the masts, yards, sails, and ropes. They vary greatly in size, shape, power, and designation; but nearly every B. comprises a *shell* or wooden exterior, a *sheave* or wheel on which the rope runs, a *pin* or *axle* on which the sheave turns, and a *strap* (of rope or iron) to fasten the B. to any particular station (see PULLEY). A single B. contains only one sheave; a double B., two; and so on. Besides the designations of blocks according to the number of sheaves they contain (*single, double, treble, fourfold*), ships' blocks receive numerous other names—such as *bee-B., cut-B., cheek-B., clew-garnet B., clew-line B.*, &c. Some of these names depend on the kind of service, others on the place of fixing; while the rest are examples of the odd nomenclature adopted by seamen.

Block-making.—Ships' blocks were made by hand until about a century ago. But mere workers in wood could not produce them; it required unusual skill and practice to fashion the several pieces,



Various forms of Ships Blocks:
a, long-tackle; *b*, clue-block; *c*, double block.

and put them together so as to possess the requisite strength and facility in working. The trade was either carried on alone, or in conjunction with mast-making. More than 1400 such blocks were required for one of the old 74's, and a proportionate number for vessels of larger or smaller size.

In 1781, a Mr. Taylor began to make the sheaves and shells of blocks by a process which he had invented. He made all the blocks for the royal navy until the expiration of his patent rights. The Admiralty then commenced the manufacture on their own account. In 1801, Mr. (afterwards Sir) Mark Isambard Brunel submitted to the Admiralty a working-model of a very beautiful system of machinery for block-making; it was accepted, and the inventor engaged to set up the apparatus at Portsmouth. So intricate was the machinery, and so great the difficulty in procuring the several working-parts from the machinists of those days, that it was not until the year 1808 that the system was put into effective operation. It was then, however, so perfect, that very few additions or improvements have since been needed. The machinery made blocks more accurately than they had ever been made by hand, and with the aid of ordinary workmen only. It could effect £50,000 worth of work in a year, or 140,000 blocks, by the assistance of ten men attending the machine. Duplicate machinery was made for Chatham. Brunel received £20,000 for his invention and for his personal superintendence until the machinery was brought into working-order; this sum was money well laid out, for the machine saved to the country more than £20,000 a year, in the busy warlike period from 1808 to 1815. The machinery itself is too complicated to be described except at a length incompatible with the limits of this work; but it may be stated in a general way, that the system is made up chiefly of saws and lathes, combined with great ingenuity. The blocks are made of elm, and the sheaves of lignum vitæ; the pins are of iron, carefully prepared to avoid friction as much as possible.

BLOCKA'DE, in military tactics, is an operation for capturing an enemy's town or fortress, without a bombardment or regular siege. The attacking party throws up works on the neighboring heights and roads; these works may be redoubts, for 200 or 300 men each, raised around at distances of 1000 to 1500 yards asunder; or they may assume other forms, according to the circumstances of each case. The rest of the besieging force remains under cover in villages, or in a temporary camp, ready to repel any sortie attempted by the besieged. The whole purpose in view is to prevent the

besieged from receiving supplies of any kind, in order that, when the food or the ammunition is exhausted, they may be compelled to surrender. Fortresses situated on steep and rocky eminences, difficult to conquer by bombardment or assault, may often be reduced by B.; because the roads or paths for the reception of supplies are few, and can be watched by a small number of troops. Towns situated on a plain are less frequently invested. If the inhabitants be numerous and commercial, they will soon be impatient of the restraint produced by a B., and may compel or induce the governor to adopt a plan opposed to his wishes as a soldier. If, however, a resistance be determined on, the governor sends out of the town as many non-combatants as possible; all the stores are collected in bomb-proof receptacles; economy is observed in the consumption of food; all the people within the walls are placed under military rules; and the governor endeavors, by frequent sorties, to prevent the besiegers from making too close an investment of the place.

Blockading, in a naval sense, is the prevention of the entrance or exit of the enemy's ships at a particular port. It is sometimes resorted to as an auxiliary to military operations by land; but generally is limited to a maritime investment.

BLOCKA'DE, in international Law, is the right in time of war, of rendering intercourse with an enemy's port unlawful on the part of neutrals; and it is carried into effect by an armed force (ships of war), which blocks up and bars export or import to or from the place blockaded. The right is described by all writers on the law of nations as clear and incontrovertible, having its origin in the soundest principles of maritime jurisprudence, sanctioned by the practice of the best times. It is explained on the reasonable theory, that if a potentate or government lays siege to a place, or simply blockades it, such potentate or government has a right to prevent any other power, or representative or subject of such power, from entering, and to treat as an enemy any one who attempts to enter the blockaded place, or in any way assists the besieged, for such a person opposes the undertaking, and contributes to the miscarriage of it.

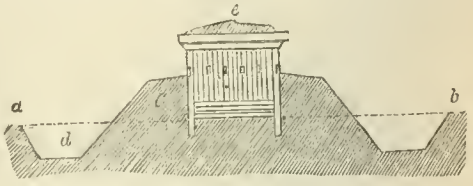
Lord Stowell laid it down that there are two sorts of B.—one by the simple fact only, the other by a notification accompanied with the fact. In the former case, when the fact ceases—otherwise than by accident or the shifting of the wind—there is immediately an end of the B.; but where the fact is accompanied by a public notification from the government of a belligerent country to neutral governments, the B. must be supposed to exist till it has been publicly repealed. This notification it is the duty of the belligerent country to make immediately. His lordship also explained that, on the question of B., three things must be proved: 1st, The existence of an actual B.; 2d, The knowledge of the party; and 3d, Some act of violation, either by going in or coming out with a cargo laden after the commencement of the blockade. On this last point, the time of shipment is very material; for although it might be hard to refuse a neutral liberty to retire with a cargo already laden, and by that act already become neutral property, yet, after the commencement of a B., a neutral cannot be allowed to interfere in any way to assist the exportation of the property of the enemy. After the commencement of a B., a neutral is no longer at liberty to made any purchase in that port. But the most essential element is *actual* B., and this state of things can only be proved to the satisfaction of a court of justice by the ships stationed on the spot to maintain the B. using their force for that purpose. A B., therefore, is only to be considered as actually existing when there is a power to enforce it.

To be valid, a B. must be accompanied by actual investment of the place, and it may be more or less rigorous, either for the purpose of watching the operations of the enemy, or, on a more extended scale, to cut off all access of neutral vessels to that interdicted place, which is strictly and properly a B.; for the former is, in truth, no B. at all, as far as neutrals are concerned. But to be binding on neutrals, it ought to be shown that they have knowledge, or may be presumed to know of the B.; and this knowledge may arise in two ways—either by such a public and formal notification as we have already described, or by the notoriety of the fact. Yet it is at all times most convenient that the B. should be declared in a public and distinct manner, instead of being left to creep out from the consequences produced by it; and the effect of such notification to the neutral government is clearly to include all the individuals subject to the latter.

The breach of B. may be either by coming out of the blockaded port, or going in; such breach, however, may sometimes be excusable. It has been decided that intoxication on the part of the master of a ship will not be received as an excuse. That breach of B. subjects the property employed for that purpose to confiscation is an established rule of the law of nations, and is universally acknowledged by all civilized governments. The violation of B. by the master, however, effects the ship, but not the cargo, unless the cargo is the property of the same owner, or unless the owner of the cargo is cognizant of the intended violation.

On the proclamation of peace, or from any political or belligerent cause, the continuance of the investment may cease to be necessary, and the B. is then said to be *raised*. The blockading force then retires, and the port is open as before to all other nations.—See the law on the subject of this article extremely well stated in *A Manual of the Law of Maritime Warfare*, by William Hazlitt and Henry Philip Roche, Barristers-at-law, 1854; see also, ORDERS IN COUNCIL, BRITISH.

BLO'CKHOUSE is to a temporary fortification what a tower is to one that is permanent. In a wooded country, it is easily and quickly made, and the enemy cannot readily bring guns to bear upon it; on flat open ground it is less useful. The B. is always a covered defence, unlike a battery; sometimes with only one story, sometimes with two, of which the lower forms a barrack for a few men. It is usually either rectangular or shaped like a Greek cross; the latter is preferred, as enabling the fronts of fire to flank each other. One among the many kinds of B. is shown in the annexed cut: where *ab* denotes the natural level of the ground; *c*, a mound



Elevation of Blockhouse.

or parapet formed from the earth obtained out of the ditch, *d;* and *e*, a mass of earth to cover the roof. The loopholes for musketry are shown at the side. The defence is usually by musketry. If opposed to infantry only, single rows of trunks of trees, either upright or horizontal, make a very good B., loopholed at intervals of about three feet; and if there be earth enough quickly obtainable, by digging a ditch or from any other source, to embank it all round and to cover the roof, it will bear a great deal of rough usage. If opposed to artillery, the B. requires to be formed with double rows of trunks three feet apart, with well-rammed earth between them. The American backwoodsmen build blockhouses with great quickness and efficiency; several of these, with a curtain or continuous wall of stockading, may be made to enclose a large space, capable of accommodating a great number of defenders, and of repelling a considerable hostile force. The base of a wind-mill, on a hill, has in European countries often formed a good blockhouse. A regular B. should have a ditch, not only to supply earth, but to keep the enemy from approaching near enough to fire the timber of the blockhouse. There must be, at least, four feet of well-rammed earth on the roof, to resist the effect of artillery. Such a structure without a roof is not a B., it is simply a stockade.

BLO'CK-PRINTING. See PRINTING.

BLO'CKSBERG, the name given to various mountains and hills in Germany, but pre-eminently to the Brocken, the highest point of the Harz Mountains, and, indeed of the north of Germany. According to the popular belief, it is the favorite haunt of the witches, where they celebrate the night of the 1st of May, *Walpurgisnacht* (see WALPURGA), with wild orgies. Almost all mountains thus haunted, are known to have been famous places of sacrifices in the ages of paganism.

BLO'CK-SHIP, is a ship of war too old or too slow in sailing to render efficient service in action out at sea, but useful as a defence in great ports and naval arsenals. Since war-steamers have almost superseded the old sailing men-of-war, the latter are of little service except as block-ships, or for training-ships. In 1880 there were 17 vessels in the navy which were inefficient for naval warfare.

BLOCK-SYSTEM. See *Signals*, under RAILWAYS.

BLOCK TIN is an inferior variety of tin. When the metal is reduced from its ores, it is first poured into moulds, and the ingots thus procured are heated to incipient fusion in a reverberatory furnace, when the pure tin first fuses, and is withdrawn; and the less pure tin which is left behind being melted at a higher temperature, is poured into moulds, and is known as block tin. See TIN.

BLOEMFONTEIN, capital of the Orange River Free State. (q. v.).

BLOIS, a town of France, capital of the department of Loire-et-Cher, has a remarkably fine situation on the acclivity of a hill, and is built chiefly on the right bank of the Loire. It is about 35 miles S. W. of Orleans. The houses, in the upper part of the town especially, are mean and ill built, and the streets are crooked and narrow, but they are kept clean by water from the public fountains, which are supplied by a splendid aqueduct, supposed

to have been constructed by the Romans. B. has a handsome cathedral; but its chief glory is its old castle, which has been the scene of many interesting historical events. Louis XII. was born in it, and under its roof Charles, Duc d'Alençon, and Margaret of Anjou, and Henry IV. and Margaret of Valois were married. Here also were sometimes held the courts of François I., Henri II., Charles IX., and Henri III. Here also the Duc de Guise and his brother were murdered, by order of Henri III., on the 23d December 1588. Isabella, queen of Charles VI., here found a retreat; it served as a prison for Mary de' Medici; Catharine de' Medici died within its walls; and Maria Louisa here held her court in 1814, after Paris had capitulated. B. is a place of great antiquity. Stephen, who usurped the crown of England on the death of Henry I., was a son of one of the counts of B., by Adela the daughter of William the Conqueror. B. is an archbishop's see, has a tribunal of commerce, a communal college, a public library of 20,000 vols., a botanic garden, &c., and manufactures of porcelain and gloves, with a trade in brandy, wine, and wood. Pop. (1876) 18,188.

BLOM'FIELD, Charles James, Bishop of London, a learned and influential prelate of the Church of England, was born in 1786, at Bury St. Edmund's, in Suffolk, where his father was school-master. Being well grounded by his father in the classics, B. went to Cambridge, where he took high honors. After he had filled several curacies, the Bishop of London appointed him his chaplain, in recognition of his acknowledged philological and theological acquirements. Shortly after, he was called to the living of St. Botolph; in 1824, he was made Bishop of Chester; and in 1828, he was promoted to the see of London, on the translation of Bishop Howley to Canterbury. B.'s reputation for classical scholarship rests chiefly on his editions of *Callimachus* (Lond. 1815), and of several of the dramas of the *Eschylus*. In connection with Rennel, he published the *Musæ Cantabrigienses;* and with Monk (1812) the *Posthumous Tracts of Porson;* and in 1814, the *Adversaria Porsoni*. He also published *Lectures on the Acts of the Apostles*. B. was exceedingly active in the superintendence of his diocese, and was a prime mover in the agitation for the erection of new churches. Under his presidency, more churches were erected in London than under any bishop since the Reformation. His conduct in regard to the controversies that latterly agitated his diocese was much animadverted on by both parties. He was accused at one time of leaning to Puseyism, and yet he proceeded against his clergy for alleged crypto-catholic practices. He died August 1857.

BLOMMAERT, Philip, one of the most prominent of modern Flemish authors, was born in 1809. In 1834, he published a volume of verse, characterized by much simplicity and earnestness, but so inartistic in form that it met with little success. He rendered better service to literature and to the patriotic cause by the publication (1836—1841) of *Thcophilus*, an old Flemish poem of the 14th c., and of the *Oudvlaemsche Gedichten* (Old Flemish Poems) of the 12th, 13th, and 14th centuries. Both works are enriched with glossaries and learned annotations. B. showed a predilection for middle-age literature generally, and translated the *Nibelungen* into Flemish iambics. His most important work is a History of the Belgians (Brussels, 1849), in which he attempts to show that the political destiny of the Low Countries has ever been identical with that of Germany, and that it is with the latter country, and not with France, she should seek to ally herself. B. also contributed extensively to several Belgian journals, especially to the *Messager des Sciences Historiques*. He died at Ghent, August 14, 1871.

BLONDEL, a celebrated French minstrel of the 12th c., and the favorite of Richard the Lion-heart, king of England, whom he accompanied to Palestine. When Richard, on his return, was seized and imprisoned by Leopold, Duke of Austria, B. (according to the exquisitely romantic myth of an old chronicler) resolved to find out the place in which his master was confined. He wandered through Germany in disguise, and at length coming to the castle of Löwenstein, in Austria, he heard that it contained some illustrious captive. Feeling assured that this was no other than the king, he tried all means to get a sight of him, but to no purpose. He then placed himself opposite to the tower in which he learned the unknown was imprisoned, and commenced singing one of those Provençal songs which Richard and he had composed together. Hardly had B. finished the first stanza, when a well-known voice from the tower took up the second, and carried it on to the end. So the minstrel discovered his monarch, and, returning with all speed to England, was the means of his being ransomed by his subjects. Only a few of B.'s poems have come down to us; these are preserved in the Library of the Arsenal at Paris.

BLOOD, the nutritive fluid of the tissues, consists of a transparent colorless fluid, the *liquor sanguinis*, and minute solid bodies, the 'corpuscles' which float in it. The liquor sanguinis consists of water in which are dissolved fibrine, albumen, chlorides of sodium and potassium, phosphates of soda, lime, and magnesia, together with fatty and extractive matters, the latter the product of the metamorphosis of the tissues. The corpuscles are of two kinds—white and red; the white are larger and less numerous than the red, being in healthy blood in the proportion of 2 or 3 to 1000. In certain forms of disease the number of these white blood-corpuscles is increased. They present a granular appearance on the surface, have a nucleoleus, which is speedily brought into view by the action of dilute acetic acid, and are identical with the lymph-corpuscle. Under the microscope they vary their forms in the same way as the Amœba (see Proteus); hence these movements are called *amœboid*. The *red* corpuscles are peculiar to vertebrates, and seem to have their origin in the white corpuscles, are oval and nucleated in fishes, reptiles, and birds, but in man and the mammalia generally they are non-nucleated, and are bi-concave flattened discs, their edges being thicker than the center, hence the dark appearance of the latter when seen under the microscope. They have a great tendency to turn on their side and run into rouleaux, like piles of coins. Their color is straw-yellow, and it is only when seen *en masse* that they give the blood its characteristic red color. The size of the human red blood-corpuscles is $\frac{1}{3200}$ of an inch. They are largest in reptiles, those of the Proteus (q. v.) being $\frac{1}{700}$th of an inch in their long diameter. Hoppe Seyler has shown that, chemically, they consist chiefly of hæmo-globin, with traces of albumen, cholestrin, protagon, phosphate of potash, but no fat. The specific gravity of B. is 1052 to 1057, and its *mean* quantity in an adult man about 34½ lbs. On evaporation as a whole, the B. yields 790 parts in 1000 of water, and 210 of solid residue, which residue has nearly the same ultimate chemical composition as that of flesh. When B. is set aside for a time, occasionally crystals consisting of globulin tinted with coloring matter appear. 'The B. crystals of man and the carnivora have a prismatic form, whilst those of the rat and mouse are tetrahedral, and those of the squirrel hexagonal' (Carpenter).

Blood-corpuscles highly magnified.

Coagulation of the Blood.—When B. is drawn from the vessels, the liquor sanguinis separates into two parts—into fibrine, which becomes solid, and a pale yellowish colored liquid, *serum*. The fibrine coagulates, and in doing so entangles the corpuscles, and forms a red mass, the clot (*crassamentum*). Fibrine does not exist in the B. as such, but when it appears as a coagulum in a fluid, it is produced then and there by the union of two substances present in the blood, which separate as a solid matter (Schmidt)—the one, *globulin*, is contained in the blood-corpuscles; the other, *fibrinogen*, in the blood-plasma, the two uniting to form the fibre of the clot. The rapidity with which this change takes place varies with circumstances. Moderate heat, and exposure to the air, favor it; cold and exclusion from the air retard it. The B. remains fluid in the veins for some time after death. In glanders and some forms of malignant fever, and where the B. is *poor*, as in scurvy, it may remain fluid. The size and firmness of the clot depends on the amount of fibrine in the B., which in health averages about 2 parts in 1000. In inflammations it is much increased, and the B. forms slowly into a tough clot, which is almost destitute of red globules on its surface, and drawn in towards the center. This colorless layer is termed the *buffy coat*, and the physicians of bygone times used to attach great importance to it, believing that it was a phenomenon peculiar to inflammation, and bled repeatedly, with the view to its removal; whereas anything which delays coagulation, great poverty of B., as in Chlorosis (q. v.), or any condition in which the fibrine is in greater proportion than the red blood globules, will cause this appearance; the clot of the impoverished blood will, however, be small and loose, and floating in an excessive quantity of serum. The color of the B. varies. In the arteries it is of a bright-scarlet color, while in the veins it is of a dark purple color. The chief difference between arterial and venous blood is that the former contains more oxygen and less carbonic acid than the latter. See Circulation of the Blood. This change probably arises from the oxygen contracting the corpuscles, and altering their reflecting surfaces; carbonic acid, on the other hand, rendering them thinner and more flaccid. The changes in color can be effected in B. drawn out of the body by the application of the gases mentioned.

The red blood-corpuscles possess great powers of absorbing oxygen. They receive oxygen in the lungs, where they become colored, and carry it all over the body to the tissues to form new combinations. After a time, the corpuscles become dissolved in the liquor sanguinis, which fluid they serve to elaborate. The products of the metamorphosis of the tissues are poured into the B., so that it is really a very complex fluid. See Respiration.

BLOOD, Avenger of. In the early ages of society, the infliction of the penalty of death for murder did not take place by the action of any tribunal or public authorities administering law, but, in accordance with the rude social condition, was left to the nearest relative of the murdered, whose recognized duty was to pursue and slay the murderer. He was called the Avenger of B., in Hebrew *Goël*, which term, however, was of much wider signification. The Mosaic law (Numb. xxxv.) did not set aside this universal institution of primitive society, but placed it under regulations, prohibiting the commutation of the penalty of death for money, which appears to have become frequent, and appointing *cities of refuge* for the manslayer who was not really a murderer. See City of Refuge. The Koran sanctions the avenging of B. by the nearest kinsman, but also sanctions the pecuniary commutation for murder. The primitive institution or custom subsists in full force among the Arabs at this day. Many of the hereditary feuds of families, clans, and tribes in all barbarous and semi-barbarous countries, have always been connected with the avenging of blood.

BLOOD, Corruption of (in Law). See Treason.

BLOOD, Eating of. The eating of B. was prohibited under the Old Testament dispensation, obviously for reasons connected with the use of animals in sacrifice. Christians, with a few exceptions, have always regarded the prohibition as having ceased with the reason for it; and the exhortation of the apostolic council of Jerusalem to the Gentile converts, to abstain 'from things strangled and from blood,' to have been merely an application of the great law of Christian charity to the circumstances of a transition period, with reference to the prejudices of Jewish converts.

BLOOD OF OUR SAVIOUR, was an order of knighthood in Mantua, instituted by Duke Vincent Gonçaga in 1608, on the occasion of the marriage of his son with the daughter of the Duke of Savoy. It consists of 20 knights, the Mantuan dukes being sovereigns. The collar had threads of gold laid on fire, and interwoven with the words *Domine probasti*. To the collar were pendent two angels, supporting two drops of blood, and circumscribed with the motto *Nihil isto triste recepto*. The name originated in the belief that in St. Andrew's Church, in Mantua, certain drops of our Saviour's blood are kept as a relic.

BLOOD OF ST. JANUARIUS. See Januarius, St.

BLOOD, Thomas, a most daring, unscrupulous, and successful adventurer, was born in Ireland about 1628, and served there in the parliamentary army. After the Restoration, he put himself at the head of an insurrectionary plot, which was to begin with the seizure of Dublin Castle, and of Ormond, the lord-lieutenant. On its timely discovery, he fled, while his chief accomplices were seized and executed. Escaping to Holland, he was received there with high consideration. He soon found his way back to England, to try what mischief might be brewed among the fifth-monarchy men. Finding no prospect of success, he repaired to Scotland, invited by the turbulent state of affairs, and was present at the fight of Pentland, November 27, 1666. On the night of the 6th December 1670, the Duke of Ormond was seized, in his coach in St. James's Street, by a gang of bravoes, tied on horseback behind one of them, and hurried away towards Tyburn. The timely approach of his attendants at the moment that he had succeeded in struggling with his riding-companion to the ground, probably saved him from hanging. The leader in this daring villainy was B., and so well had he contrived it, that he did not even incur suspicion. His next enterprise was still more wild and dangerous. On the 9th of May 1671, disguised as a clergyman, and accompanied by his former accomplices, he entered the Tower with the determination to carry off the regalia of England. After nearly murdering the keeper of the jewels, he actually succeeded in carrying off the crown under his cloak, while one of his associates bore away the orb. They were immediately pursued, however, seized and committed to the Tower jail. Now came a singular turn of fortune. At the instigation of Buckingham, who was accused of having hired B. to attack the Duke of Ormond, King Charles visited the dauntless miscreant in prison, and, dreading the threat that there were hundreds of B.'s associates banded together by oath to avenge the death of any of the fraternity, pardoned him, took him to court, gave him an estate of £500 a year, and raised him so high in favor that for several years Colonel B. was an influential medium of royal patronage. This scandalous disregard of public decency was heightened by the fact, that the old jewel-keeper, who had risked his life in defence of his charge, applied in vain for payment of a small reward for his devotion. After the fall of the 'cabal' ministry, B. became hostile to Buckingham, and for a scandalous charge against him was committed to prison. He was bailed out, and died in his own house in 1680.

BLOOD-BIRD of New South Wales (*Myzomela sanguinolenta*), a beautiful little species of Honeyeater (q. v.), which receives its name from the rich scarlet color of the head, neck, breast, and back of the male. It inhabits thickets. A very similar species is found in Bengal.

BLOOD-FLOWER (*Hæmanthus*), a genus of bulbous-rooted plants, of the natural order *Amaryllideæ* (q. v.), mostly natives of South Africa, some of which are among the prized ornaments of British green-houses. They take their name from the usual color of their flowers, which form a fine head or cluster, arising from a spathe of a number of leaves. The fruit is a berry, usually with three seeds. The leaves of the different species exhibit considerable diversity of form, in some almost linear, in others almost round; in some, also, they are erect, in others appressed to the ground. The bulbs of some of the finest species of B. being very slow to produce offshoots, a curious method of propagating them is resorted to by gardeners, which is occasionally practised also with other bulbous-rooted plants, by cutting them across above the middle, upon which a number of young bulbs form around the outer edge.

Many-flowered Blood-flower: *a*, leaves and fruit of flower-stem, in miniature; *b*, flower; *c*, seed-bud, shaft, and summit; *d*, seed-bud cut transversely.

The species of B. seem generally to possess poisonous properties. The inspissated juice of *H. toxicarius* is used by the natives of South Africa for poisoning their arrows.

BLOOD'-HOUND, a variety of Hound (q. v.) remarkable for its exquisite scent and for its great sagacity and perseverance in tracking any object to the pursuit of which it has been trained. It derives its name from its original common employment in the chase, either to track a wounded animal or to discover the lair of a beast of prey. It was also formerly called, both in England and Scotland, *sleut-hound* or *sleuth-hound*, from the Saxon *sleut*, the track of a deer. The B. was formerly common and much in use in Britain, as well as on the continent of Europe, but is now rare. The poetical histories of Bruce and Wallace describe these heroes as occasionally tracked by blood-hounds, when they were skulking from their enemies. The B. was at a later period much used to guide in the pursuit of cattle carried off in Border raids; it has been frequently used for the pursuit of felons and of deer-stealers; and formerly, in America, for the capture of fugitive slaves, an employment of its powers which has contributed not a little to render its name odious to many philanthropists.

Blood-hound.

Terrible ideas are also, probably, suggested by the name itself, although the B. is by no means a particularly ferocious kind of dog, and when employed in the pursuit of human beings, can be trained to detain them as prisoners without offering to injure them. The true B. is taller and also stronger in proportion, and of more compact figure than a fox-hound, muscular and broad-chested,

with large pendulous ears, pendulous upper lips, and an expression of face which is variously described as 'thoughtful,' 'noble,' and 'stern.' The original color is said to have been a deep tan, clouded with black. The color appears to have been one of the chief distinctions between the B. and the Talbot (q. v.), but it is not improbable that this name was originally common to all blood-hounds. Many interesting anecdotes are recorded of the perseverance and success of blood-hounds in following a track upon which they have been set, even when it has led them through much frequented roads.—The CUBAN B., which is much employed in the pursuit of felons and of fugitive slaves in Cuba, differs considerably from the true B. of Britain and of the continent of Europe, being more fierce and having more resemblance to the bull-dog, and probably a connection with that or some similar race. Many of these dogs were imported into Jamaica in 1796, to be employed in suppressing the Maroon (q. v.) insurrection, but the terror occasioned by their arrival produced this effect without their actual employment. It is this kind of B. which was chiefly introduced into the former slave-states of North America.

BLOOD-ROOT. See GEUM, HÆMODORACEÆ, and SANGUINARIA.

BLOODSTONE. See HELIOTROPE.

BLOOM, an appearance on paintings resembling in some measure the bloom in certain kinds of fruit, such as peaches, plums, &c. (hence the name), produced, in all probability, by the presence of moisture in the varnish, or on the surface of the painting when the varnish is laid on. The B. destroys the transparency, and is consequently very injurious to the general effect of a picture. It is best prevented by carefully drying the picture and heating the varnish before applying it; and best removed by a sponge dipped in hot camphine, after which a soft brush should be employed to smooth the surface of the picture, which should be finally placed in the sunshine to dry.

BLOOMERISM, a new and fanciful fashion of ladies' dress, partly resembling male attire, which arose out of what is termed the 'Woman's Rights' Movement,' that began to be agitated in the United States about the year 1848. The first Woman's Rights' Convention was held at Worcester, New York, in 1850, under the presidency of Mrs. Lucretia Mott. Its object was to advocate for women a more liberal education, training in trades and professions, and generally the social and political privileges possessed by the other sex. At the same date, and in close connection with this movement, arose an agitation for the reform of female attire. Its advocates said, justly enough, that if women were to take their place in the world as fellow-workers with men, they ought not to labor under the disadvantage of having a dress that deprived them of the use of their hands, and required nearly their whole muscular power for its support. In 1849, Mrs. Ann Bloomer adopted the costume to which she has given her name, and lectured in New York and elsewhere on its advantages. The Bloomer dress consisted of a jacket with close sleeves, a skirt falling a little below the knee, and a pair of Turkish trousers. Though a few ladies followed the example of Mrs. Bloomer, the dress was extremely unpopular, and exposed its adherents to a degree of social martyrdom which the more prudent, timid, or amiable declined to brave. A very elegant modification of the Bloomer dress was achieved by a New York lady—a Polish jacket, trimmed with fur, and a skirt reaching to within a few inches of the ground, avoiding a display of pantaloon, and showing off merely the trim furred boot, but still sufficiently short to avoid contact with the street; the filthy habbit of spitting, which prevails in America, rendering such avoidance peculiarly necessary. The agitation for dress-reform has not died out on the other side the Atlantic. There appeared in New York a monthly publication, called the *Sibyl*, devoted to its advocacy, and whose editor, a married lady, as well as several of her contributors, personally illustrated their principles. A wood-cut at the head of the periodical represented the Reform Dress, as it was called. It looked by no means tempting in point of elegance—a fault fatal to its general adoption. The skirt was immoderately short, and the jacket cut the figure awkwardly in two. The introduction of B. into England, soon after it had sprung up in America, was under such unfavorable auspices, that it failed to gain entrance into respectable society, and speedily disappeared Still here, as in America, nothing is more frequently talked of, or desired with more apparent fervency, than a dress-reform. For instance, the heavy hooped skirts prevalent some years ago, injurious to health, fatal to comfort, and liable to be equally dirty and ridiculous, were universally complained of, but the prejudice with which any innovation is sure to be met, long discouraged every attempt to introduce a reform.

BLOOMFIELD, ROBERT, the author of *The Farmer's Boy*, and other pastoral pieces, born 1766, at Honington, near Bury St. Edmund's, was the son of a poor tailor, who died, leaving Robert an infant. His mother with difficulty subsisted by teaching a school, where B. learned to read. At the age of 11 he was hired to a farmer, but ultimately became a shoemaker in London, where he wrote his *Farmer's Boy* in a poor garret. It was published in 1800, had extraordinary popularity, and was translated into a number of languages. He subsequently published *Rural Tales*, *Wild Flowers*, and other pieces. Though efforts were made for him by persons of rank, his health broke down, and he died nearly insane, at Shefford, in Bedfordshire, in 1823.

BLOUSE, a name borrowed from the French for that loose, sack-like over-garment which, as worn in England by wagoners and farm-laborers, is called a smock-frock. The English smock-frock is made of coarse and imperfectly bleached linen, and is ornamented, particularly on the breast and shoulders, with plaits and embroidery. In the south of Scotland it is sometimes worn by butchers, and is then blue, as in Germany and France. In Germany, it is frequently tightened to the body by a belt, and is sometimes made of coarse woollen; but France is pre-eminently the country of blouses. There, they are worn universally, not only by the country people, but also by the laboring-classes in towns, not excepting Paris; and so characteristic is this garment, that the French populace are often called the 'blouses.' The *white* B. is Sunday dress with the working-classes in France, and has also often served as a countersign among the leaders of sections in secret societies. A lighter and neater garment of the sort, usually made of fine but imperfectly bleached linen, and buttoning in front, which the English smock-frock and the original continental B. do not, is much worn by summer tourists.

BLOW'-FLY (*Sarcophaga carnaria*), an insect of the order *Diptera* (two-winged), (q. v.), and of the large family *Muscides*, of which the common House-fly (q. v.), Flesh-fly (q. v.), &c., are familiar examples. The B. is very similar to these in its general appearance; its body is hairy, the expanse of its wings about one inch, the face silky and yellow, the thorax gray, with three black stripes, the abdomen of a shining blackish brown, which, in certain points of view, assumes a bluish tint, chequered with glittering yellowish spots. One of the distinguishing characters of the genus is, that the eyes are widely separate in both sexes. The species of this genus are not unfrequently ovoviviparous, the eggs being hatched within the body of the parent. The generic name (Gr. *sarx*, flesh; *phago*, to eat) is derived from the circumstance that the larvæ of most of the species feed upon the flesh either of dead or of living animals. The B. is common in Britain on heaths, in gardens, &c., and its larvæ are to be found feeding upon meat, the carcases of animals, sometimes upon living earthworms, and too frequently upon sheep, of which it is one of the most grievous pests, requiring the constant attention of the shepherd during the most of the summer and autumn. Some districts are more infested with it than others; it is particularly troublesome in the fenny districts of England. Unless the maggots are removed, they eat into the skin, the sheep suffer great torment, and soon die. At first they may be removed by shaking them out of the wool, into which dry sand is then abundantly sprinkled; but if they are very numerous, a mercurial ointment or wash of corrosive sublimate is applied; and when the skin is much broken, the wool is clipped away, an ointment of tar and grease is used, and a cloth sewed over the part. Like many other insects, the B. multiplies with excessive rapidity.

Blow-fly and Pupa.

Another species of this genus, common in Britain, is *S. mortuorum*, so named from its frequenting burial-vaults and similar places. It is very similar to the B., but the abdomen is of a shining steel blue, and there is a reddish brown line down the forehead.

BLOWING-MACHINES. The earliest blowing-machine was, doubtless, some form of the common bellows, the idea of which is supposed to have been derived from the lungs. A very primitive form of this instrument is still in use in some Eastern countries, consisting simply of the skin of some animal sewed into a rude bag with a valve and nozzle. The older forms of domestic bellows are all constructed on the same principle—viz., a chamber formed of two boards with flexible leather sides, having at one end a nozzle with a narrow mouth; and in the lower board, a valve of considerably larger area for the admission of air. When the bellows are distended by drawing the boards apart, air is sucked in by the valve, to replace the vacuum which would otherwise be formed; and then, when the boards are being closed, the valve, which only opens inwards, is shut by the compressed air; and the latter, having no other escape, is forced out at the nozzle.

The great fault of the common bellows is, that it gives a succes

sion of puffs, and not a continuous blast. One remedy for this was to use two bellows, so that one was blowing while the other was filling; but it was afterwards found that the double-bellows secured a still more uniform blast. This machine, shown in fig. 1, is merely the common bellows with a third board of the same shape as the other two placed between them, so as to form two chambers instead of one. The middle board is fixed, and both it and the lower one have valves placed in them opening inward. A weight on the lower board keeps the under chamber filled with air; and when this board is raised by a lever or otherwise, the air which it contains is forced into the upper chamber. The exit-pipe is attached to the latter, and a weight is placed on the upper board sufficiently heavy to press the air out in a continuous stream, the continuity being maintained by the large quantity of air always present in the upper chamber, and the uniform pressure of the weight. Sometimes a spring is used instead of a weight to press out the air. Even with the double-bellows, however, the constant refilling of the upper portion from the lower prevents the blast from being quite regular.

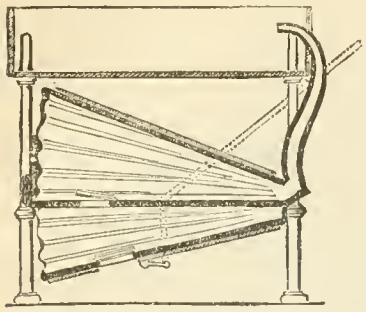


Fig. 1.—Section of Double-bellows for a Portable Forge.

For such purposes as the supplying of a continuous stream of air to a flame for glass-blowing or soldering, a very convenient form of apparatus has been constructed by Mr. P. Stevenson of Edinburgh, which the diagrams (figs. 2 and 3) will explain. By means of the common bellows worked by a treadle, air is blown into the lower portion of a small cylinder containing a quantity of water, and having a diaphragm in the middle of the height, with a wide pipe reaching nearly to the bottom. When the apparatus is at rest, the water remains below the diaphragm, as shown in fig. 2; but when the air is blown in, it gradually rises through the pipe to the position shown in fig. 3. The water as it descends then presses out the air in a steady stream by the exit-pipe, as a valve prevents it returning to the bellows.

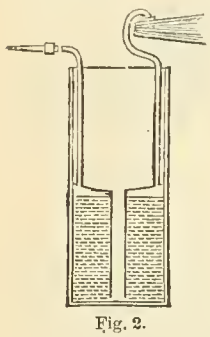


Fig. 2.

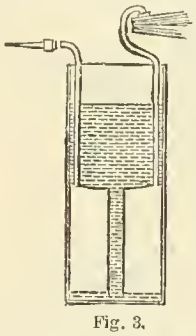


Fig. 3.

Bellows made entirely of wood except the nozzle, first made in Germany in the 16th c., are in use in some continental countries. They are usually of large size, and the contrivance consists in having two boxes, of which the sides of the upper enclose those of the lower, so that the former can move up and down on the latter without admitting air except by a valve, as in the common bellows, of which, in fact, they are only a modification.

Fig. 4.—Chinese Bellows.

The Chinese have a very simple form of bellows, shown in fig. 4, which is not only interesting in itself, but also because its action is almost the same as the blowing-engine. It is merely a square chamber of wood, with a close-fitting piston, which, when drawn from the nozzle, opens the valves *v*, *v*, to admit air, and when pushed in the opposite direction, shuts these valves, and forces the air out by the nozzle.

For blowing a domestic fire in a chimney, the most effective contrivance is a metal screen to close the front of the aperture above the grate, so that the supply of air must all pass through the fire. This kind of blower, however, will only act when the fire is producing as much heat as to cause a sensible draught up the chimney.

For smelting and refining furnaces, where a blast with a pressure of 3 or 4 lbs. per square inch is required, blowing-engines of large size are usually employed. In our article IRON, this kind of engine is referred to, and a small figure of one given; but we shall here describe the blowing apparatus itself more in detail. A blowing-engine consists, as shown in fig. 1, article IRON, of a steam-engine, with the ordinary steam-cylinder at one end, and a blast-cylinder at the other end of the beam. Such, at least, is the construction preferred for the larger-sized engines; but sometimes a horizontal arrangement of the cylinders is adopted for those of smaller size. The blowing-cylinder, X, shown in fig. 5, is of cast-iron, with an air-tight piston, P, which, as it ascends and descends with the motion of the engine, alternately inhales and expels the air at each end. To effect this, a series of valves are provided, and these are arranged as follows: Inlet valves are placed on the top of the cylinder at A, and also on three sides of the box at B, but on the fourth side of this box there are two outlet valves at C. These valves consist of numerous openings, against which leather flaps lie when they are shut. Valves of a similar nature are placed at the bottom of the cylinder; those for the inlet of air at D, E, and F; and those for outlet at G. When the piston descends, it would create a vacuum in the upper portion of the cylinder, provided there were no openings in it; but the external air pressing on the inlet valves, opens them, and fills the space above the piston; at the same time, the outlet valves at C, which only open outwards, are tightly closed by the air pressing inwards from the pipe M. Again, when, the piston ascends, it compresses the air above it, and exactly reverses the action of the valves; that is to say, it shuts the inlet valves at A and B, opens the valves at C, and allows the compressed air to pass along the outlet pipe M, which is made of large size, so as to offer as little resistance as possible to the passage of the air. The valves at the bottom of the cylinder work exactly in the same way, the inlet valves, D, E, and F, opening when the piston ascends, and shutting when it descends, thus compelling the inhaled air to pass into the pipe M by the lower outlet valves at G. The air is conducted by the pipe M into a receiver of large capacity, which serves to equalize the blast before it passes to the tuyeres. See IRON, fig. 1.

A blast-engine at Shelton Iron-works, of which the blowing-cylinder is 8 feet 4 inches in diameter, and has a 9-feet stroke (represented in fig. 5), working with 186 horse-power, and making 32 single strokes of the piston per minute, inhales 15,700 cubic feet of atmospheric air per minute; but this is compressed by the blowing-cylinder to a pressure of 3 lbs. per square inch above the atmosphere, which reduces the volume supplied by the cylinder to 13,083 cubic feet. Its volume, however, is largely increased again, when raised to the hot-blast temperature, before entering the furnace. Much valuable information respecting blowing-engines and blast apparatus will be found in Dr. Percy's large work on Metallurgy, vol. ii., from which the above figure is taken.

In the Catalan forges of Spain and the south of France, there is a very ingenious water-blowing machine in use called a *Trompe;* but it can only be advantageously employed where a fall of a few yards of water is available. Its construction will be understood by an inspection of fig. 6. A strong wooden cistern, C, to act as a reservoir for the water; wooden pipes, P (generally two in number), through which it descends; and a wind-chest, W, to allow the air and water to separate, constitute the essential parts of the apparatus. It is put in operation by lifting the wedge *v* with a lever; this allows the water to rush down the pipe, and in doing so, it draws in air through sloping holes, *a*, *a*, called aspirators, at the throat of the pipe. A continuous current of water and air is thus supplied to the wind-chest, which is provided with an opening at *o* for the escape of the water, while the air passes out in a regular stream by the nozzle-pipe at *n*. The height from which the water falls determines the tension of the blast; but the height seldom exceeds 27 feet, which gives a pressure of from 1½ to 2 lbs. to the square inch. It is asserted that no other blowing-machine gives so equable a blast as the trompe, and it is

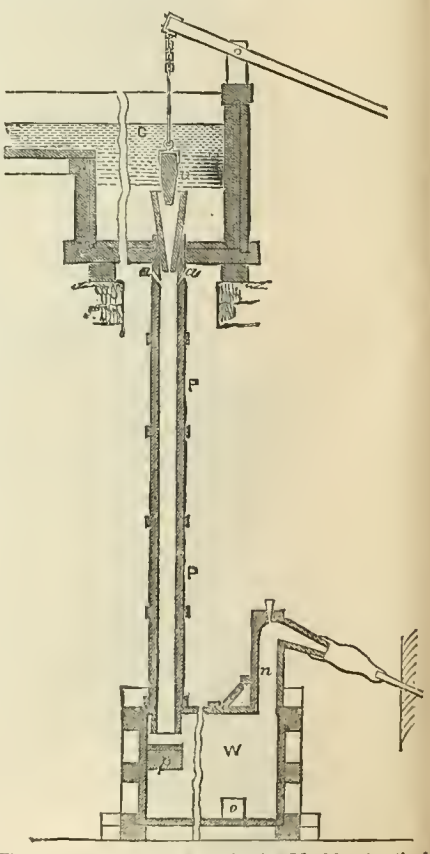


Fig 6.—Trompe, or Water-blowing Machine (vertical section).

the least costly of any; but it has the serious defect of supplying air more or less saturated with moisture. The theory of this singular machine has never been satisfactorily explained, although one or two able philosophers, who have specially studied the matter, incline to the belief that much of the air is carried down the pipe by becoming entangled in water. It is found that the separation of the air from the water is greatly promoted by allowing the falling current to impinge on a narrow platform at *p*.

The fan, or Fanners (q. v.), as it is sometimes called, is another machine of great value for producing currents of air. It has long been in use as a winnowing machine for agricultural purposes, and

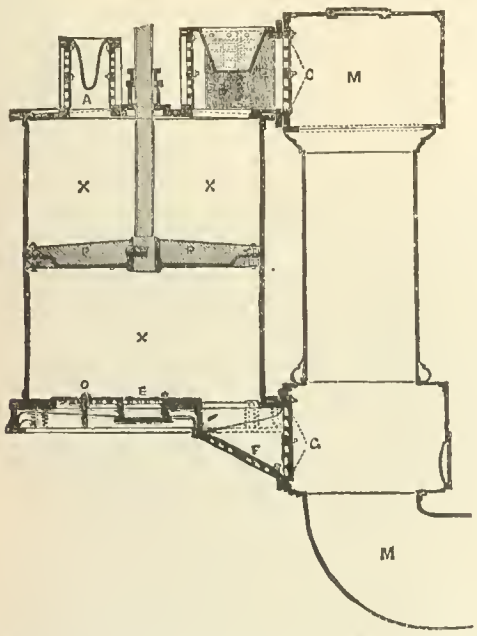


Fig. 5.—Section of a Blowing Cylinder, Shelton Iron Works, Stoke-upon-Trent.

also for creating a blast to melt pig-iron in foundries. More recently, it has been employed instead of bellows in smithies, on account of its greater convenience and the steadier blast which it yields. A domestic bellows has even been introduced on the fan principle. The fan is also much used in the ventilation of buildings, ships, and mines. For the last, it is now considered preferable to the plan of furnace-ventilation, especially where there are fiery seams of coal.

In its construction, the fan is like a wheel, having the arms tipped with vanes, instead of being joined by a rim. It is placed

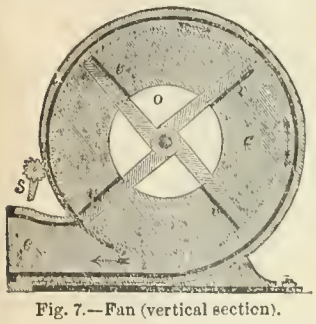


Fig. 7.—Fan (vertical section).

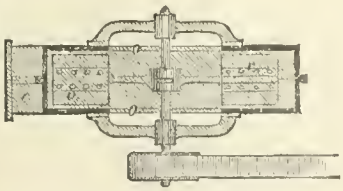


Fig. 8.—Fan (horizontal section).

inside a chest—usually in an eccentric position—with openings on each side round the spindle for the admission of air. The motion is given by steam or other power; and as it revolves, the centrifugal action sucks in air at the center, draws it towards the tips of the vanes, and these impel it forward through the exit-pipe. Fig. 7 represents a vertical section, and fig. 8 a plan of a blowing-fan, in which *v*, *v*, *v*, *v* are the four vanes; *o*, one of the central openings; *c*, the chest or fan-case; and *e*, the exit-pipe. Engineers differ as to the proportions which should be adopted for the fan, and as to the extent of spiral which the fan-case should have. For foundries and smithies where the pressure of the blast required is from four to five ounces per square inch, the following have been found to suit very well in practice: the width of the vanes, as well as their length, made one-fourth of the diameter of the fan; the inlet openings in the sides of the fan-chest, one-half, and the degree of eccentricity, one-tenth of this diameter. There is a segmental slide shown at *s* in fig. 7, by which the opening into the delivery-pipe may be increased or diminished. For such purposes, fans vary from 3 to 6 feet in diameter, and they are entirely constructed of iron. Double fans have been introduced by Mr. Chaplin in England, and by M. Perrigault in France. In these, two simple fans are so disposed on one spindle that the blast produced by one passes in its compressed state through a tube to the other, which largely augments the working pressure. In Platt and Schiele's silent fan, the air enters by a central entrance at one side only, and is expelled from the case at the opposite side. The vanes are a peculiar shape, and describe what the inventor (Schiele) calls an antifriction curve. It is said to be very efficient, and so also is another form of noiseless fan by Mr. George Lloyd, London.

For the use of the fan in ventilation, see that head. In some cases, fans are of large size; some also are of peculiar construction. Agricultural fans (see FANNERS) are not usually placed in an eccentric position in their cases, and only some kinds of ventilating fans are. One of the happiest applications of the fan has been to draw off and render harmless the fine steel dust in the operation of needle-grinding.

A modified form of the fan, called a *centrifugal disc*, patented by Mr. Rammell, was successfully employed by the Pneumatic Dispatch Company for the transmission of the mail-bags. An ingenious but simple ventilator is in use in the mines of the Harz for supplying fresh air. It consists of two long cylindrical vessels, one of which is so much smaller as, when inverted, to move up and down inside the other. The outer one is partly filled with water, and has a tube leading through the water down to the mine. The inner inverted cask, which has a valve opening inwards, is lifted and then pressed down, so forcing air through the tube.

The Messrs. Roots' blowing-machine is thus described: 'A pair of horizontal shafts, geared together at both ends, traverse a case of the form of two semi-cylinders, separated by a rectangle equal in depth to the diameter of the semi-cylinders, and in width to the distance between the centers of the shafts. . . . These shafts carry a pair of solid arms, each having a section somewhat resembling a figure of eight, the action of which, as they revolve, takes the air in by an aperture at the bottom of the machine, and expels it with considerable pressure, if required, at the top.' Fig. 9 will further explain the construction of this machine. It gives a much greater pressure of blast than is attainable by the fan.

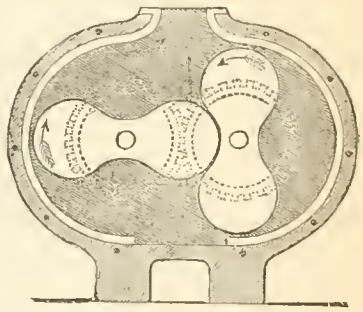


Fig. 9.—Roots' Blowing-machine.

For the purpose of ventilation, and also for expelling accumulations of hot air, dust, waste flyings, &c., in factories, a machine has been constructed by Mr. J. Howarth, Farnworth, Bolton, called a *revolving Archimedean screw-ventilator*. It consists of an Archimedean screw enclosed in a tube with proper means of lubrication. Its diameter is 30 inches, and it is made to be set in motion by steam or other power, but it is also furnished with a hood, on the top of which there are curved vanes, which turn the screw by the action of the wind. Immediately beneath these, there is another series of lateral vanes for the escape of the hot air.

BLOW-PIPE, a small instrument used in the arts for soldering metals, and in analytical chemistry and mineralogy, for determining the nature of substances by the action of an intense and continuous heat, its principle depending on the fact, that when a jet of air or oxygen is thrown into a flame, the rapidity of combustion is increased, while the effects are concentrated by diminishing the extent or space originally occupied by the flame.

The B. generally consists of a conical tube of metal, about eight inches long (fig. 1), closed at the wider or lower end, but open at the narrow or upper end, *a*, which latter constitutes the mouthpiece, and is turned over to admit of the lips closing perfectly round it. Near the lower end, a small tube, fitted with a finely perforated nozzle, *b*, is inserted at right angles to the large tube—the space below being intended as a chamber for condensing the moisture of the breath—through this nozzle a fine current of air can be projected against the flame experimented with.

When a current of air from the B. is directed against a candle or gas-jet, the flame almost entirely loses its luminosity, owing to the perfect combustion of the gases evolved from the source of heat, and is projected in a lateral direction, as a long pointed cone, consisting of three distinct parts (fig. 2). The first or central cone is of a dark-blue color, and there the combustion is complete from the excess of air thrown in from the small nozzle. The second cone, or that immediately surrounding the first, is somewhat luminous; and here the oxygen, being insufficient for the com-

bustion of the carbon, any metallic oxide subjected to the action of this portion of the flame is deprived of its oxygen, and reduced to the condition of metal; for this reason the luminous cone is generally termed the *reducing flame* of the blow-pipe. Beyond the second cone, or where the flame comes freely in contact with the atmosphere, and abundance of oxygen is present to effect complete combustion of the gases, is a third, or pale yellow envelope, containing excess of atmospheric air at a very high temperature, so that a portion of metal, such as lead or copper, placed at this point, becomes rapidly converted into its oxide: this outer part of the flame is on this account called the *oxidizing flame* of the blow-pipe.

Substances under examination before the B. are generally supported either on wood-charcoal or platinum—the latter in the condition of wire or foil. In applying the B. test, the body to be examined is either heated alone, or along with some flux or fusible

Fig. 1.

Fig. 2.

substance; in some cases, for the purpose of assisting in the reduction of metals from their ores and other compounds; in others, for the production of a transparent glassy bead, in which different colors can be readily observed. When heated alone, a loop of platinum wire, or a piece of charcoal, is generally employed as a support; the former when the color of the flame is to be regarded as the characteristic reaction, the latter when such effects as the oxidation or reduction of metallic substances are to be observed.

The following are exemplifications of the difference of color communicated to the flame by different substances: Salts of potash color, the flame *violet;* soda, *yellow;* lithia, *purplish red;* baryta, *yellowish green;* strontia, *carmine;* lime, *brick red;* compounds of phosphoric acid, boracic acid, and copper, *green.* The commonly occurring metallic oxides reducible by heating on charcoal alone in the inner flame of the B. are the oxides of zinc, silver, lead, copper, bismuth and antimony; the principal ores not so reducible are the alkalies and akaline earths, as also the oxides of iron, manganese, and chromium. The fluxes generally used in B. experiments are either carbonate of soda, borax (biborate of soda), or the ammonia-phosphate of soda, otherwise called *microcosmic salt* (q. v.). The carbonate of soda, when heated on platinum-wire in the oxidizing flame, forms with silica a *colorless glass;* with oxide of antimony, a *white bead,* &c. The following metals are reduced from their compounds when heated with carbonate of soda on charcoal in the inner flame of the B.; viz, nickel, cobalt, iron, molybdenum, tungsten, copper, tin, silver, gold, and platinum. When compounds of zinc, lead, bismuth, arsenic, antimony, tellurium, and cadmium are similarly treated, these metals are also formed, but being volatile, they pass off in vapor at the high temperature to which they are exposed.

Borax, as a flux, is generally mixed with the substance under examination, and placed on platinum-wire. When thus heated in either of the flames, baryta, strontia, lime, magnesia, alumina, and silica, yield *colorless beads;* cobalt gives a *fine blue color;* copper, a *green,* &c. With microcosmic salt, the results obtained are generally similar to those with borax, and need not be specially mentioned, as the test is applied in the same way. The B. has been long used by goldsmiths and jewelers for soldering metals, and by glass-blowers in fusing and sealing glass tubes, &c.; it has also been applied in qualitative analysis for many years, but more recently chemists (especially Plattner) have devoted their attention to its use, and have even employed it with great success in *quantitative* chemical analysis; the advantages being that only a very small quantity of material is required to operate upon, whilst the results may be obtained with great rapidity and considerable accuracy.

BLOW'-PIPE AND A'RROW, a kind of weapon much used by some of the Indian tribes of South America, both in war and for killing game. It consists of a long straight tube, in which a small poisoned arrow is placed, and forcibly expelled by the breath. The tube or blow-pipe, called *gravatána, pocuna,* &c., is 8—12 feet long, the bore not generally large enough to admit the little-finger. It is made of reed or of the stem of a small palm. Near Pará, it is in general very ingeniously and nicely made of two stems of a palm (*Iriartea setigera,* see IRIARTEA) of different diameters, the one fitted into the other, in order the better to secure its perfect straightness. A *sight* is affixed to it near the end. The arrows used in that district are 15—18 inches long, made of the spines of another palm, sharply pointed, notched so as to break off in the wound, and their points covered with *curari* (q. v.) poison. A little soft down of the silk-cotton tree (q. v.) is twisted round each arrow, so as exactly to fit the tube. In Peru, arrows of only 1½—2 inches long are used, and a different kind of poison seems to be employed. An accidental wound from one of these poisoned arrows not unfrequently proves fatal. In the hand of a practised Indian, the B. and A. is a very deadly weapon, and particularly when directed against birds sitting in the tops of high trees. As his weapon makes no noise, the hunter often empties his quiver before he gathers up the game, and does more execution than an English sportsman could with his double-barrelled fowling-piece.

BLUBBER. See CETACEA, WHALE, and WHALE-FISHERY.

BLUCHER, GEBHARD LEBERECHT VON, Prince of Wahlstadt, Field-Marshal of Prussia, was born at Rostock, in Mecklenburg-Schwerin, West Germany, 16th December 1742. At the commencement of the Seven Years' War, he joined a regiment of Swedish hussars, and in his first action was taken prisoner by the Prussian hussars, whose colonel persuaded him to exchange out of the service of Sweden into that of Prussia, and gave him a lieutenancy. A lieutenant, Jägersfeld, having been promoted over B.'s head, he immediately wrote to Frederick the Great as follows: 'Von Jägersfeld, who has no merit exept that of being the son of the Markgraf of Schwedt, has been put over my head: I beg to request my discharge.' The result was, that B. was put under arrest, and after repeated applications for discharge, he received from Frederick the curt intimation: 'Captain Blücher is at liberty to go to the devil!' B. went instead to his estate of Grossraddow, in Pomerania, and devoted himself to farming; but he soon tired of a bucolic life.

In 1793, having returned to the army, he fought, as a colonel of hussars, against the French on the Rhine, evincing great genius as a leader of cavalry. The breaking out of the war of 1806 led him, as lieutenant-general, to the battle of Auerstadt. B., with the greater part of the cavalry, occupied the left flank of the Prince of Hohenlohe in the retreat to Pomerania. He is accused, on this occasion, of not giving the prince due support, and thus leading to the capitulation of Prenzlau. B. himself then marched into the territory of the free town of Lübeck, and hastily fortified the city; but the French took it by storm, and B. was forced to surrender at Ratkow, near Lübeck, whither he had escaped with a few troops. A fortnight after, he was exchanged for the French general Victor; and immediately on his arrival in Königsberg, was sent, at the head of a corps, by sea, to Swedish Pomerania, to assist in the defence of Stralsund. After the peace of Tilsit, he was employed in the war-department in Königsberg and Berlin, and subsequently became commander of Pomerania. At a later period, he was pensioned, along with several other men of note, at the instance, it was said, of Napoleon. He was one of the few to combat the general belief in the invincibility of Napoleon, which had grown into a sort of fatalism in high places. In common with Stein and Hardenberg, he labored to remove all weak and unpatriotic counsellors from the person of the king. When all the leaders of the army lost courage, his constancy revived confidence, and made him the center of all hope for the future. When the Prussians at last rose in opposition to France, B. was appointed to the chief command of the Prussians and of General Winzingerode's Russian corps. At the battles of Lützen, Bautzen, and Haynau, he displayed heroic courage. At the Katzbach, he defeated Marshal Macdonald, and cleared Silesia of the enemy. In vain did Napoleon himself attempt to stop the 'old captain of hussars,' as he called him, in his victorious career. In the battle of Leipsic he won great advantage over Marshal Marmont at Möckern, 16th October 1813, and on the same day pressed on to the suburbs of Leipsic. On the 18th, in conjunction with the crown-prince of Sweden, he had a great share in the defeat of the French, and on the 19th his troops were the first to enter Leipsic. B., in opposition to the policy of Austria, continually pressed the taking of Paris as the real aim of the war. On the 1st of January 1814, he crossed the Rhine, garrisoned Nancy on the 17th of the the same month, and after winning the battle of La Rothière, pressed forward to Paris; but his scattered corps were routed by Napoleon, and he fought his way back to Chalons with great loss. On the 9th March, however, he defeated Napoleon at Laon; and at the end of the month, after being joined by Schwarzenberg and his corps, he again advanced towards Paris. The day at Montmartre crowned the brilliant deeds of this campaign, and, on the 31st of March, B. entered the French capital. Frederick William III. created him Prince of Wahlstadt, in remembrance of the victory at Katzbach, and gave him an estate in Silesia. In

England, whither he followed the allied sovereigns, he was received with an enthusiasm never before excited by a German. The university of Oxford conferred on him the degree of Doctor of Laws.

After Napoleon's return in 1815, B. once more assumed the general command, and promptly led the army into the Netherlands. On the 16th June 1815, he lost the battle of Ligny, in which he was personally in great danger, from his horse falling on him. The victory of the allies at the battle of Waterloo was completed by B.'s timely appearance on the field. B. ordered his Prussians to pursue the flying enemy, which they did the whole night. Declining the offered truce, B. marched again against Paris, and on the second taking of that city manifested a strong desire to retaliate on Paris the spoliation that other capitals had suffered at the hands of the French; but he was held in check by the Duke of Wellington. In order to reward B.'s services to Prussia and the common cause, Frederick William III. created a new order, the badge of which consisted of an iron cross surrounded by golden rays. On the 26th August 1819, a colossal bronze statue was erected in his honor in his native town. B. died 12th September 1819, after a short illness, at his estate of Krieblowitz, in Silesia. In Berlin, a statue twelve feet high, modelled by Rauch, and cast in bronze by Lequine and Reisinger, was erected to his memory, 18th June 1826, and at Breslau another, also executed by Rauch, in 1827. In the beginning of the campaign of 1813, his characteristic activity and the style of his attacks gained him the nickname of 'Marshal Forward' from the Russians; it soon became his title of honor throughout Germany. His tactics were always much the same: to attack the enemy impetuously, then to retreat when the resistance offered was too great for his troops to overcome; to form again at a little distance, and watch narrowly the movements of the enemy, and whenever an advantage offered itself, to charge with lightning speed, and throw him into disorder, make a few hundred prisoners, and retire ere the opposing force had recovered from its surprise. Such were his usual manœuvres. B., as a man and as a soldier, was rough and uncultivated, but energetic, open, and decided in character. His ardent enthusiasm for the liberation of Prussia and Germany from a foreign yoke, and his uncompromising pursuit of his noble aim, have justly rendered him a hero in the eyes of the German people. The old red uniform, and the old name of 'Blücher's Hussars,' was restored to the 5th Regiment of Hussars by Frederick William IV., on occasion of the centenary celebration of B.'s birthday.

BLUE, a color of which there are several varieties used in the arts, noted below. See also COLOR. Blue, or, as it is sometimes termed, *True Blue*, was the favorite color of the Scottish Covenanters in the 17th century. When their army entered Aberdeen, says Spalding, there were few of them without a blue ribbon; this color being probably adopted in contradistinction to the red of the royal forces. At the battle of Bothwell Bridge, the flag of the Covenanting army was edged with blue. From these usages, blue seems to have become the partisan color of the Whigs, but commonly in association with orange or yellow, in memory of the House of Orange and the revolution settlement. This combination of blue and yellow is seen in the liveries of certain Whig families of distinction, and also in the cover of the *Edinburgh Review*. Blue is the color of the uniform of the Royal Navy of England; it is of a dark tint, and is known as *Navy Blue*.

AZURE BLUE is a pigment prepared by mixing 2 parts of deep blue, 1 of oxide of zinc, and 4 of lead glass; the latter consisting of 4 parts of minium and 1 of sand. The above azure blue is for skies, but a pigment for more general use is prepared from 11 fused borax and 67 gray flux; the latter being itself made from 89 pebble flux, 75 minium, and 25 sand.—BERLIN BLUE. See PRUSSIAN BLUE.—BRUNSWICK BLUE, or *Celestial*, is made by precipitating the alumina from a solution of alum by carbonate of soda, washing the precipitate, and adding sulphate of baryta, sulphate of iron, yellow prussiate of potash, and some bichromate of potash. When dried, this mixture is known as Brunswick blue, but when the sulphate of baryta is left out, and the material not dried, it is called *Damp Blue*.—CERULEAN BLUE is a color used in pottery, and consists of 79 parts of gray flux, 7 carbonate of cobalt, 14 hydrated carbonate.—BLUE COLOR OF FLOWERS, or *Anthocyan*, may be obtained from those petals of flowers which are blue by digesting them in spirits of wine in the dark. The color is soluble in alcohol, but is precipitated from its alcoholic solution by water. It is changed to red by acids, and to green by alkalies.—BLUE COPPERAS, or the sulphate of Copper. See COPPER.—BLUE DYES. See INDIGO, LITMUS, PRUSSIAN BLUE, and DYEING.—IRON EARTH BLUE occurs native amongst bog iron ore and in mossy districts in Europe and New Zealand. It mainly consists of a phosphate of iron with a little alumina, silica, and water. It is called *Native Prussian Blue*.—INDIGO BLUE, in pottery-ware, consists of 13 parts of carbonate of cobalt, 26 hydrated carbonate of zinc, and 61 gray flux.—COBALT BLUE is the only really good and serviceable blue in the coloring of glass and porcelain, and is essentially the oxide of cobalt (CoO), the coloring power of which is so great, that the addition of $\frac{1}{1000}$ part to white glass is sufficient to render it blue. Several of the compounds named above owe their blue color to this substance. See COBALT.—DEEP BLUE is employed in porcelain coloring, and is made from 1 part of oxide of cobalt, 4 glass of lead (2 minium, 1 white sand), 1 lead glass (2 minium, 1 sand, 1 calcined borax), and 1 oxide of zinc, all of which are placed together in a porcelain crucible, fused for 2 or 3 hours; the residue washed, dried, and ground to a fine powder.—KING'S BLUE is made from 29 parts carbonate of cobalt, 29 sand, and 42 carbonate of potash, by fusing these ingredients in a crucible. The residue is intense blue, bordering on a black blue, and is generally reduced to powder, and re-fused with about half its weight of pebble flux (3 minium or litharge, and 1 sand).—MINERAL BLUE and PARIS BLUE. See PRUSSIAN BLUE.

PRUSSIAN BLUE is the deep blue color which is so frequently seen on cotton, muslin, and woollen handkerchiefs and dresses. It was discovered in the year 1710 by Diesbach, a color-maker in Berlin, and hence called *Berlin Blue*. The mode of its manufacture was published in Britain, by Dr. Woodward, in 1724. It may be prepared in several ways: 1. By the addition of a solution of yellow prussiate of potash (ferrocyanide of potassium) to a solution of sulphate of iron (green vitriol). The blue compound thus produced deepens in tint when exposed to the air; and where it is required of greater consistence or more *body*, some alum and carbonate of potash are added to the prussiate solution before mixing with the iron solution. 2. By mixing solutions of yellow prussiate of potash and perchloride of iron, which yields the variety known as *Paris Blue*. 3. By adding a solution of the red prussiate of potash (ferrocyanide of potassium) to a solution of sulphate of iron, and this mode of preparation gives *Turnbull's Blue*. The Prussian blue settles to the bottom of the mixing vessels, and may be collected and dried by exposure to the air, when it is obtained as a blue powder. If heat be applied during the drying, the material cakes, and when cut, exhibits a lustre and hue like copper. When alum has been used in its manufacture, the product has a dull earthy fracture. The composition of Prussian blue is that of a ferrocyanide of iron. See CYANOGEN. It is employed by washerwomen, under the name of *blue*, for neutralizing the yellow tint of cotton and linen clothes; by paper-makers, to color paper; and is very largely employed as a pigment in CALICO-PRINTING (q. v.) and DYEING (q. v.). *Mineral Blue* is formed when the Prussian blue is precipitated along with a solution of zinc, or magnesia, or moist carbonates of zinc or magnesia are added during the precipitation of the color. In the formation of *Royal Blue*, a solution of tin is added, and *Steam Blue* is produced on the addition of solutions of tartaric acid and yellow prussiate of potash. The impurities liable to be present in Prussian blue are starch, chalk, and stucco, either of which necessarily decreases the intensity of the blue color, and the utility of the substance.

SAXONY BLUE is prepared by dissolving indigo (q. v.) in Nordhausen sulphuric acid, and was first manufactured in Saxony in the year 1810, by taking the very finely powdered indigo and incorporating it with the acid cautiously heated, when the indigo dissolves, and yields a blue color of great depth of tint. It is largely used in dyeing (q. v.).—OLD SEVRES BLUE is a cobalt blue used in pottery, and is made up of 19 parts oxide of cobalt, 39 dry carbonate of soda, 3 dry borax, and 39 sand.—THENARD'S BLUE is the blue formed by heating alum with a solution of cobalt, or it may be formed by igniting a mixture of phosphate or arseniate of cobalt with eight times its weight of alumina in the hydrated state procured by precipitation from alum by ammonia. Used in pottery.—TURQUOISE BLUE is composed of 3 of oxide of cobalt, 1 of alumina, and 1 oxide of zinc. It is manufactured by dissolving the oxides of zinc and cobalt in dilute sulphuric acid, adding the liquid to a solution of 40 parts of ammonia alum, drying up and igniting at a red heat for several hours. The addition of a little chromate of mercury gives it a green shade.—VARIEGATED BLUE is used for coloring porcelain, and is formed by fusing 10 oxide of cobalt, 9 oxide of zinc, 5 lead glass (2 minium, 1 sand, and 1 calcined bones), and 25 glass of lead (2 minium and 1 sand).

BLUE STONE, or BLUE VITRIOL, is sulphate of copper. See COPPER.

BLUE'BEARD, the name given to the hero of a well-known tale of fiction, which is of French origin. According to this romance, the Chevalier Raoul has a blue beard, from which he gets his designation. This personage tests his wife's curiosity by intrusting her, during his absence on a journey, with the key of a chamber, which she is forbidden to enter. She is unable to stand the test, and he puts her to death. Several wives share the same fate, but at length the seventh is rescued at the last moment by her brothers, and B. is slain. The tale appears in innumerable collections, under various forms. Tieck, in his *Phantasus*, has

worked up this material into a clever drama, with numerous romantic and satirical additions, and Grétry has made use of it in his opera of *Raoul*.

This historic original of Chevalier Raoul would appear to be one Giles de Laval, Lord of Raiz, who was made marshal of France in 1429, and fought valiantly in defence of his country when invaded by the English; but his cruelty and wickedness seem to have eclipsed even his bravery, as he is remembered chiefly for his crimes, which credulous tradition has painted in the blackest and most fearful colors. He is said to have taken a pleasure, among other atrocities, in corrupting young persons of both sexes, and afterwards in murdering them for the sake of their blood, which he used in his diabolical incantations. Out of this fact, in itself probably half-mythical, the main feature of the tale of B. has probably grown. Laval was burnt alive in a field near Nantes, in 1440, on account of some state-crime against the Duke of Brittany.

BLUE'-BELL. See HYACINTH.

BLUE BIRD, BLUE WA'RBLER, BLUE RE'DBREAST, or BLUE RO'BIN (*Sylvia sialis*, or, according to the most recent ornithological systems, *Erythaca* or *Sialia Wilsoni;* see SYLVIADÆ), an American bird, which, from the confidence and familiarity it displays in approaching the habitations of men, and from its general manners, is much the same sort of favorite with all classes of people in the United States that the redbreast is in Britain. Except in the southern states, it is chiefly known as a summer bird of passage, appearing early, however, as a harbinger of spring, and visiting again 'the box in the garden, or the hole in the old

Blue Bird (*Sylvia sialis*)

apple-tree, the cradle of some generations of ancestors.' Few American farmers fail to provide a box for the B. B.'s nest. In size, the B. B. rather exceeds the redbreast, which, however, it much resembles in general appearance. Its food is also similar. The upper parts of the B. B. are of a rich sky-blue color, the throat and breast are reddish chestnut, and the belly white. The female is duller in colors than the male. The B. B. lays five or six pale-blue eggs, and has two or three broods in the season. Its song is 'a soft agreeable warble.' The male is remarkably attentive to his mate, and both exhibit extraordinary courage in driving away intruders from the vicinity of their nest. A hen, with her brood, has been seen to flee from the attacks of an enraged and pugnacious blue bird.—The B. B. is known as an inhabitant of the Bermudas, Mexico, the West Indies, Guiana, and Brazil.—In the western and in the more northern parts of North America, its place is taken by nearly allied and very similar species.

BLUE'-BOOKS, the name popularly applied to the reports and other papers printed by parliament, because they are usually covered with blue paper. The term was, for like reasons, long applied to the reports sent annually by the governors of colonies to the colonial secretary; and even in technical official phraseology, these are called 'blue-books.' The practice of printing, and to some extent publishing, the proceedings of the House of Commons, began in the year 1681, when disputes ran high on the question of excluding the Duke of York from the succession to the throne. The proceedings on the occasion are extremely interesting. It was stated, that especially after parliaments were dissolved, false accounts of their proceedings were circulated, and, as a remedy, Sir John Hotham moved that the votes and proceedings of the House be printed. Mr. Secretary Jenkins opposed the motion, saying: 'Consider the gravity of this assembly: there is no great assembly in Christendom that does it; it is against the gravity of this assembly, and is a sort of appeal to the people.' He was answered by Mr. Boscawen: 'If you had been a privy council, then it were fit what you do should be kept secret, but your journal-books are open, and copies of your votes in every coffee-house, and if you print them not, half votes will be distributed to your prejudice. This printing is like plain Englishmen, who are not ashamed of what they do, and the people you represent will have a full account of what you do.' Colonel Mildmay said: 'If our actions be nought, let the world judge of them; if they be good, let them have their virtue. It is fit that all Christendom should have notice of what you do, and posterity of what you have done—and I hope they will do as you do, therefore I am for printing the votes.' The motion was carried. See *Parl. Hist.* iv. 1307; *Kennet*, iii. 396. The documents printed by the House of Commons accumulated gradually in bulk and variety, until they reached their present extent. In 1836, the House adopted the practice of selling their papers at a cheap rate. A curious legal and constitutional question immediately arose out of this practice, a publisher having taken proceedings for libel against the officers concerned in circulating the papers, because it was stated in a report concerning prisons that the prisoners read indecent books printed by him. The chief contents of these papers at present are —the votes and proceedings of the House; the bills read in their several stages; the estimates for the public service of each year; the accounts of the expenditure of the moneys voted in the previous year; any correspondence or other documents which the ministry may voluntarily, or at the demand of the House produce, as connected with a question under discussion; reports of committees of inquiry appointed by the House; reports of commissions of inquiry appointed by the crown; and annual reports by the permanent commissions and other departments of the government, stating their proceedings during the year. The B. of a session, when collected and bound up, now often fill fifty or sixty thick folio volumes. Nothing can seem more hopelessly chaotic than those of a few sessions huddled together unarranged. It deserves to be known, however, that they are all printed according to a peculiar sequence, which enables the whole papers of a session to be bound up in such an order that any paper can be found by consulting an ample index in the last volume. In any library where the B. are preserved and properly bound up, the most trifling paper of any session may thus be found with ease; and it need hardly be said that with much that is useless or unimportant, there is an enormous mass of valuable matter hidden in the blue-books.

There is no doubt, however, that although the means are thus provided for finding what the B. contain, their contents are heterogeneous, and to a great extent cumbersome and valueless. They are not prepared on any uniform system, or subjected to general revision, or what may be called editing. Each officer prepares his own report in his own way, sometimes lauding his own services, or arguing in favor of his own peculiar principles on some public question, so that it has been remarked that the B. contain a large number of articles like those in the periodical press, but too cumbersome and dull to get admission there. It has been matter of complaint that the public are burdened with the expense of widely distributing such documents. It is stated in a treasury minute, circulated among the government departments in May 1858, with the view of in some measure remedying the abuse, 'that the cost of printing the report of the commissioners appointed to inquire into the endowed schools of Ireland, and the three volumes of evidence and appendices (including the cost of the paper), was £5200, and that the weight of the paper used in printing them was about 34 tons.'

BLUE'-BOTTLE FLY. See FLESH-FLY.

BLUE CA'RDINAL. See LOBELIA.

BLUE'-COAT SCHOOL, the name ordinarly given to Christ's Hospital, London, in which the boys wear blue coats or gowns, according to an old costume. See CHRIST'S HOSPITAL.

BLUE'-EYE (*Entomyza cyanotis*), a beautiful little bird, abundant and very generally dispersed in New South Wales, although not found in the more southern Australian colonies. It is a species of Honey-eater (q. v.) or Honey-sucker, and is sometimes called the Blue-cheeked Honey-eater. The B. seeks its food almost exclusively among the blossoms and small leafy branches of *Eucalypti*. Its food consists partly of insects and partly of honey; perhaps also of berries. It is a bold and spirited bird, of most elegant and graceful movements. Numbers are often seen together clinging and hanging in every variety of position, frequently at the extreme ends of the small thickly-flowered branches, bending them down with their weight.

BLUE'FIELDS, a river of the Mosquito Territory, in Central America, which, after a course of several hundred miles to the east, enters the Caribbean Sea in lat. 12° N., and long. 83° W. Its lower stream is navigable to a distance of 80 miles from the sea. At its mouth is a good harbor, above which stands a town of the same name, formerly the residence of the king of the Mosquito Territory (q. v.).

BLUEFISH (*Temnodon saltator*), a fish of the family *Scombéridæ*, of a genus having no detached finlets, no isolated dorsal spines, and no lateral armature of the tail, two dorsal fins, the first of which is small, and two deeply hidden spines in front of the anal fin. The only known species is a native of the east coast both of North and South America. The upper parts are of a bluish color, the lower parts whitish, a large black spot at the base of the pectoral fins. The mouth is crowded with teeth, the jaws are furnished with large ones. The B. preys on other fishes, as the weak-fish, menhaden, and mackerel, the shoals of which it pursues. It is very swift, strong, and voracious. It sometimes attains a length of three feet, and a weight of 14 lbs. It is much esteemed for the table, and great numbers are brought to market in New York, Philadelphia, and other towns about the end of summer. It is often caught by trolling, as it bites readily at any object drawn swiftly through the water. It frequently ascends rivers even to fresh water.

BLUE'-GOWNS, the name commonly given to a class of privileged mendicants in Scotland. The proper designation of these paupers was the King's Bedesmen, or Beadsmen. In ancient times, a beadsman was a person employed to pray for another. See BEAD. From practices of this kind, there sprang up a custom in Scotland of appointing beadsmen with a small royal bounty, who ultimately degenerated into a class of authorized mendicants. Each of the beadsmen on his majesty's birthday received a gown or cloak of blue cloth, with a loaf of bread, a bottle of ale, and a leathern purse containing a penny for every year of the king's life. Every birthday, another beadsman was added to the number, as a penny was added to each man's purse. The most important part of the privilege was a large pewter badge, attached to the breast of the gown, which, besides the name of the bearer, had the inscription, *Pass and Repass*. This inferred the privilege of begging, and bespoke the kindly consideration of all to whom the beadsmen appealed for an alms or a night's lodging. The fictitious character of Edie Ochiltree, in Sir Walter Scott's tale of the *Antiquary*, is a fair sample of this ancient and picturesque fraternity. The practice of appointing beadsmen was discontinued in 1833, at which time there were sixty on the roll. The whole have since died out. The last beadsman drew from the Exchequer in Edinburgh his last allowance in May 1863.

BLUE'-MANTLE, the title of an English pursuivant-at-arms. See PURSUIVANT.

BLUE MOU'NTAINS, the name of two mountain-chains, the one in New South Wales, the other in Jamaica.—1. The B. M. of New South Wales run very nearly parallel with the coast, and being impassable by nature, long threatened to cut off the maritime part of the colony from the interior. To cross this apparently insurmountable barrier was the grand aim of the colony during the first 24 years of its existence, Surgeon Bass, the discoverer of the strait that bears his name, standing pre-eminent among the adventurous and patient explorers. It was not till 1813 that a practicable passage was found, or rather made, for it terminated towards the west in a zigzag road down a nearly perpendicular height of 670 feet; but it was not before 25th April 1815 that Governor Macquarie, with a numerous retinue, actually opened a route into the Bathurst Plains, then yielding the richest pasturage in the colony, and now forming its gold-field. The highest point of the B. M., Mount Beemarang, is 4100 feet high, and some parts of the road which crosses them are about 3400 feet above the sea. A line of railway crosses the B. M., in the construction of which great engineering difficulties have been overcome, part of it being carried along the face of a precipitous mountain.—2. The still loftier range of the same name in Jamaica traverses the whole length of the island, and in some places attains an altitude of 7000 feet.

BLUE PILL (*Pilula hydrargyri*) is the most simple form in which mercury can be administered internally. It consists merely of *two* parts of mercury rubbed up with three parts of conserve of roses, till globules of mercury can no longer be detected; to this is added powdered liquorice-root, so that a pill of five grains contains one grain of mercury.

In cases of torpid condition of the liver or inflammation of that organ, B. P. is much used as a purgative, either alone or combined with some other drug, such as rhubarb. When it is given with the view of bringing the system under the influence of mercury (Salivation, q. v.), small doses of opium should be added to counteract its purgative tendency, and the state of the gums watched carefully from day to day, so that the first symptoms of salivation may be noticed, and the medicine omitted. As a purgative, the common dose of B. P. is one or two pills of five grains each, followed by a purgative draught. When the system is to be saturated with it, or salivated, one pill may be given morning and evening, or one every night combined with ¼ of a grain of opium, repeated till the gums become sore. But the sensibility to the action of mercury varies with the individual; some may take large quantities before it exhibits its physiological symptoms, and on the other hand, three blue pills, one taken on three successive nights, have brought on a fatal salivation. When taking blue pills, all sudden changes of temperature should be avoided; and, indeed, though they are found in every domestic medicine-chest, neither they nor any other form of mercury should be given without good cause and without the greatest caution.

BLUE RIDGE, the most easterly range of the Alleghanies, in the United States. It forms an almost continuous chain from West Point in New York down to the north of Alabama, through New Jersey, Pennsylvania, Virginia, the Carolinas, and Georgia. It divides Virginia into Eastern and Western. Mount Mitchell, in North Carolina, the loftiest point of the B. R., is 6470 feet above the sea; while the Otter Peaks in Virginia, next in elevation, have an altitude of 4200 feet.

BLUE STOCKING, a name given to learned and literary ladies, who display their acquirements in a vain and pedantic manner, to the neglect of womanly duties and graces. The name is derived from a literary society formed in London about the year 1780, which included both men and women. A gentleman of the name of Stillingfleet, who was in the habit of wearing blue stockings, was a distinguished member of this society; hence the name, which has been adopted both in Germany and France.

BLUE'THROAT, or BLUE'BREAST, also called Bluethroated Warbler and Bluethroated Robin (*Phœnicura Suecica*, or *Sylvia Suecica*, see SYLVIADÆ), a beautiful bird, a very little larger than a redbreast, and much resembling it, but having the throat and upper part of the neck of a brilliant sky-blue, with a spot in the center, which in some specimens is pure white, and in very old males is red. Below the blue color is a black bar, then a line of white, and again a broad band of bright chestnut. The B. is well known as a summer bird of passage in many parts of Europe, from the Mediterranean Sea to the Arctic Ocean, but is very rare in Britain, only a few instances of its occurrence having been recorded. It is supposed to spend the winter in Africa. Great numbers are caught for the table in Lorraine and Alsace. The bird is one of those known by the names of *Becfin* (q. v.) and *Beccafico* (q. v.), and esteemed a delicacy. It is a bird of very sweet song. It imitates, to an unusual degree, the notes of other birds, so that the Laplanders give it a name which signifies the bird of a hundred tongues.

BLUE'WING, according to some naturalists, a genus of *Anatidæ*, which has been named *Cyanopterus* (by a sort of Greek translation of the English name), but more generally regarded as a mere section or subsection of the restricted but still large genus *Anas*. See DUCK. The tail-feathers are only 14 in number, instead of 16, as in the common duck, teal, &c.; but the character from which the name is derived is, after all, that which chiefly distinguishes the bluewings, and never fails to arrest attention. The best known species, the Common or Lunate B. (*Anas* or *Cyanopterus discors*), is generally called the Blue-winged Teal in the United States of America, where it is very abundant. Vast numbers spend the winter in the extensive marshes near the months of the Mississippi, to which they congregate both from the north and from the coast regions of the east; but the summer migrations of the species extend as far north as the 57th parallel, and it is plentiful on the Saskatchewan in the breeding-season. It breeds, however, also in the marshes of the south, even in Texas; and is common in Jamaica, where it is supposed to be not a mere bird of passage, but a permanent resident. None of the duck tribe is in higher esteem for the table, and it has therefore been suggested that the B. is particularly worthy of domestication, of which it seems to be very easily susceptible. In size it is rather larger than the common teal; in the summer plumage of the male, the upper part of the head is black, the other parts of the head are of a deep purplish blue, except a half-moon shaped patch of pure white before each eye; the prevalent color of the rest of the plumage on the upper parts is brown mixed and glossed with green, except that the wings exhibit various shades of blue, the lesser wing-coverts being of a rich ultramarine blue, with an almost metallic lustre; the lower parts are reddish orange spotted with black; the tail is brown, its feathers short and pointed.—The B. is a bird of extremely rapid and well-sustained flight. The flocks of the B. are sometimes so numerous and so closely crowded together on the muddy marshes near New Orleans, that Audubon mentions having seen 84 killed by the simultaneous discharge of the two barrels of a double-barrelled gun.—There are other species of B., also American; but this alone seems to visit the more northern regions.

BLUM, ROBERT, was born in very humble circumstances at Cologne, 10th November, 1807. After a brief military service in 1830, he became scene-shifter, afterwards secretary and treasurer, to Ringelhardt, director of a theater at Cologne, and subsequently at Leipsic, in which situation he remained, devoting his leisure time to literature and politics until 1847, when he established himself as bookseller and publisher. In 1840, he founded at Leipsic the *Schiller's-Verein*, i. e., Schiller's Society, which celebrated the poet's anniversary, as a festival in honor of political liberty. In

1845 he acquired, in connection with the German Catholic movement and the political outbreaks in Leipsic, great reputation as a popular orator; and in 1848, was elected vice-president of the provisional parliament at Frankfort, and as such he ruled that turbulent assembly by presence of mind and a stentorian voice. In the National Assembly he became leader of the Left; and was one of the bearers of a congratulatory address from the Left to the people of Vienna, when they rose in October. At Vienna he joined the insurgents, was arrested, and shot on the 9th November. B. was a man of strong character, of great natural intelligence, and a speaker of stirring eloquence. For heading a party, he possessed cleverness and ambition enough, but he had not that passion and fanaticism which scorns to consider the consequences likely to flow from unbridled popular license. The news of his execution caused an indignant outcry among the democrats in Germany, who, besides instituting commemorations for the dead, made an ample subscription for his widow and children.

BLUMENBACH, JOHANN FRIEDRICH, a very eminent naturalist, was born at Gotha, 11th May, 1752. He studied at Jena and Göttingen, in the latter of which universities he became extraordinary professor in 1776, and ordinary professor in 1778. Here he lectured for fifty years on natural history, comparative anatomy, physiology, and the history of medicine. In 1785, consequently before Cuvier, he made natural history dependent on comparative anatomy. His *Manual of Comparative Anatomy and Physiology* has been translated into almost all the principal languages of Europe. The natural history of man was always his favorite study; and his *Collectio Craniorum Diversarum Gentium*, commenced in 1791, and completed in 1808, gave to the learned world the result of his observations on the skulls of different races, of which he had an extensive collection (see ETHNOLOGY). He published many other works on natural history, all of which were favorably received; for, both as a writer and a lecturer, he was eminently successful. His *Manual of Natural History*, indeed, has gone through 12 editions. Towards the end of the 18th c., he visited England, where he met with a distinguished reception from the most famous naturalists. On the 19th September, 1825, his friends celebrated the jubilee of his doctorate, presented him on the occasion with a medal struck on purpose, and founded an exhibition in his name, the proceeds of which were to assist young physicians and naturalists in the prosecution of their researches by travel. In 1835, the increasing infirmities of age compelled him to resign his academical functions. He died on the 22d January, 1840

BLU'NDERBUSS is a kind of short musket with a very wide bore, sufficient to take in several shot or bullets at once. It has a limited range, but is very destructive at close quarters. As a military weapon, it is chiefly of service in defending passages, doorways, staircases, &c. Some of the English and German troopers in the 17th c. were armed with the B.; but the carbine has since nearly superseded this weapon.

BLUSHING, a sudden reddening of the face, neck, and breast, owing to some mental shock, most commonly of the character of humiliation or shame. The nature and cause of this effect have been recently elucidated by physiological researches. It is produced by an increased flow of blood into the capillary vessels over the parts where the blush extends. Besides reddening the complexion, it creates a sensible augmentation of heat in those parts. The feeling that accompanies the state is of a distressing kind.

The phenomenon of B. is part of a general influence exerted on the capillary circulation by mental causes operating through the brain. The experiments whereby the existence of this influence has been established, may be described as follows: The *small blood-vessels*, by which the blood is brought into proximity with the various tissues of the body, are kept in a state of balanced distention between two forces: the one the propulsive power of the heart's action, which fills and distends them; the other, an influence derived from the nervous centers, and acting upon the muscular fibres so as to contract the vessels. The first of the two forces—the agency of the heart—is quite well understood: it is simply like the case of distending the hose of a fire-engine by working the pump, and driving the water along. The counteracting force of the nerve-centers is proved by the following experiments: When the sympathetic nerve proceeding to the vessels of the head and face of an animal is cut, there follows congestion of the blood-vessels with augmented heat over the whole surface supplied by the nerve. The ear is seen to become redder; a thermometer inserted in the nostril shows an increase of temperature, the sign of a greater quantity of blood flowing into the capillaries. The inference from the experiment is, that, from the withdrawal of a counterpoise, the force that *distends* the small blood-vessels—that is to say, the heart's action—has an unusual predominance. It is further proved that this nervous influence, acting upon the minute muscular fibres of the small vessels, proceeds from the nerve-centers lodged in the head, for, by cutting the connection between the brain and the ganglion in the neck, from which the above-mentioned nerve is derived, the same restraining influence is arrested, and the congestion takes place. By stimulating the divided nerve galvanically, the suffusion disappears, the vessels shrinking by the galvanic contraction of their muscular coats.

The agency now described is of a piece with the action of the brain upon involuntary muscles generally, as the heart and the intestinal canal, and by it many organic functions—digestion, nutrition, absorption, &c.—are affected by those changes in the cerebral substance that accompany mental states. It is known that mental excitement has an immense influence in all those functions; one set of passions, such as fear, tend to derange them, while joy and exhilaration operate favorably upon them.

To apply these observations to the case in hand. Supposing a person in the average mental condition, and something to arise which gives a painful shock to the feelings—a piece of ill news, a reproach from some one whose good opinion is much valued, an open shame, or the fear of it, a fit of remorse, an occasion of grief—the pain is accompanied with a sudden loss, or waste, or decrease of cerebral power; none of the functions that the brain aids in maintaining is so strongly stimulated as before; and in particular, that stream of nervous energy which balances the heart's action in regulating the distension of the small blood-vessels, is abated, the abatement being made apparent in the redness and heat over the face and neck. In a great stroke of mental depression, the influence is of a much more extensive kind, though still of the same nature essentially as regards the enfeeblement of the nervous energy, and may lower the action of the heart itself; in which case there will be a wide-spread pallor, perhaps without a blush. In all probability, it is when the loss of cerebral influence extends only to the relaxation of the muscular fibres of the small vessels, leaving the heart in its usual vigor, that the state of B. is most fully manifested. Hence it is more apt to arise out of the smaller modes of painful apprehension, than from the more serious calamities that prostrate the system throughout.

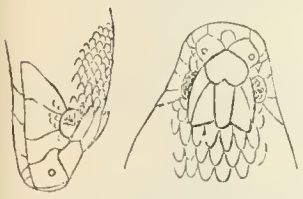
It is said that, in the Circassian slave-market, a young woman that blushes fetches a higher price. Some complexions do not show the increased flow of blood in this way, and all persons are not equally sensitive to the cerebral shock that causes it.

BO TREE, the name given in Ceylon to the PEEPUL (q. v.) of India (*Ficus religiosa*). It is held sacred by the Buddhists, and planted close by every temple, attracting almost as much veneration as the statue of Buddha itself.—The B. T. of the sacred city Anarajapoora, is in all probability the oldest tree in the world, of which the age can be ascertained by historical evidence. It was planted in 288 B.C., and Sir James Emerson Tennent, in his

Bo Tree.
From a Drawing in Tennent's work on Ceylon.

work on Ceylon, published in 1859, gives reasons for believing that the tree was then really the wonderful age of 2147 years; and refers to historic documents in which it is mentioned at different dates, as 182 A.D., 223 A.D., and so on to the present day. This tree is invested, in the estimation of the Buddhists, with wonderful sanctity. 'To it,' says Sir James, 'kings have even dedicated their dominions in testimony of their belief that it is a branch of the identical fig-tree under which Gotama Buddha reclined at Uruwelaya when he underwent his apotheosis.' Its leaves are carried away as treasures by pilgrims; but it is too sacred to be touched with a knife, and therefore they are only gathered when they fall.

BO'A, in popular language, the name of all those large serpents which kill their prey by entwining themselves around it, and constricting it in their coils; but by zoologists of the present day, limited as the name of a genus to a very small portion of their number, all of which are natives of the warm parts of America—the similar large serpents of Asia and Africa forming the genus *Phyton* (q. v.). The name *B.*, however, was certainly not originally applied to American serpents, for it is used by Pliny, who accounts for its origin by a fable of serpents sucking the milk of cows, thus referring it, very improperly to the Latin *bos*, an ox. The Linnæan genus B. comprehended all serpents having simple subcaudal plates, but without spur or rattle at the end of the tail, and was thus very artificial, as founded chiefly upon a single unimportant character, and consisted of a very miscellaneous assemblage of species, venomous and non-venomous. The B. family, or *Boïdæ*, as now constituted (containing the *Pythons*, &c., of the old world, as well as the true *Boas* of the new), is almost exclusively confined to tropical climates, and all the species are of large size and great strength, some of them far exceeding in these respects all other serpents. The story related by the ancients of a serpent 120 feet in length, which devoured several soldiers, and caused alarm to a Roman army in Africa, may perhaps be deemed unworthy of credit, although the skin is said to have been long preserved at Rome; but there is good reason to believe that serpents in more modern times have attained at least half this length, and have made even the larger mammalia, and sometimes man, their prey. The *Boïdæ* are not venomous; but their mouth, although destitute of poison-fangs, is so furnished with teeth as to make their bite very severe. Their teeth are numerous, long, and directed backwards, so as the more effectually to prevent the escape of the prey, which is first seized by the mouth, and then the serpent, with a rapidity of motion which the eye of the closest observer fails perfectly to follow, coils itself around it; the powerful muscles of the body are afterwards brought into action to compress it, so that usually in a few minutes its life is extinct, and its bones are broken. Deglutition then takes place—not, as has been alleged, after the prey has been licked and covered with saliva by the tongue, but accompanied with an extraordinary flow of saliva, which seems not only to serve for lubrication, but to have the property of hastening the decomposition of animal substances, and so to assist in making the prey more easy to be swallowed. It is always swallowed entire, and the process is sometimes a tedious one, and seems to require no small muscular effort; but the muscles of the serpent are capable of acting for this purpose, even at the neck, when that usually narrowest part of the body is distended to an enormous degree as the prey passes through it. The lower jaw is not simply articulated to the skull, but by the intervention of other bones, a structure without which the dilatation of the throat would be impossible. The lungs consist of two lobes, one much larger than the other, and at the extremity of the larger is an extremely capacious air-bag, which is supposed to serve for the necessary aeration of the blood whilst respiration is impeded in the process of deglutition.



Head of Boa.

The tail in all the Boïdæ has great prehensile power, and its grasp of a tree round which it may be coiled is aided by the opposing action of two claws, on each side of the anus, which are really the representatives of the hinder limbs of the superior vertebrate animals, and which, on dissection, are found to be connected not only with strong muscles, but with bones entirely concealed within the serpent, one jointed to another, so as to make the character of a rudimentary limb very apparent. These serpents being almost all inhabitants of watery places, often lie in wait for animals that come to drink; thus the largest of the American species, *Boa* (*Eunectes*) *murina*—sometimes called Anaconda, although Anaconda seems to be originally, like B., the name of a serpent of the old world—is to be found where rivers or narrow lagoons are overshadowed by gloomy forests. Perhaps the want of sufficient supplies of water, more than the greater cold of the climate, may account for the short time that specimens of the Boïdæ brought to Europe have generally lived in confinement.

After a repast these serpents spend a considerable time in a state of comparative torpidity—several weeks generally elapsing before they waken up to require a new supply—and in this lethargic state they are easily killed. When they do waken up, the demands of appetite seem to be very urgent. Many of our readers must still remember the interest excited some years ago concerning a B. in the London Zoological Gardens, which to the astonishment of its keepers, swallowed its rug; but this, after a trial of a week or two, it found indigestible, and the animal then gratified public curiosity by a reversal of the process of deglutition.

The head in the *Boïdæ* is thick, yet somewhat elongated; the eyes are small; the body is thickest in the middle; the tail usually has a blunt termination. The scales are numerous and rather small. The colors are various, and in many of the species rather bright and elegantly disposed. The true boas have the plates underneath the tail single, whilst in the pythons they are double. The species to which the name *Boa Constrictor* is appropriated, is far from being one of the largest, seldom attaining a length of more than twelve feet. It is common in Surinam and Brazil, where its skin is used for making boots and saddle-cloths. The name *Boa Constrictor* is, however, popularly extended to almost any of the species.— The number of species, whether in the genus or in the family, is far from being well ascertained.

Boas are much infested by intestinal worms, which appear often to cause their death. The excrement of the B.—the urine and faces being combined as in other reptiles, and voided by a single vent—is a solid white substance, and consists mainly of urate of ammonia, accompanied by phosphate of lime (bone-earth). It is employed as an easy source of uric acid.

BOADICE'A, a warrior-queen of the Iceni, a tribe inhabiting the eastern coast of Britain, in the time of the Romans. She flourished after the middle of the 1st century. Prasutagus, her husband, who died A.D. 60, or 61, had left his wealth jointly to the Roman Emperor Nero, and to his two daughters, hoping that by this artifice his kingdom would be protected from oppression; but the Roman soldiery, taking advantage of the defenceless condition of the country, began to plunder unscrupulously. B. herself was scourged, her daughters were violated, and the noblest among the Iceni were treated as slaves. These outrages soon drove the Britons to revenge. B. gathered round her a large army; attacked and captured the Roman colony of Camalodunum; defeated Petilius Cerealis, legate of the ninth legion, who was marching to its relief; took Londinium and Verulamium; and destroyed, it is said, somewhere about 70,000 Romans, many of them by torture. Suetonius, the Roman governor of Britain, now advanced at the head of 10,000 men against B., who, we are informed, had under her command no less than 263,000. A dreadful battle ensued (62 A.D.), in which, according to Tacitus, 80,000 Britons perished, and only 400 Romans. These figures, of course, cannot be trusted; but the victory must have been decisive, as it finally established the authority of the Romans in Britain. B. overwhelmed with despair, committed suicide.

BOARD, the general name applied to persons in their collective capacity, who have the management of some public office or department, bank, railway, charity, or, indeed, of any other trust. Thus, the Commissioners of Customs, when met for the transaction of business, are called the B. of Customs; the Lords of the Treasury, the B. of the Treasury; Commissioners of Excise, B. of Excise; directors of railways, B. of Directors, poor-law guardians, B. of Gurdians, &c. See CUSTOMS, TREASURY, &c.

BOARD, BOARDING. In nautical language, *board* is used with many significations. Besides its ordinary application to a plank of wood, B. is a space or portion of sea over which a ship passes in tacking; hence the phrases, 'to make a good board,' 'to make short boards,' 'to make a stern-board,' 'to leave the land on back-board,' &c.—all of which refer to the direction of a ship's movement at a particular time and place. Again, *board* or *aboard* relates to the interior of the ship, in such phrases as 'to go aboard,' 'to heave overboard,' &c.

But the most important of these meanings is that which relates to the *boarding* of an enemy's ship, or making a forcible entry for the sake of capturing it. Whenever this bold operation is determined on, certain seamen are told off to act as boarders. It is very rarely that, between two men-of-war, this operation is ventured on; it would, in most cases, be too perilous to the assailants, who more frequently conquer by cannon and musketry. Boarding is, in most instances, attempted by privateers against merchantmen, where the defenders are few in number. The assailant well considers all the circumstances for and against him—the relative sizes of the two vessels, the relative strength of the crews, the state of the wind and sea, and the chances of escape if foiled. Besides the pistols, cutlasses, and boarding-pikes of the seamen, there are provided powder-flasks for producing smoke and confusion on the enemy's deck, and shells called stink-pots, for producing an intolerable stench. The moment and the spot being selected, the fuses of the flasks and stink-pots are lighted; these combustibles are thrown upon the enemy's deck; and while the fire, smoke, and stench are doing their work by confusing the enemy, the boarders climb on board, and gain a mastery by their personal prowess—that is, if the calculations of relative strength have been duly made. Sometimes terrible hand-to-hand encounters take place on deck before victory decides for or against the assailants.

General Sir Howard Douglas, in his able work on 'Warfare with Steam,' expresses an opinion that steam war-ships are likely sometimes to come to close quarters; and that, on that account they should be provided with a larger quota of marines and of

boarding-implements than have hitherto been supplied to sailing ships. The defenders, he adds, should construct loopholed barricades across the terminations of the quarter-deck and the forecastle, to prolong the defence within board. The French naval officers, it is known, look forward to a great increase in all such military resources on board war-steamers; and Sir Howard endeavors to impresss similar convictions on the English authorities.

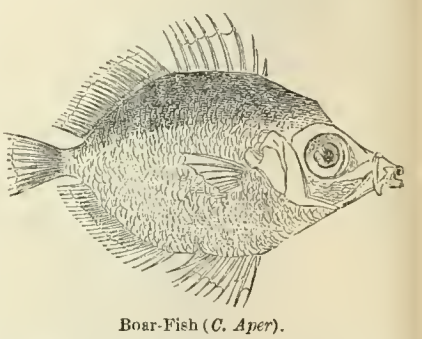
BOARD OF A'DMIRALTY, a government department which has the management of all matters concerning the British navy. In the article ADMIRAL, the steps are noticed by which the duties of the Lord High Admiral, in former days, were transferred to a Board of Commissioners. The constitution and functions of this body will now be described.

The B. of A. comprises five lords commissioners, who decide collectively on all important questions. Besides this collective or corporate action, each has special duties assigned to him. There are two civil or political lords, and three naval or sea lords. The first lord, who is always a cabinet minister, besides a general control, has the management of naval estimates, finance, political affairs, slave-trade, prevention, appointments, and promotions. The first naval lord manages the composition and distribution of the fleet, naval discipline, appointment of inferior officers, commissioning ships general instructions, sailing orders, and the naval reserve. The second naval lord attends to armaments, manning the navy, the coast-guard, the marines, marine artillery and naval apprentices. The third naval lord has control over the purchase and disposal of stores, victualling-ships, navy medical affairs, transports, convicts, and pensioners. The junior civil lord attends to accounts, mail-packets, Greenwich Hospital, naval chaplains, and schools. Naval architecture, the building and repairing of ships, steam-machinery, and new inventions are superintended by the controller of the navy, who is not a member of the Board, but is directly responsible to the first lord. Under the lords are the first secretary (parliamentary), the second secretary (permanent), and the naval secretary (professional), who manage the daily office work. The lords all resign when the prime minister resigns, and those who have seats in parliament are replaced by others. This change gives rise to many evils. There is likely to be a change of views and of system: the new board is not bound to act on the plans of its predecessors; and many of the costly novelties of the navy within the last ten years are directly traceable to this cause. The system is defended on the plea that these changes infuse new blood into the Admiralty, and give fair-play to increased knowledge and new plans. Some statesmen advocate a modified plan: proposing to render a few naval officers of rank *permanent* lords of the Admiralty, and only changing the others on a change of ministry. A connecting-link between the old and new boards is the controller of the navy, who is a permanent officer. The secretaries and the lords determine which letters ought to be submitted to the Board collectively; and that portion of the correspondence is treated as in most boards and committees. All delicate or doubtful matters are specially reserved for the first lord; but in the Board meetings he has only one vote, like the rest, though, from his general parliamentary responsibility, he has practically at once an absolute veto and an absolute power of giving action to his views. The Admiralty offices are at Whitehall and Spring Gardens, close adjoining.

BOARD OF O'RDNANCE, a government department formerly having the management of all affairs relating to the artillery and engineering corps, and to the *matériel* of the British army. Under this precise designation, the Board no longer exists; a change having been made which requires brief explanation. The Board existed from the time of Henry VIII. until 1855, when it was abolished, its functions being vested in the Secretary of State for War as regarded *matériel*, and in the commander-in-chief as concerned the military command of the artillery and engineers. The B. of O., until 1854, comprised the master-general of the Ordnance, the surveyor-general, the clerk of the Ordnance, and the principal storekeeper, all of whom were usually members of parliament. There was no chairman at the meetings, and the Board often consisted of only one officer. The master-general had a veto, and was in that respect more powerful than the chief member of the Board of Admiralty; although, not having necessarily a seat in the cabinet, he had less political power. The Board days were thrice a week; and each of the four members had control over certain departments—the patronage of which was generally vested in him. Scarcely any improvements were made from 1828 till 1854, and the general arrangements were very defective. Of the four members, the master-general, besides his veto, had a general authority; the surveyor-general had control over the artillery, engineers, sappers and miners, ordnance medical corps, contracts, laboratory, gunpowder, barracks, and navy gunners; the clerk of the Ordnance managed the estimates, money-arrangements, civil establishment, pensions, superannuations, and Ordnance property; while the principal storekeeper had charge of stores, storerooms, naval equipments, and naval war-stores. In matters relating to coast-defences, it was often difficult to decide between the Admiralty and the Ordnance, each Board claiming authority. When the Crimean disasters took place in 1854, the defects of the B. of O. became fully apparent: it could not work harmoniously with the other government departments. The Board was dissolved, and the office of master-general abolished. By the War-office Act of 1870, the post of surveyor-general of the Ordnance was revived as one of the principal officers of the Secretary of State for War. He is responsible for the *matériel* and supplies of the army.

BOARD OF TRADE. See TRADE, BOARD OF.

BOA'R-FISH (*Capros*), a genus of fishes of the Dory (q. v.) family, or *Zeïdæ*, differing from the genus *Zeus*, or Dory, in the still more protractile mouth—the resemblance of which to the snout of a hog is supposed to have given origin to the name—in the want of spines at the base of the dorsal and anal fins, and of long filaments to the dorsal spines. The body has the usual oval, much compressed form of the family. The common B. (*C. Aper*) is a well-known inhabitant of the Mediterranean, rarely caught on the coasts of England. The eyes are very large, and placed far forward; the body is of a carmine color, lighter below, and with seven transverse orange bands on the back. The flesh is little esteemed.



Boar-Fish (*C. Aper*).

BOAR'S HEAD. The B. H. is the subject of a variety of legends, poetic allusions, and carols connected with the festivities of Christmas in England. At this wintry season, the wild boar was hunted, and his head served up as the most important dish on the baronial table. According to Scott's graphic lines:

> Then was brought in the lusty brawn
> By blue-coated serving-man;
> Then the grim boar's head frowned on high,
> Crested with bays and rosemary.
> Well can the green garbed ranger tell,
> How, when, and where the monster fell;
> What dogs before his death he tore,
> And all the hunting of the boar.

Referring to the article CHRISTMAS for a notice of some of the observances on this occasion, we need here only say, that in the 'boar's-head carols' are found some of the most interesting specimens of the old English convivial verses. The following, from a carol printed by Wynkin de Worde (1521), may be given:

> *Caput Apri defero*
> *Reddens laudes Domino.*
>
> The boar's head in hand bring I,
> With garland gay and rosemary;
> I pray you all sing merrily
> *Qui estis in convivio.*
>
> The boar's head, I understand,
> Is the chief service in this land;
> Look wherever it be found,
> *Servite cum cantico.*

The boar's head 'erased,' according to heraldic phraseology, is a well-known cognizance of a number of old families, particularly the Gordons; it also formed the sign of a tavern at Eastcheap, London, which has been immortalized by Shakespeare. On the site of this famed tavern now stands the statue of William IV.

BOAST (Fr. *Ebaucher*), a word in use with sculptors. To B., as its French original implies, is to block out a piece of stone or wood, so as to form a rude approach to the ultimate figure, leaving the smaller details to be worked out afterwards. Ornamental portions of buildings are often inserted in their places in this condition, and frequently remain so if they are in an obscure position.

BOAT is the general name for a small open vessel. Boats differ, however, greatly one from another. They may be slight or strong, sharp or flat-bottomed, decked or undecked, swift for despatch or roomy for cargo, ornamental for pleasure or plain for hard service, deep or light of draught for deep or shallow water. The chief varieties supplied to ships of war are the following—*Long-B.:* the largest B. of a ship, furnished with mast and sails; it is either armed and equipped, to render warlike service in certain situations, or it is employed to fetch water, wood, provisions, and heavy stores on board. *Launch:* longer and more flat-bottomed than the long-B.; being rowed with a greater number of oars, it makes more rapid progress up rivers. *Barge:* a long, narrow, light B., employed in carrying the principal officers to and from the ship; for other kinds of boats or vessels under this

name, see BARGE. *Pinnace:* a B. for the accommodation of the inferior officers; it has usually eight oars, whereas the barge has ten or more. *Cutter:* broader, deeper, and shorter than the barge or pinnace; it is rowed with six oars, sometimes hoisting a sail, and is chiefly employed in carrying light stores, provisions, and crew. *Jolly-B.:* a smaller cutter, rowed with four oars instead of six. *Yawl.:* small in size, and used for nearly the same purposes as cutters and jolly-boats. *Gig:* a long, narrow B., rowed with six or eight oars, and employed by the chief officer on expeditions requiring speed. Some of the above-named boats are diagonal-built for strength; the others are clincher-built, to be as light as possible. The largest ships of war carry boats of all these various kinds, varying in weight from 110 ewt. down to 10 ewt.; the smaller ships carry fewer; while merchant-ships have seldom more than three—except passenger-ships, which are bound by law to carry boats enough to save all the passengers and crew in case of disaster. There are other kinds of boats which do not belong to ships. See BOATING.

In reference to the legal regulation of boats in the merchant-service, the following are the chief provisions: When a B. belongs to any ship or other vessel, the name of the vessel and of the place to which she belongs must be painted on the outside of the stern of the B., and the master's name within side the transom—the letters to be white or yellow on a black ground. Boats not belonging to ships or other vessels must be inscribed with the name of the owners and the port to which they belong. All boats having double sides or bottoms, or any secret places adapted for the concealment of goods, are liable to forfeiture.

The boats intended for the rescue of shipwrecked persons, or crews and passengers exposed to that danger, are described under LIFE-BOAT.

BOATBILL (*Cancroma cochlearia*) a bird of the Heron (q. v.) family, the only known species of a genus differing from the true herons in little else than the form of the bill, which is comparatively short, and very broad, the mandibles resembling the bowls of two spoons placed one upon the other, the upper mandible overlapping the lower, keeled on its upper ridge, and hooked at the point. The B. is about the size of a domestic fowl, has shorter limbs than most of the herons, but resembles them in plumage, and is abundantly provided with elongated feathers on the back of the head and neck which it erects when irritated. Its general color is rusty red, the forehead and breast whitish. It inhabits Cayenne, Surinam, Brazil, &c., sits perched upon trees which hang over streams, and darts down upon fish, which seem to be its principal food.

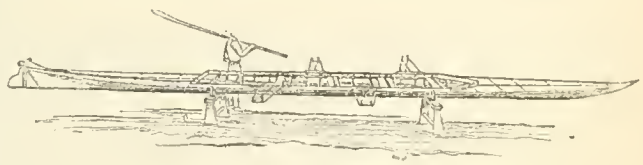
Boatbill (*Cancroma cochlearia*).

BOA'T-FLY (*Notonecta*), a genus of insects of the order *Hemiptera* (q. v.), suborder, *Heteroptera*, and of the family of the *Hydrocorisæ*, or Waterbugs (q. v.). All of them, like the rest of the family, are aquatic insects. Their English name is derived from their boat-like form, eminently adapted for progression in water, and probably also from their remarkable habit of always swimming on their back—peculiar to the genus *Notonecta*, as restricted by recent entomologists—and of resting in this posture suspended at the surface of the water. The known species of this genus are not numerous. One of them, *N. glauca* (sometimes called the *Water Boatman*), is common in Britain: it is about half an inch long, and varies considerably in color; but exhibits a general greenish tinge, the other colors being black, brown, and gray. They fly well, but seldom use their wings. They move with difficulty on dry ground. When they descend into the water, they carry down a supply of air for respiration in a hollow between their folded wings. They feed on animal substances, and often kill and devour those of their own species.

Water Boatman (*N. glauca*).

BOATING, the art of managing and propelling a boat. This is done by means of either oars or sails. As sailing is fully treated under the head of YACHT, rowing only is dealt with here. The most ancient form of boat known to have been used in the British Islands is the coracle; it is still much used in Wales. The *coracle* is but a large wicker-work basket, covered with skins, or some thin water-proof substance stretched over the wicker-work, strengthened by a cross seat. Seated in one of these rude boats, with but a single paddle, it is astonishing with what dexterity the paddler will skim over broken water, and avoid dangers which would infallibly destroy a heavier or less manageable craft. From the coracle spring all the varied classes of boats now in use, either as pendants to ships, or as used for pleasure traffic or a means of conveyance upon our rivers and inland waters. The *wherry* next claims attention. There are many kinds of wherries, but we only notice the Thames wherry. This is stoutly built, and is constructed to carry about eight passengers. It is usually managed by one sculler or two oarsmen; it is almost entirely employed by watermen for the conveyance of passengers or pleasure-parties. The boats used for rowing as a sport or pastime are of a much lighter and sharper build. They are constructed of all sizes, to carry from twelve oarsmen down to a single sculler. Of this class of boats for racing purposes, we have the 8, 6, 4, 2, and single pair oared boats; while in contests between single scullers, we have what is denominated the *wager-boat*—a boat so frail and light in its proportions, that none but a most experienced sculler can sit in one without danger of upsetting. For pleasure, we have another class of boats denominated *gigs*, of stouter and more capacious build; they are constructed either for four oars, a pair of oars, or single sculls. Boat-racing is a practice of some antiquity, but it has culminated in our day. Many prizes have been given from time to time for competition, some of which have been made annual. Perhaps the most famous of all these is Dogget's coat and badge, which is rowed for yearly on the Thames by watermen's apprentices, on the 1st of August. But the events of most note in the rowing world are the Oxford and Cambridge 8 oared match, rowed annually upon the Thames, from Putney to Mortlake. This match has not been a regular yearly match, there having been occasional intervals at times of a year or two. In 1829, 1842, 1849, 1852, 1854, 1857, 1859, from 1861 to 1869 inclusive, in 1875 and 1878, the Oxford boat carried off the prize; Cambridge having wrested it from Oxford in the years 1836, 1839, 1840, 1841, 1845, 1846, 1849, 1856, 1858, 1860, 1870—1874, 1876, and 1879. Thirty-six matches have come off in 51 years, the balance being on the side of Oxford. Two matches were rowed in 1849; that of 1877 was a dead heat.

The best picked men from each university are selected to contest this great event, and the hardest exercise and the severest training gone through by the crews, to improve their wind, strength, and endurance, for months before the day of rowing; their diet consisting mainly of the plainest cooked lean meat and potatoes, with malt liquors, spirituous drinks being prohibited, and the duties of temperance, soberness, and chastity strictly

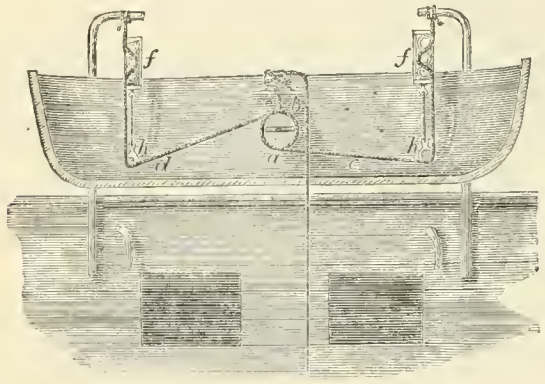


Four-oared Racing-boat.

enforced. It was at one time thought that light men stood the best chance in these matches, but experience has shown this to be an error, and ten, eleven, and twelve stone men are now chiefly selected. The distance rowed upon this course is 4¼ miles. The time chosen is usually at slack-tide, and the time taken in rowing varies according as there is little or no tide or wind, or the reverse, from 18 to 26 minutes. The introduction of sliding-seats has added very greatly to the power of the rower by lengthening the stroke. The sliding-seat is a small piece of board on which the rower sits, and which works on rollers, and slides backwards and forwards as the rower makes his stroke. From 36 to 44 strokes of the oar per minute is held to be fair racing pace; and a long steady even stroke—the blade of the oar not being dipped too deeply in the water, or thrown too high above the surface when withdrawn, the arms being well extended in taking the stroke, and the elbows brought well home to the sides at the conclusion—is the kind of a stroke now preferred by connoisseurs. The other great events of the boat-racing world are the regattas of Henley and Putney. At the former, the Oxford and Cambridge crews usually fight their battle over again in conjunction with others for the challenge-cup; and at these also many scullers' matches are rowed, though single scullers' races for the championship of the Thames, &c., are usualy events of themselves. Campbell was one of the first sculling champions, beating Williams in 1831. He was beaten by Robert Coombes in 1846, who held the championship for about six years. He at length succumbed to the prowess of Cole in 1852. Cole, in 1854, was beaten by Messenger; Messenger yielded the palm to Kelly in 1856; and Kelly was, in 1859, beaten by Robert Chambers, the champion of the Tyne. In 1865, Kelly recovered his laurels, and beat Chambers. In 1867, he beat him also on the Tyne; and in 1868 he had in turn to yield to Renforth, having been champion

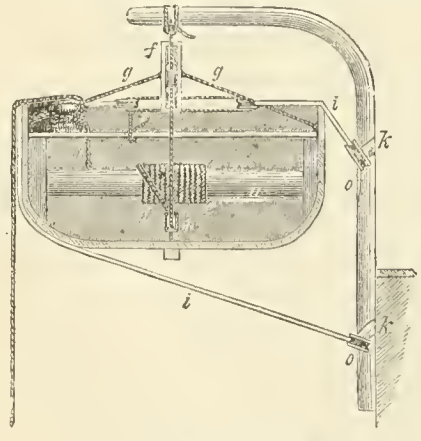
off and on for twelve years. A Canadian oarsman, named Hanlan, won the championship in 1879, and maintained his place in 1880. So much is B. favored at our universities and schools, that almost every college has its club.

BOAT-LOWERING APPARATUS is the name given to certain ropes and pulleys for lowering boats from ships quickly and safely, in case of emergency. Every passenger-ship is compelled by law to carry a certain number of boats, depending on the tonnage; and every ship of war necessarily carries boats (see BOAT) for minor services; but until recent years the apparatus was very inefficient for lowering these boats from the davits or cranes by which they are usually suspended. In shipwreck or other emergencies at sea, the boats were, until recent years, often so difficult to extricate that they could not be lowered in time to save the crew and passengers; or in lowering they capsized, and plunged the unhappy persons into the sea. Many inventors have recently directed their ingenuity to this subject, with a hope of devising a remedy. In Lacon's apparatus, the principal feature is the employment of a friction-brake, by which one man can regulate the rate of descent to varying degrees of speed. Captain Kynaston's *disengaging hooks* are intended not only to lower boats quickly and safely when suspended over the side of the ship, but also to hoist them out quickly when they happen to be stowed in-board. Wood and Rogers's ap-



Clifford's Boat-lowering Apparatus.—Longitudinal section of Boat.

aratus resembles Kynaston's in this: that the actual lowering from the ship is effected by the crew on shipboard, leaving to the person or persons in the boat only the duty of disengaging it from the tackle. But the apparatus which now engages most attention is Clifford's, the leading principle of which is, that the lowering and the disengaging are both effected by one man seated in the boat. Two ropes or lowering pendants, *c* and *d* (see fig.), descend from two davits; pass through blocks or sheaves, *f*; then through other blocks, *h*, within and near the keel of the boat; and finally, round a roller, *a*, placed horizontally beneath the seat on which the man-



Transverse section of Boat.

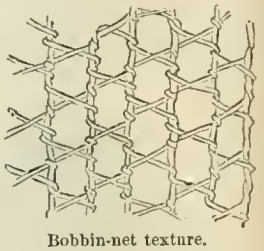
ager of the boat takes his place. By means of a winding-rope, *b*, held in one hand, he can regulate the speed with which the other two ropes uncoil themselves from the roller, thus graduating the boat's descent to the water's level. When lowered, the two ropes can be thrown off and the boat set free. The slings or lifts, *g*, are intended to prevent the canting or upsetting of the boat. The lanyard, *m*, belongs to the lashings, *i*, which hold the boat to the side of the ship; but by the thimbles, *k*, slipping off the prongs, *o*, the boat is liberated. The efficiency of the apparatus is most remarkable. In 1856, by order of the Admiralty, experiments were made with the starboard-cutter of H.M.S. *Princess Royal*. Twelve men got into the boat while it was hanging from the davits; it weighed, with the crew and the gear, nearly three tons; nevertheless, this cutter, thus laden, was successfully and quickly lowered by one of the twelve men, to a depth of 40 feet from the davits to the water.

Many other experiments of similar kind were made. Clifford's apparatus is now supplied to many ships of war and merchant-vessels; and many lives have been saved by its means, under circumstances which would almost certainly have proved fatal under the old mode of lowering boats from the davits.

Other systems have since been partially adopted; but none has yet been found which is wholly satisfactory to naval men.

BOA'TSWAIN is a warrant-officer on board her Majesty's ships, who has charge of the boats, sails, rigging, cables, anchors, flags, and cordage. He is immediately under the master in some of these duties; he frequently examines the masts and yards, sails and ropes, to report on their condition and efficiency. He also keeps account of all the spare rigging, &c., and superintends the replacement of old by new. The B. has certain duties in connection with the crew: he assists in the necessary business of the ship, and in relieving the watch. In bad weather, he looks well to the boats and anchors, especially when night is coming on. A B. should be a good sailor, a good rigger, and a vigilant, sober, firm man.

The *boatswain's mate* assists in all the above-named duties; and to him is assigned the repulsive, though now, happily, very rare, office of inflicting the flogging awarded to very serious offences.



Bobbin-net texture.

BO'BBIN-NET is the name of a kind of net-fabric, usually made of cotton-thread. It is of the nature of lace, but is made in the lace-frame instead of by hand. The texture is peculiar: it consists in the interlacing of a set of long threads, representing the warp in common weaving, with a set of cross ones (the weft), in such a manner as to form a mesh-texture. B. is one of the most elegant of textile fabrics, and forms an extensive branch of business, the chief seat of the manufacture in this country being Nottingham. See LACE MANUFACTURE.

BO'BBINS are small wooden rollers, flanged at the ends, and bored through the center lengthwise, so that they can be placed on a spindle or skewer. The bobbin on which ordinary sewing-thread is wound, although generally of small size, is a good example of their prevailing shape. One or two kinds are, however, of a different type; thus the bobbin, called in Scotland pirn, for delivering the weft from the shuttle, is simply a tapered pin, bored, it may be, throughout, with but the rudiments of a flange at the thick end; and the bobbin used for a similar purpose in lace-weaving, is merely a thin metal pulley about the size of a halfpenny. For the machines used in the various spinning processes of the textile industries—namely, the slubbing, the roving, the drawing, and spinning frames, bobbins of various sizes, and in enormous numbers, are required. Some of these are 15 inches long by 5 inches in diameter, and diminish in size for each succeeding process, those for the spun-yarn being scarcely larger than a good-sized thread-bobbin. There are also winding and warping bobbins for the weaving processes. For some purposes paper tubes have of late years superseded bobbins.

We are so familiar with the neat and convenient thread-bobbin, now seen in every house, that we are apt to think it a very old invention. Yet people are still living who can remember when all the sewing-thread used for domestic purposes was wound in the form of balls.

In the making of thread-bobbins ingenious automatic machinery is now employed. Transverse slices of common birch, the wood chiefly used for these, are first cut to the length of the bobbins. From each of these a number of circular bobbin blanks are next cut out by an annular saw, a hole being drilled through the center of each at the same time. These blanks are then fed into a self-acting turning-machine, operating with a compound cutting tool, whose form is the reverse of the profile of the bobbin. One of these machines produces from 80 to 100 gross of bobbins per day, while an expert hand-turner could not produce more than eight gross in the same time. As most of the bobbins required for spinning purposes are larger than those required for thread, they are made by turning the barrels and ends separately, and then gluing them together, in order to save wood.

Bobbins are made of various kinds of wood, but principally of birch, beech, ash, and plane tree. Sometimes two kinds are used in the same bobbin; and for some special purposes, bobbins are

made entirely of metal, such as iron or tinplate. Of late years, some bobbin manufactories have been erected in the Highlands of Scotland, in neighborhoods where birch is plentiful. When we consider that there are now about 40 millions of spindles in the spinning-mills of Great Britain, we get some idea of the prodigious number of bobbins constantly wanted to supply the tear and wear of those used in the spinning processes. One or two of the larger bobbin manufacturers in England employ about 300 hands.

BO'BBIO, a town in Northern Italy, in the province of Pavia, is situated near the left bank of the Trebbia, about 37 miles north-east of Genoa. B. is an ancient place, having originated from a church and convent erected here in the end of the 6th, or beginning of the 7th c., in the crypt of which St. Columbanus and some of his disciples lie buried. B. has a cathedral, an episcopal palace, and a palace belonging to the Malaspina family. It is guarded from the inundations of the Pellice by a long embankment, built by a money-grant from Oliver Cromwell, during whose protectorate the town was nearly destroyed by an inundation. Pop. about 4000.

BO'BIA, or PIRATE ISLE, a singular island in the Bay of Amboise, off the coast of Guinea, Africa. Originally of considerable size, it has been greatly reduced by the action of the waves, and the same agency is still gradually lessening it. It is difficult of access, on account of the precipitous character of its shores, but it is said to be densely peopled.

BO'B-O-LINK, or BO'BLINK, REED BIRD, or RICE BIRD (*Dolichonyx oryzivorus*), a bird nearly allied to buntings and sparrows, but of a genus characterized by stiff-pointed tail-feathers. It is rather larger than a yellow-hammer; and the male in his summer or nuptial plumage exhibits a fine contrast of colors, black, yellow, and white. The female differs greatly from the male in colors of plumage, yellowish-brown chiefly prevailing; and in the latter part of summer, the males assume the comparatively dull hues of the females. The B. is a bird of passage, spending the winter in the West Indies. In summer it is found as far north as the banks of the Saskatchewan, in lat 54°, but is most plentiful in the Atlantic States and other eastern parts of America, where it is to be seen in every meadow and cornfield. It renders good service by the destruction of insects and their larvæ; but the immense flocks which congregate on their return southwards in autumn, commit great ravages in the rice-plantations of Carolina. At this season, these birds become extremely fat, and are killed in great numbers for the table. Their flesh is delicate, and resembles that of the ortolan.

The B. generally makes its nest in a grassy meadow, an artless structure of a few dry stalks and leaves, with a lining of finer grass. It displays the same instinct with many other birds, of seeking to lead intruders away from its nest, by pretending great anxiety about some other part of the field. During the breeding-season, the males are very musical, singing mostly in the air, in which they seem to rise and fall in successive jerks. Their song is very pleasing, and is 'emitted with a volubility bordering on the burlesque.' On account of their beauty and powers of song, many are caught, caged, and sold in the New York and other markets.

BOBRUI'SK, a fortified town of Russia, in the government of Minsk, and 88 miles south-east of the city of that name. It is situated on the right bank of the Beresina, and is a station for the steam-packets navigating the Dnieper and Beresina. It was besieged ineffectually by the French in 1812. Pop. (1880) 26,870.

BO'B-STAY, in the rigging of a ship, is a rope used to confine the bowsprit down to the stem or cut-water; its purpose is to keep the bowsprit steady, by counteracting the force of the stays of the foremast, which draw it upwards.

BO'CA (Span. meaning *Mouth*), a term applied to the entrance of various straits and rivers, chiefly in America.—1. B. *Chica*, the channel of 28 miles in length, which leads to Cartagena in New Granada.—2. B. *de Navios*, the largest and most southerly outlet of the Orinoco.—3. B. *Grande*, a bay of the Caribbean Sea, at the mouth of the Zucar, in Costa Rica.—4. B. *del Toro*, on the Caribbean Sea, in Costa Rica, in lat. 9° 20′ N., and long. 82° W.

BO'CCA TI'GRIS, or BOGUE, the name given to that portion of the estuary of the Canton River (q. v.) extending north from lat. 22° 45′ N.; south of this point, the estuary is designated the 'Outer Waters.' In the center of the B. T. are the rocky islands of North and South Wantung, while on the east the B. T. has the islands of Anunghoy and Chuenpee, and on the west the Ty-cock-tow island. On these islands are situated the Bogue forts, which have been more than once captured by the British. The last time they were taken was in November 1856, the occasion of quarrel being the refusal of the Chinese to make proper reparation for the capture of a vessel under British protection, but alleged, on the other hand, to be nothing but a smuggling craft, contriving to hide its real character by hoisting the British flag.

BOCCA'CCIO, GIOVANNI, the celebrated author of the *Decamerone*, was born in Paris, 1313. He styled himself *Da Certaldo*, and was sometimes named *Il Certaldese* by others, because his family sprang from Certaldo, a village in the Florentine territory. From an early period he displayed an invincible attachment to poetry, which his father attempted in various ways to thwart; but as soon as B. had attained his majority, he commenced to follow vigorously his own inclinations, poetising both in the Italian and Latin tongues, but not with any 'fine issues.' In prose he succeeded far better, developing quickly that airy grace of style which suits so admirably his light and lively tales, and which soon placed him in the highest rank of Italian prose-writers. He studied Dante closely, but did not confine himself to literature properly so called. In 1350, B. formed an intimate friendship with Petrarch, and, following his friend's example, collected many books and copied rare MSS., which he could not afford to buy. It is said that he was the first Italian who ever procured from Greece a copy of the *Iliad* and the *Odyssey*. He also wrote a *Genealogy of the Gods*, in 15 books, which was unquestionably the most comprehensive mythological work that Europe had as yet seen. But not only was B. one of the most learned men of his time, he was also one of the most enlightened in his scholarship. He helped to give a freer direction and a greater expansiveness to knowledge, stimulated his contemporaries to the study of Greek, and wished to substitute the wisdom of antiquity for the unprofitable scholasticism that prevailed.

While in Naples (1341), B. fell passionately in love with a young lady who was generally supposed to be an illegitimate daughter of King Robert. His passion was returned, and to gratify his mistress, B. wrote *Il Filocopo*, a prose-romance, and afterwards *La Teseide*, the first attempt at romantic epic poetry, and written in *ottava rima*, of which B. may be considered the inventor. In 1342, he returned to Florence, but in 1344, went back to Naples, where he wrote his *Amorosa Fiammetta*, *Il Filostrato*, and *L'Amorosa Visione*. Here also he composed his famous *Decamerone*, to please Joanna, the daughter and successor of King Robert. It consists of 100 stories, ten of which are told each day by seven ladies and three gentlemen, who had fled from Florence during the frightful plague of 1348, to a country villa, and who try to banish fear by abandoning every moment to delicious gaiety. It is impossible to exaggerate the literary merits of the book. In abundance of incident especially, it is almost inexhaustible, though many of the stories are taken from older collections of *Contes et Fabliaux*. It is, however, unfortunately steeped in impurity. B. once more returned to Florence about 1350. He was now honored with several diplomatic appointments by his fellow-citizens, and subsequently even thought of entering holy orders as a penance for the immoral life he had previously led. From this artificial course of repentance he was wisely dissuaded by Petrarch, who advised him to be content with changing his conduct. In 1373, B. was appointed Dantean professor at Florence; that is to say, he was to deliver elucidatory lectures on the *Divina Commedia* of the great poet, and zealously devoted himself to the difficult task thus imposed on him; but his health failing, he resigned the office, and retired to his little property at Certaldo, where he died, December 21, 1375, 16 months after his friend Petrarch. Besides those works we have already mentioned, B., wrote *Origine, Vita e Costumi di Dante Alighieri*, and *Commento sopra la Commedia di Dante*. This commentary on the Divine Comedy extends only to the 17th canto of the *Inferno*. In Latin, B. wrote, beside the *Genealogia Deorum*, a work arranged in alphabetical order, *De Montibus, Silvis, Fontibus, Lacubus, Fluminibus*, &c.; *De Casibus Virorum et Fœminarum Illustrium; De Claris Mulieribus*, &c.

BOCCAGE, MARIE ANNE FIQUET DU, a French poetess, was born at Rouen, 22d October 1710, and received her education in the monastery of the Assumption at Paris, where her poetic tendencies early developed themselves, though only furtively. She first appeared as an authoress in a small volume of poems, published in 1746; next as an imitator of Milton in her *Paradis Terrestre* (1748); and in 1756, issued her most important work, *La Colombiade*. The letters which she addressed to her sister, Madame Duperron, while traveling through England, Holland, and Italy, are the most interesting things which have fallen from her pen. During her life, she was excessively admired and bepraised, especially by Voltaire, Fontenelle, and Clairaut. She used to be described as *Formâ Venus, arte Minerva!* The complimentary poems addressed to her would, if collected, fill many volumes. She was elected member of the academies of Rome, Bologna, Padua, Lyon, and Rouen. She died 8th August 1802. Her poems fail now to explain the reputation she once enjoyed, and dispose us to believe that her personal attractions must have given a charm to her verses.

BOCHART, SAMUEL, a learned Protestant divine, was born of an ancient family at Rouen, in 1599. He very early exhibited remarkable talent, chiefly philological. After studying at Paris,

Sedan, and Saumur, visiting England in 1621, and finishing his education at Leyden, he was chosen pastor of the Protestant church at Caen, where he became very popular. In 1629, he gained great reputation by his victory, in a public discussion of several days' duration, over the famous Jesuit, Doctor Verin. The meetings gained additional éclat from the occasional presence of the Viceroy of Normandy, the Duke of Longueville. In 1646, appeared his Sacred Geography, bearing the title of *Phaleg* and *Canaan*. His *Hierozoicon*, or Scripture Zoology, to which he devoted many years of his life, appeared posthumously in 1675. In 1652, B. was invited to Stockholm by Queen Christina, and went thither accompanied by his friend Huet. The court-life, however, did not suit him, and his visit was short. He died suddenly, in 1667, while speaking at a meeting of the Caen Academy of Antiquaries. A complete edition of his works, with a life by Morin, was published at Leyden in 1712; and a new improved edition of the *Hierozoicon*, his most valuable work, at Leipsic, in 3 vols. 4to (1793—1796), by Rosenmüller.

BO'CHNIA, a town of Austrian Galicia, capital of a circle of the same name, and about 25 miles east-south-east of Cracow. The houses are built chiefly of wood. There are extensive mines of rock-salt in its vicinity, which employ upwards of 500 miners, and yield annually about 13,000 tons of salt. Pop. (1880) 8200.

BOCKH, Augustus, the most erudite classical antiquary of Germany in recent times, was born 24th November 1785, at Carlsruhe, and entered the university of Halle in 1803. The prelections of Wolf determined him to the science of philology. His first publication was *Commentatio in Platonis qui vulgo fertur Minoem* (Halle, 1806). In 1808, appeared his *Græcæ Tragœdiæ Principum, Æschyli, Sophoclis, Euripidis, num ea quæ supersunt et genuina omnia sint*. In 1809, he became ordinary professor at the university of Heidelberg; and in 1811, he was translated to the chair of Rhetoric and Ancient Literature, at Berlin, where he taught for upwards of forty years, forming many excellent scholars, and extending his reputation through all the learned circles of Europe. His conception of philology as an organically constructed whole, which aims at nothing short of an intellectual reproduction of antiquity, excited for a long time great opposition among his professional contemporaries, but it undoubtedly gave an impetus to a deeper study of the old classical world. His lectures include not merely a grammatico-historical interpretation of the ancient authors, but also archæology proper, the history of ancient literature, philosophy, politics, religion, and social life. The four great works of B. which have in fact, opened up new paths in the study of antiquity, are, 1st, his edition of Pindar (2 vols., Leip. 1811—1822), in which the metre and rhythm of the poet, as well as his artistic skill, are investigated and discussed with profound knowledge of the subject. 2d, *The Political Economy of Athens* (2 vols., Berlin, 1817, a work which remains unsurpassed for subtle research, surprising results, and clear exposition. It treats of the prices of goods, rate of workmen's wages, rent of houses and land, and other points of commercial economy, as well as of the larger questions of the state income and expenditure. It has been translated into English by Sir George Cornewall Lewis, under the title of *The Public Economy of Athens* (Lond. 2d edit. revised, 1842). 3d, *Investigations concerning the Weights, Coins, and Measures of Antiquity* (Berl. 1838). 4th, *Records of the Maritime Affairs of Attica* (Berl. 1840). The most important of his lesser works are the *Development of the Doctrines of Philolaus, the Pythagorean*, his edition of the *Antigone* of Sophocles, and a *Dissertation on the Silver Mines of Laurion in Attica*. B. has also the honor of having commenced, in 1824, the great work entitled *Corpus Inscriptionum Græcarum*, published at the expense of the Royal Academy of Berlin, which was afterwards continued first by Franz, and then by Kirchhoff. In 1852, appeared his *Researches on the Cosmical System of Plato;* in 1855, *The Lunar Cycles of the Greeks;* and, in 1863, *On the Four-year Solar Cycles of the Ancients*. He died in 1867.

BOC'KLAND, BOCLAND, or BOOKLAND, one of the original modes of tenure of manor-land, also called charter-land or deed-land, which was held by a short and simple deed under certain rents and free services. It was land that had been severed by an act of government from the *Folcland* (q. v.), and converted into an estate of perpetual inheritance. It might belong to the church, to the king, or to a subject; it might be alienable and divisible at the will of the proprietor; it might be limited in its descent, without any power of alienation in the possessor. It was often granted for a single life or for more lives than one, with remainder in perpetuity to the church. It was forfeited for various delinquencies to the state.

The estate of the higher nobility consisted chiefly of bockland. Bishops and abbots might have B. of their own, in addition to what they held in right of the church. The Anglo-Saxon kings had private estates of B., and these estates did not merge in the crown, but were devisable by will, gift, or sale, and transmissible by inheritance, in the same manner as B. by a subject. (Kerr's *Blackstone*, vol. ii., p. 88; *An Inquiry into the Rise and Growth of the Royal Prerogative in England*, by John Allen, pp. 143—151; Wharton's *Law Dictionary*, 2d ed., under *Bockland*.)

BODE, The Barons de, a family of doubtful nationality, best known in England in connection with a claim of indemnity frequently brought before parliament. The first member of the family connected with England was Charles A. L. F. de B., a baron of the Holy Roman Empire. He was born at Neuhof, in Germany, in 1741, and became an officer in the regiment of Nassau, which, although in the service of France, consisted exclusively of Germans. The baron had landed property in Germany, and remained German when he married a Miss Kennersley, an Englishwoman. Two years afterwards, a son was born of the marriage at Locksley in Staffordshire, named Clement J. P. P. de B. who returned when a child with his parents to the continent. In 1787, Baron Charles purchased an estate in Lower Alsace, held under German feudal tenures, in terms of the treaty of Münster, and thither he went to reside. The Revolution, however, broke out, and in 1791 the baron considered it prudent publicly to surrender his estates to his son. Two years later, the family was obliged to emigrate, and the property was confiscated. After leaving France, Baron Charles bought a fief held of the Archbishop of Cologne, and he died in Germany in 1797. Clement, his son, became an officer in the Russian artillery, married a Russian, and with his regiment, entered Paris in 1814. After the peace, conventions were entered into, under which British residents who had suffered during the Revolution by confiscation were to be indemnified. A large sum was handed over by France to England, to be divided among the claimants, one of whom was Baron Clement. The fact that he had been invested as proprietor of the estate in Alsace at the time of confiscation, that his mother was English, and that he had been born in England, secured at first a recognition of his claim to the extent of making it an item of the calculation for fixing the amount of the indemnity; but it was afterwards repudiated, on the ground, that Baron Clement was not an English subject at the time of confiscation, and that he had sustained no loss through his connection with England. He died in 1846. His son, Baron Clement A. G. P. L., took out letters of administration to his father, and prosecuted the claim of his family; without, however, any success. He petitioned the House of Commons in 1852, and his case was fully discussed. See J. Hodgkin's *Case of the Baron de B. in its Present Aspect* (1860). Baron Clement is naturalized as a British subject, and has married an Englishwoman. He has acquired reputation as an Eastern traveler, and is the translator of *Bokhara, its Emir and People*, from the Russian of Khanikoff (1845), and the author of *Travels of Lauristan and Arabistan* (1845), and of an interesting *Account of Hilly Daghestan and the Lesghi Tribes of the Eastern Caucasus*, referred to with approbation by Earl de Grey in his address to the Geographical Society in 1860.

BO'DEN-SEE. See Constance, Lake of.

BODE'S LAW, an arithmetical relation subsisting between the distances of the planets from the sun. It may be thus stated: Write, in the first instance, a row of fours, and, under these place a geometrical series beginning with 3, and increasing by the ratio 2, putting the 3 under the second 4; and by addition we have the series 4, 7, 10, &c., which gives nearly the relative distances of the planets from the sun.

4	4	4	4	4	4	4	4	4
	3	6	12	24	48	96	192	384
4	7	10	16	28	52	100	196	388

Thus, if 10 be taken as the distance of the earth from the sun, 4 will give that of Mercury, 7 that of Venus, and so forth. The actual distances are as follow, making 10 the distance of the earth—

Mercury.	Venus.	Earth.	Mars.	Asteroids.	Jupiter.	Saturn.	Uranus.	Neptune.
3·9	7·2	10	15·2	27·4	52	95·4	192	300

Close as is the correspondence between the law and the actual distances, no physical reason has been given to account for it, although there is little room for doubt that such exists. B. L., therefore, in the present state of science, is termed empirical. Kepler was the first to perceive the law, and Bode argued from it that a planet might be found between Mars and Jupiter, to fill up the gap that existed at the time in the series. The discovery of the Asteroids has proved the correctness of this prediction. The greatest deviation from the law is seen in the case of Neptune; but if we were acquainted with the principles from which the law proceeds, we might also be able to account for the discrepancy. Similar relations, though expressed in different numbers, are found to subsist in the distances of the satellites of Jupiter and Saturn from their primaries.

BO'DKIN, an instrument used by women of antiquity to fasten up their hair behind. It was the method commonly adopted by the priests of Cybele, as well as by the female characters in Greek tragedy, the B. being highly ornamented. Silver bodkins are still worn in a similar way by the peasant girls of Naples. The term

B. is also applied to a sharp-pointed instrument for piercing holes in cloth, and it was at one time a very common name for a dagger.

BO'DLE, an ancient copper coin in Scotland, in value the sixth of a penny sterling. According to Jamieson, the B. is said to have been so called from a mint-master of the name of *Bothwell*.

BODLEY, Sir Thomas, the restorer of the library originally established at Oxford by Humphrey, Duke of Gloucester, was born at Exeter, March 2, 1544. His family being forced to flee from England, during the persecutions of Mary, settled at Geneva, where B. studied languages and divinity under the most distinguished professors of that city. On the accession of Elizabeth, he returned to England, and completed his studies at Oxford, where he took the degree of M.A., and was afterwards elected a proctor. After traveling some time abroad, he was employed by the queen in diplomatic missions to Denmark, France, and Holland, and returned to his favorite city, Oxford, in 1597, where he devoted himself to literature, especially to the extension of the university library, now called the Bodleyan (q. v.), in B.'s honor. In collecting rare and valuable books from many parts of Europe, B. expended a very large sum, and also left an estate for salaries to officers, repair of the library, and purchase of books. He was knighted by King James, and died at Oxford, January 28, 1612. B.'s autobiography, extending to the year 1609, together with a collection of his letters, has been published under the title *Reliquiæ Bodleianæ* (Lond. 1703).

BODLEY'AN or BODLEI'AN LIBRARY, the public library of Oxford university, restored by Sir Thomas Bodley (q. v.) in 1597, his first act being the presentation of a large collection of valuable books, purchased on the continent at an expense of £10,000. Through his influence and noble example, the library was speedily enriched by numerous other important contributions. Among the earliest subsequent benefactors of the B. L., which was opened in 1602, with a well-assorted collection of abont 3000 volumes, were the Earl of Pembroke, who presented it with 250 volumes of valuable Greek MSS.; Sir Thomas Roe; Sir Kenelm Digby; and Archbishop Laud, who made it a magnificent donation of 1300 MSS. in more than twenty different languages. Upwards of 8000 volumes of the library of the famous John Selden (q. v.) went to the Bodleyan Library. General Fairfax presented the library with many MSS., among which was Roger Dodsworth's collection of 160 volumes on English history. During the present century, the most important bequests have been the collections of Richard Gough, on British Topography and Saxon and Northern Literature; of Edmund Malone, the editor of Shakspeare; and of Francis Douce; also a sum of £40,000, by the Rev. Robert Mason, the interest to be expended on books. By purchase, the library acquired some magnificent collections of Oriental, Greek, Latin, and Hebrew books and MSS. The B. L. is particularly rich in biblical codices, rabbinical literature, and materials for British history.

By the Copyright Act, it is entitled to a copy of every book printed in the United Kingdom. The number of volumes it possesses is estimated at about 300,000, in addition to 20,000 to 30,000 in manuscript. The first catalogue of the printed books was published by the first librarian, Dr. James, in 1600; the last, nearly two centuries and a half later (in 1843), in 3 vols., by Dr. Bandinel, the eleventh who held the office since the institution of the library. In the interval, several catalogues of various departments of the library were published; and a supplemental volume was added by Dr. Bandinel in 1850. By statutes drawn up for the government of the library by Sir Thomas Bodley, it was decreed that the vice-chancellor, the proctors, and the regius professors of divinity, law, medicine, Hebrew, and Greek, should be visitors and curators; a statute passed in 1856 added 'five more residents to be elected by congregation for ten years, if continuing to reside, and to be re-eligible.' Members of the university who have taken a degree are admitted to the use of the library—a small addition on the matriculation fees, and an annual payment, being charged for the privilege. Literary men, properly recommended, are allowed to make extracts from the works in the library, which is open between Lady-Day and Michaelmas from nine o'clock in the morning till four in the afternoon, and during the other half of the year from ten to three. It is shut during certain holidays, and for visitation purposes, in the aggregate about 34 days in the year, besides Sundays. Since 1856, a reading-room, open throughout the year from ten o'clock in the morning to ten in the evening, has been attached to the library.

BO'DMANN (ancient *Bodami Castrum*), a village of Baden, at the mouth of the Stockach, on Lake Constance, with ruins of a castle, formerly the residence of the lieutenants (*Botemann or Bodmanno*, messenger or *legatus*) of the Carlovingian kings; hence the German name of the lake, Bodman-see, or Boden-see. Pop. 900.

BODMER, Joh. Jak., a German poet and *littérateur*, was born at Greifensee, near Zurich, 19th July 1698. The study of the Greek and Latin writers, together with the English, French, and Italian masters, having convinced him of the poverty and tastelessness of existing German literature, he resolved to attempt a reformation. Accordingly, in 1721, along with a few other young scholars, he commenced a critical periodical, entitled *Discurse der Maler*, in which the living poets were sharply handled. After 1740, when B. published a treatise on *The Wonderful in Poetry*, a literary war broke out between him and Gottsched, which was long waged with great bitterness; yet it was not without fruits, inasmuch as it partly prepared the way for the Augustan epoch of German literature. B. died at Zurich (in the university of which he had held the chair of history for 50 years), 24 January 1783. As an author, he was marked by inexhaustible activity, but his poems, dramas, and translations have no vigor or originality. His best known production is the *Noachide* (Zurich, 1752). He did greater service to literature by republishing the old German poets, the Minnesingers, and a part of the *Nibelungen*, as also by his numerous critical writings.

BO'DMIN, the county town of Cornwall, in the middle of the county, 26 miles north-north-west of Plymouth. It is situated partly in a valley and partly on the side of a hill, and consists principally of one street a mile long. Its chief trade is in cattle and sheep. Among the more important recent buildings are a market house, the county jail, and the new Cornwall Lunatic Asylum. B. arose in a priory founded in the 10th c., and was long an important place, having, besides the priory, a cathedral and 13 churches. The priory was once the property of Thomas Sternhold, one of the translators of the Psalms of David into English metre. 1500 persons in B. are said to have died of the pestilence in 1351. Pop. (1881) 6866. It returns one member to parliament.

BODO'NI, Giambattista, a distinguished type-cutter and printer, born at Saluzzo, in Sardinia, 1740; went to Rome in 1758, where he secured an engagement as compositor in the printing-office of the Propaganda, and where he remained till the death of his patron, Abbate Ruggieri, in 1762, or, according to others, 1766. In 1768, he went to Parma, where he published several specimens of his workmanship; among others—on occasion of the marriage of the Prince of Piedmont with the Princess Clotilde of France—the *Epithalamia Exoticis Linguibus Reddita*, which exhibited the alphabets of twenty-five languages. In 1789 the Duke of Parma made him superintendent of his private printing establishment, and from this press he sent forth his edition of the *Iliad* (3 vols. 1808), dedicated to Napoleon. It is a splendid specimen of typography; but the correctness of the text is by no means equal to the beauty of the printing. His editions of Virgil (2 vols. 1793), and several Greek, Latin, Italian, and French classics, as also his Lord's Prayer in 155 languages, are admired for their elegance. He died at Parma, 1813.

BODY, Human, will be treated of under the names of the several organs and functions. For Body-snatching, see Anatomy (in Law).

BODY COLOR, a term which, in oil-painting, is applied to the opaque coloring produced by certain modes of combining and mixing the pigments. When, in water-color painting, pigments are laid on thickly, and mixed with white, to render them opaque, instead of in tints and washes, the works are said to be executed in body color.

BODY OF A CHURCH, more commonly called the *Nave* (q. v.), though this latter term is sometimes employed to include the Aisles (q. v.), is also known as the main or middle aisle.

BOECE, or, more properly, BOYCE, Hector, a distinguished Scottish historian, was born of an old family, about 1465, at Dundee. He completed his education at Montagne College, in the university of Paris, and in 1497, was appointed a professor of philosophy. Among other learned men whose friendship he here acquired was Erasmus. About the beginning of the 16th c., he was invited by Bishop Elphinstone to preside over the university newly founded by him at Aberdeen. B. accepted the office after some natural hesitation, the yearly salary being 40 merks, or about £2, 4*s*. 6*d*. sterling. The value of money, however, it has to be remembered, was immensely greater then than now, and the learned principal was at the same time made a cannon of the cathedral and chaplain of St. Ninian. There is every reason to suppose that he discharged his duties with high success. In 1522, he published his lives, in Latin, of the Bishops of Mortlach and Aberdeen. This work, a great part of which is occupied with the life of his excellent patron, Bishop Elphinstone, was reprinted by the Bannatyne Club in 1825. Five years later, B. published the *History of Scotland*, on which his fame chiefly rests, a work which, though proved to contain a large amount of fiction, is worthy of the commendation it has received even on the score of style. The author was rewarded by the king with a pension of £50 Scots, until he should be promoted to a benefice of 100 merks, which appears to have occurred in 1534. B. died two years later.

BŒHME'RIA, a genus of plants of the natural order *Urticeæ*, included, until recently, in the genus *Urtica* or Nettle (q. v.). The fibres of a number of species are used for making ropes, twine, nets, sewing-thread, and cloth; and some of them appear likely to acquire much economical and commercial importance. *B. nivea* (formerly, *Urtica nivea*) has been recently ascertained to yield great part of the fibre employed in China in the manufacture of the beautiful fabric known as *China-grass* (q. v.) cloth.

It is a perennial herbaceous plant, with broad ovate leaves, which are white and downy beneath, and is destitute of the stinging powers of the nettles. It is carefully cultivated by the Chinese, by whom it is called *Tchou Ma*. It is propagated either by seeds or by parting the roots. It loves shade and moisture. Three crops are obtained in the season, new shoots springing up after it has been cut. Great attention is bestowed upon the preparation of the fibre; the stems are sometimes tied in little sheaves, and instead of being steeped, are placed on the roof of a house, to be moistened by the dew, and dried by the sun, but are carefully preserved from rain, which would blacken them; and in rainy weather they are placed under cover in a current of air. Another plan is to steep the separated fibres for a night in a pan of water, and sometimes they are steeped in water containing the ashes of mulberry-wood. A patent was obtained in Britain, in 1849, for the preparation of this fibre, by boiling the stems in an alkaline solution, after previously steeping them for 24 hours in water of the temperature of 90° F., then thoroughly washing with pure water, and drying in a current of high-pressure steam. —It seems now to be ascertained that this is the same plant which Dr. Roxbourgh strongly recommended to attention about the beginning of the 19th c., under the name of *Utrica tenacissima*, and of which the Court of Directors of the East India Company, in 1816, declared the fibre to be 'stronger than Russian hemp of the best description,' and to have been 'brought to a thread, preferable to the best material in Europe for Brussels lace.' It may well be regarded as curious that, after this, it was lost sight of for a considerable time, although the commendation bestowed upon it is found not to have been exaggerated. The plant grows naturally, and is cultivated not only in China, but in Sumatra, Siam, Burmah, Assam, and other parts of the East. The fibre is called *Caloee* in Sumatra, *Ramee* by the Malays, and *Rheea* in Assam.— *B. candicans* and *B. utilis*, from which a fine silky fibre is obtained in Java, are either varieties of this or nearly allied species.—*B. frutescens* is another important species, common in Nepaul, Sikkim, and other parts of the Himalaya, to an elevation of 3000 feet above the sea. It is not cultivated, but often overruns abandoned fields, It grows to a height of 6 or 8 feet, and varies from the thickness of a quill to that of the thumb. The leaves are serratad, dark-green above, silvery-white below, not stinging. The plant is cut down for use when the seed is formed, the bark is then peeled off, dried in the sun for a few days, boiled with wood ashes for four or five hours, and beaten with a mallet to separate the fibres, which are called *Pooah* or *Poee*, and also *Kienki* or *Yenki*. When properly prepared, the fibre is quite equal to the best European flax.—The fibres of a number of coarser species are employed in different parts of the East Indies for making ropes.

The China grass-plant, *B. nivea*, has recently been introduced into cultivation in some of the southern parts of the United States, under its Malay name of *Ramee*. It succeeds well, and the results as to produce of fibre have proved very encouraging.

BŒO'TIA, one of the ancient political divisions of Greece, was bounded on the N. and N.W. by Locris and Phocis, on the E. by the Eubœan Channel, on the S. by Attica and Megaris, and on the W. by the Corinthian Gulf. B. had a surface estimated at 1120 square miles. The plains enclosed on the south by Mounts Cithæron and Parnes, on the west by Mount Helicon, on the north by the slopes of Mount Parnassus and the Opuntian Mountains, fall naturally into three divisions—the basin of the lake Copais, now called Topolias, that of the Asopus, and the coast-district on the Crissæan Sea. The principal stream was anciently called the Cephissus. It entered the country from Phocis at Chæronea; and in the spring, when it was swollen by innumerable torrents, almost converted the Copaic plain into a lake. There were several natural channels for the outlet of the waters that congregated in this plain, but they were not sufficient to carry off the whole surplus, and the surrounding country was in consequence frequently deluged. In order to guard against this inundation, two tunnels had been cut in the rock for the discharge of the water. One of these tunnels, which carried the water to Upper Larymna—where it emerged in a natural outlet after a subterraneous course of nearly four miles, whence it flowed above ground a mile and a half to the sea—was no less than four miles in length, with about twenty vertical shafts let down into it, some of which were from 100 to 150 feet deep. The other tunnel, which united the Copais Lake with that of Hylica, was much shorter, but still an extensive and striking work. The date of these gigantic engineering undertakings is not precisely known, but they are generally attributed to the Minyæ of Orchomenus. B. was in ancient times very productive of marble, potters' earth, and iron, besides abounding in corn and fruits; and it was also particularly celebrated for flute-reeds. The earliest inhabitants belonged to different races, the two most powerful of which were the Minyæ and Cadmeans or Cadmeones; but were at an early date (about 60 years after the Trojan war, according to Thucydides) in part dislodged by the Bœotians, an Æolian people who were driven from Thessaly, and in part incorporated with them. The Bœotians excelled as cultivators of the soil, and were gallant soldiers both on foot and horseback; but they were rude, unsociable, and took little part in the gradual refinement of manners and intellectual development of the rest of Greece, so that the name became proverbial for illiterate dulness. This was usually ascribed to their thick damp atmosphere. Yet there have not been wanting amongst them eminent generals, as Epaminondas; and poets and historians, as Hesiod, Pindar, Corinna, Plutarch, &c. The greater cities, of which the number was about fourteen, Thebes, Haliartus, Thespiæ, &c., with their territories, formed the Bœotian League. At the head of this was an archon, and next to him a council, which was composed of four persons, and had its head-quarters in Thebes. The executive authority was intrusted to Bœotarchs, who were elected in popular assemblies of the separate states, and could only hold office for one year. Of this League, a shadow still remained down to the times of the empire; but after the battle of Chæronea, in which Philip established the Macedonian throne on the ruins of Grecian liberty, the political importance of the country declined so rapidly, that about 30 B.C. only two cities, Tanagra and Thespiæ, were of any consideration.—Along with Attica, B. now forms one of the 'nomarchies' of the kingdom of Greece.

BOERHAAVE, HERMANN, the most celebrated physician of the 18th c., was born at Voorhout, near Leyden, December 13, 1668. In 1682, he went to Leyden with the intention of becoming a clergyman, and there studied Greek, Latin, Hebrew, Chaldee, history, ecclesiastical and secular, and mathematics. In 1689, B. was made doctor of philosophy, and in 1690 began the study of medicine, reading carefully Hippocrates among the ancients, and Sydenham among the moderns. Though mainly self-educated in medicine—as in chemistry and botany—he gained his doctor's degree at Harderwyck, 1693, and returned to Leyden, where, in 1701, having abandoned theology, he was appointed lecturer on the theory of medicine, and in his inaugural lecture recommended to the students the ancient method of Hippocrates in medicine; but in 1703 his views had become greatly enlarged. He saw the necessity of *a-priori* speculations, as well as of the Hippocratic method of simple observation, and elaborated various mechanical and chemical hypotheses to explain the diseases of the body, especially in the case of the fluids. In 1709, he was elected professor of medicine and botany in the place of Hotton. About this time, he published the two works on which his great fame chiefly rests: *Institutiones Medicæ in Usus Annuæ Exercitationis Domesticos* (Leyd. 1708), and *Aphorismi de Cognoscendis et Curandis Morbis, in Usum Doctrinæ Medicinæ* (Leyd. 1709), both of which went through numerous editions and were translated into various European languages, and also into Arabic. In the first work—a model of comprehensive and methodical learning—he gives a complete outline of his system, including a history of the art of medicine, an account of the preliminary knowledge necessary to a physician, and a description of the parts and functions of the body, the signs of health and disease, &c.; in the second, he gives a classification of diseases, with their causes, modes of treatment, &c. B. also rendered important services to botany. One of his best lectures is that delivered on his resignation of the office of rector of the university, *De Comparando Certo in Physicis*. To combine practice with theory, he caused a hospital to be opened, where he gave clinical instructions to his pupils. Though so industrious in his own profession, he undertook, in 1718, after Lemort's death, the professorship of chemistry, and published in 1724 his *Elementa Chemiæ*, a work which did much to render this science clear and intelligible; and although now entirely superseded by advanced researches, one that will always occupy a high place in the history of chemistry. His fame had meanwhile rapidly increased. Patients from all parts of Europe came to consult him. Peter the Great of Russia visited him; and it is even said that a Chinese mandarin sent him a letter, addressed 'HERR BOERHAAVE, celebrated physician, Europe.' He was a member of most of the learned academies of the day. He died September 23, 1738, having realized from his profession a fortune of two millions of florins.—Burton, *Account of the Life and Writings of B.* (2 vols., Lond. 1743); *Johnson, Life of B.* (Lond. 1834).

BOERHAA'VIA. See NYCTAGINACEÆ.

BOERS (*Dutch*, agriculturists, farmers), the name applied to the Dutch colonists of the Cape of Good Hope who are engaged in agriculture and the care of cattle. The B., generally, according to Dr. Livingstone, 'are a sober, industrious, and most hospitable body of peasantry.' Very different, however, are certain of their numbers who have fled from English law, on various pretexts,

and formed themselves into a republic in the Cashan Mountains. Coming 'with the prestige of white men and deliverers,' from the cruelty of Kaffir chiefs, they were received by the Betjuans gladly, who, however, soon found out that their new friends were much less desirable as neighbors than their old enemies. The B. force even those tribes of the Betjuans who are most friendly towards them to perform all kinds of field-labor for nothing; and not only this, but they also compel them to find their own implements of labor and their own food. They steal domestic servants from the more hostile tribes in the most cowardly and cold-blooded way imaginable. The plan of operation is thus described by Dr. Livingstone: 'One or two friendly tribes are forced to accompany a party of mounted Boers, and these expeditions can be got up only in the winter, when horses may be used without danger of being lost by disease. When they reach the tribe to be attacked, the friendly natives are ranged in front, to form, as they say "a shield;" the Boers then coolly fire over their heads, till the devoted people flee, and leave cattle, wives, and children to the captors. This was done in nine cases during my residence in the interior, and on no occasion was a drop of Boer's blood shed.' They have an immense contempt for the ignorance of the natives, and told Dr. Livingstone that he might as well teach baboons as Africans. See ORANGE RIVER FREE STATE. The B. of the Transvaal (q. v.) were hostile to the British annexation in 1877, and after a short campaign they secured in 1881 the restoration of independent government under certain conditions, British suzerainty being recognized.

BOE'THIUS, ANICIUS MANLIUS SEVERINUS (to which a few MSS. add *Torquatus*), a Roman statesman and philosopher, was born between 470 and 475 A.D. The family to which he belonged had been distinguished both for its wealth and dignity for two centuries. His own father held the office of consul, but dying while B. was still a boy, the latter was brought up under the care of Festus, Symmachus, and other honorable Romans. He studied with sincere enthusiasm philosophy, mathematics, and poetry, translated and elucidated with laborious care the writings of Aristotle, and of the old mathematicians Euclid, Archimedes, Ptolemæus, and others; but the story of his eighteen years' stay at Athens is entirely unhistorical. B. soon attracted notice; he became a patrician before the usual age, a consul in 510, and also *princeps senatus*. Having, moreover, gained the esteem and confidence of Theodoric, king of the Goths, who had fixed the seat of his government at Rome in the year 500, he was appointed by that monarch *magister officiorum* in his court. His influence was invariably exercised for the good of Italy, and his countrymen owed it to him that the Gothic rule was so little oppressive. His good-fortune culminated in the prosperity of his two sons, who were made consuls in 522. But his bold uprightness of conduct, springing from what seems to have been the essential characteristics of the man—viz., a strong faith in the truth of his philosophic ethics, and a courage to regulate his official conduct by them—at last brought down upon his head the unscrupulous vengeance of those whom he had checked in their oppressions, and provoked by his virtues. He was accused of treasonable designs against Theodoric; and the king, having become despondent and mistrustful in his old age, was induced to listen to the charges. B. was stripped of his dignities, his property was confiscated, and he himself, after having been imprisoned for some time at Pavia, was executed in 524 or 526; according to one account, with circumstances of horrible cruelty. During his imprisonment, B. wrote his famous *De Consolatione Philosophiæ*, divided into five books, and composed in the form of dialogue, in which B. himself holds a conversation with Philosphy, who shows him the mutability of all earthly fortune, and the insecurity of everything save virtue. The work is composed in a style which happily imitates the best models of the Augustan age, and the frequent fragments of poetry which are interspersed throughout the dialogue are distinguished by their truthfulness of feeling and metrical accuracy. The *Consolatio* is piously *theistic* in its language, but affords no indication that he was a Christian; and if the doctrinal treatises ascribed to him are, as the acutest criticism maintains, not genuine, we must class him in religion rather with Marcus Aurelius than with his alleged friend, St. Benedict. He was the last Roman writer of any mark who understood the Greek language and literature. During the middle ages, he was regarded with profound reverence, as the *Augustine* of philosophy, but on the introduction of the Aristotelian metaphysics in the 13th c., his reputation gradually sank. The first edition of B.'s entire works appeared at Venice, 1491—1492; a more correct one at Basel, 1570. The oldest edition of the *Consolatio* is that published at Nürnberg, 1473, but many manuscript translations into various languages had appeared long before the invention of printing. Among these may be mentioned that by King Alfred into Anglo-Saxon.

BOG, land covered with peat, the spongy texture of which containing water, converts it into a kind of quagmire. The term PEAT-BOG is sometimes employed as more perfectly distinctive of the true bog from every other kind of swamp or morass; the term PEAT-MOSS is also sometimes employed, particularly in Scotland, and even simply MOSS. The word Bog is of Irish origin, being from a Gael. root, signifying a bobbing, quaking motion.

Bogs of great extent exist in some of the northern parts of the world. A very considerable part of the surface of Ireland is occupied with them. The Bog of Allen (see ALLEN, BOG OF) is the most extensive in the British Islands, although its continuity is not altogether unbroken, strips of arable land intersecting it here and there. The Solway Moss (q. v.), on the western borders of England and Scotland, is about seven miles in circumference. Chatmoss (q. v.), in Lancashire, famous for the engineering difficulties which it presented to the formation of the first great English railway, is twelve square miles in extent. The swamps of the east of England are in general not peat-bogs, but consist chiefly of soft mud or silt.

The general surface of a bog is always nearly level, but it is usually varied with rushy tussocks rising above the rest, and having a rather firmer soil. By the continued growth of peat, the surface of a bog is gradually elevated; that of Chatmoss, for example, rises above the level of the surrounding country, having a gradual slope of thirty or forty feet from the center to the solid land on all sides. In rainy weather, it sensibly swells, the spongy mass imbibing water, whilst the mosses and other growing plants on the surface prevent evaporation. Occasionally, the quantity of water becoming excessive, a bog *bursts*, and pours a terrible deluge down the course of a stream, causing great devastation, not only by the force of its torrent, but by the enormous quantities of peat which it deposits upon meadows and cultivated fields, as has recently happened in some memorable instances in Ireland. The depth of a bog is sometimes more than forty feet. The spongy mass of which it is formed shakes on the least pressure. Sometimes it is impossible to traverse it; in other cases, it is possible only for those who are well accustomed to it, a false step being a plunge into a quagmire, in which a man sinks as in a quicksand. Safety is sometimes insured by 'pattens'—boards fastened upon the soles of the feet—a method which Mr. Roscoe of Liverpool, in his extensive operations for reclaiming land from Chatmoss, employed also to enable horses to work upon its surface. It was not the least remarkable triumph of the genius of Stephenson, to extend the same principle to the support of the railway. Tradition reports that at the battle of Solway, in 1542, a fugitive troop of horse plunged into the moss, which instantly closed upon them; and in the end of the 18th c., this tradition was confirmed by the discovery, made in peat-digging, of a man and horse in complete armor.

One of the remarkable phenomena of peat-bogs is the frequent presence of roots and fallen trunks of trees, in a good state of preservation, many feet below the surface. From the black bog-oak of Ireland, various small fancy articles are manufactured. The circumstance of trees being found imbedded in bogs, leads to the conclusion that in many instances these morasses originated in the decay or partial destruction of ancient forests. This subject, however, along with all that relates to the origin and nature of bogs, will be treated in the article PEAT. It may be proper here to mention that there is a popular division of bogs into two classes—*Red Bogs* and *Black Bogs;* the decomposition of the vegetable matter in the former being less perfect, and the substance, consequently, more fibrous and light than in the latter. There is indeed no precise line of distinction, and all intermediate conditions occur. The most extensive bogs are red bogs, and they are said to cover 1,500,000 acres in Ireland. Black bogs, although comparatively of small extent, are more numerous, particularly in elevated districts, for which reason they are sometimes called *mountain bogs*. The depth of red bogs is usually much greater than that of black bogs.

The conversion of bogs into good pasture or arable land, is a subject of national importance. There can be no doubt that much of the land now occupied by bog is capable of being rendered very productive, whilst the effects of extensive bogs upon the climate are always injurious. The reclaiming of shallow mountain bogs is comparatively easy, and in some cases it is effected by a very simple and inexpensive drainage, and by throwing them at once under cultivation in a manner analogous to that known in Ireland as the *lazy-bed* method of planting potatoes—the soil upon which the bog rests being partially digged up and thrown over its surface. Great difficulties, however, attend the reclaiming of red bogs. It has unfortunately happened, particularly in Ireland, that the tenures of land, and the want of capital on the part of the owners of estates, have formed the most insuperable of all obstacles to improvements of this kind, which, however, have been carried on to no inconsiderable extent since the middle of the 18th c., and have in general proved highly remunerative. A chief difficulty, in some cases, is caused by the low situation of the bog, and the want of *fall* for drainage. Another great difficulty is presented by the spongy substance of red bogs being extremely retentive of water, so that a deep ditch only drains a very narrow

strip on each side of it. A difficulty has been also found in disposing of the peat, where a good soil being known to exist below, it has been attempted to reclaim land by removing the peat instead of draining it and converting its own surface into soil. To some extent, in such cases, the peat is advantageously disposed of for fuel, or to be used as a species of manure for other soils; but the demand for these purposes is often insufficient for any other than a very slow processs of improvement in an extensive bog.

The peat is therefore, sometimes, by various means, floated off, as in the long-continued operations at Blair-Drummond, on the banks of the Forth, the results of which have for many years formed a peculiar feature on the shores and in the bays of the upper part of the Firth of Forth. But when a similar method was more recently introduced in an extensive moss in the low lands of Renfrewshire, the Clyde trustees interposed to prevent it, in the interests of the navigation of the river. A portion of the peat, taken from the upper surface, is not unfrequently burned in heaps upon the spot, the ashes becoming a manure, and assisting in the formation of a soil.

Of course, the first essential in the reclaiming of bogs is drainage. The method of affecting this must be varied according to circumstances; but very frequently, after a general outlet with sufficient fall has been secured, wide open drains are cut, by which the bog is divided into strips, which again are traversed and subdivided by smaller drains. When these drains begin to serve their purpose, the surface of the bog sinks, and their depth is reduced; they are then often deepened, and at last a permanent system of covered drains emptying themselves into open ditches is thus formed, and fits the land for all the purposes of agriculture. It is, however, often ploughed before this state of things is attained, the plough-horses being shod with the *pattens* already mentioned, and socks and coulters of unusual sharpness being employed for the cutting of the bog. Various implements have also been devised for cutting the moss, to facilitate cultivation. Lime, calcareous sand, clay, and other manures are applied, according to circumstances, to promote the conversion of the peat into useful soil. Sometimes the first crop taken from the ploughed bog is a crop of oats; sometimes is is found preferable to begin with rape, turnip, or the like. In some places in the North of Ireland, florin grass (see BENT GRASS) has been sown on bogs in process of being reclaimed, and enormous crops have been obtained.—See WASTE LANDS.

BO'GAN, or NEW-YEAR RIVER, the *Allan Water* of Oxley, an interior stream of East Australia, joins the Darling, after a general north-west course of more than 300 miles, about lat. 30° S., and long. 146° E. Its source is in the Harvey Range, about lat. 33° S., and long. 148° 30′ E.

BOG BUTTER, a very peculiar mineral substance, which is found in some of the bogs of Ireland. It is evidently of vegetable origin, and has been formed by the decomposition of the peat amidst which it is found. In composition and qualities it exhibits a general agreement with bitumen, asphalt, amber, and the other mineral resins; all of which are not improbably supposed to resemble it also in their origin, although perhaps it is the most recent of them all. It contains about 74 per cent. of carbon; its remaining constituents being oxygen and hydrogen in nearly equal proportions. Incolor and consistency, it much resembles butter, and at 124° F. it becomes liquid. It is not soluble in water, but is readily dissolved by alcohol.

BOGDANOVITCH, HIPPOLYTUS THEODOROVITCH, a distinguished Russian poet of the 18th c., was born at Perevolotchna, Little Russia, in December 1743. His fame rests entirely upon his poem *Dushenka*, published in 1775. The story of Psyche forms the groundwork of the poem, which is characterized by a refined and graceful style, and vivacious playfulness of language. Its publication made him at once famous, as well as obtained for him the high favor of the court; but there can be no doubt that the popularity of the work was as much owing to the adventitious circumstances in which it was produced—nothing of the kind having been previously attempted in Russia—as to its intrinsic merits. B., though he wrote much afterwards, never equalled his first performance. He died in January 1803.

BO'GEN, a town of Bavaria, in the circle of Lower Bavaria, situated on the left bank of the Danube, about six miles east of Straubing. It has extensive breweries, but is chiefly celebrated for its chapel, still a place of pilgrimage, built on a neighboring height. Here, according to tradition, a hollow stone image of the Virgin floated up by the river, remained stationary, and its miraculous arrival had the effect of converting a notorious robber-chief, the ruins of whose castle now enclose the church. Innumerable pilgrims flocked to the image, including, at various times three German emperors, and the monks grew very wealthy on their offerings. Pop. 1200.

BOGERMANN, JOHANN, who occupies a place in history as president of the far-famed synod of Dort, was born in 1576, at the village of Oplewert, in Friesland. He took a violent part in the religious controversies which inflamed, with unwonted fire, the Dutch mind at the beginning of the 17th century. His hatred of Arminianism extended itself (as theological hatred generally does) to the persons who upheld it, and his zeal was on various occasions gratified by securing the punishment of those who had the misfortune to differ in opinion from him. He translated and recommended Beza's book on the *Capital Punishment of Heretics;* and about the year 1614, ventured to assail the great Grotius in a polemical treatise, which, along with most of the angry literature of the period, has properly perished. In 1618, B. was elected president of the synod of Dort; but his conduct there does not seem to have given satisfaction to the Frieslanders who had delegated him, for he was accused on his return of having exceeded his instructions. For one thing, however, B. deserves great credit, his translation of the Bible into the vernacular. Four other persons were associated with him in the task, but the translation of the Old Testament is chiefly B.'s work, and is characterized by taste, fidelity, and purity of language. It is still used in the Dutch churches. B. died in 1633, at Franeker, in the university of which he was primarius professor of divinity.

BOGHA'Z KIE'UI, KE'WEE, or KOI, a village of Asia Minor, vilayet of Kastamuni, 88 miles S.W. of Amasia. In its vicinity are the ruins of a magnificent temple, supposed to be that of Jupiter which Strabo mentions (lib. xii.). A perfect ground-plan of the building still remains; the length outside is 219 feet, the breadth 140 feet, while the cella measures 87 feet by 65. There are several other ruins which seem to identify B. K. as the ancient *Tavium*.

BOG IRON ORE, a mineral of very variable composition, but regarded as consisting essentially of peroxide of iron and water; the peroxide of iron often amounts to about 60 per cent., the water to about 20. Phosphoric acid is usually present in quantities varying from 2 to 11 per cent. Silicic acid, alumina, oxide of manganese, and other substances, which seem accidentally present, make up the rest. B. I. O. occurs chiefly in alluvial soils, in bogs, meadows, lakes, &c. It is of a brown, yellowish-brown, or blackish-brown color. Some of its varieties are earthy and friable, formed of dull dusty particles; some are in masses of an earthy fracture, often vesicular; and some more compact, with conchoidal fracture. It is abundant in some of the northern and western islands of Scotland, and in the northern countries of Europe generally; also in North America. When smelted, it yields good iron. See IRON, ORES OF. From what source the iron in B. I. O. is derived, has often been a subject of discussion; but Ehrenberg appears to have determined that it proceeds from the shields of animalcules, and he regards the mineral itself as composed of incalculable multitudes of these shields. He found in the marshes about Berlin a substance of a deep-ochre yellow passing into red, which covered the bottom of the ditches, and which, when it had become dry after the evaporation of the water, appeared exactly like oxide of iron; but which under the microscope was found to consist of slender articulated threads, formed of the partly silicious and partly ferruginous shields of *Gaillonella ferruginea*.

BOG MOSS. See SPHAGNUM.

BO'GNOR BEDS. See LONDON CLAY.

BOGODOUKHO'V, or BOHODUKHO'V, a fortified town of Russia, in the government of Kharkov, 29 miles north-west of the city of that name. It is situated on the Merle—the chief industry of its population, which amounts to about 15,000, consisting in leather-dressing and boot-making. B. has also a considerable trade in cattle and hides.

BOGOMI'LI, a religious sect which came into notice in the 12th c., whose chief seat was in Thrace. They resembled the Paulicians and Kathari. Their name, which is derived from the Bulgarian *Boq*, 'Lord,' and *milui*, 'have mercy,' refers to the frequency of their prayers. The basis of their creed was as follows: Out of the eternal Divine Essence or Being sprang two principles—Satanael and Logos; the former, at first good, afterwards rebelled, and created in opposition to the original spiritual universe a world of matter and human beings. These human beings, however, received from the Supreme Father a life-spirit; but this was kept in slavery by Satanael until the Logos or Christ came down from heaven, and assuming a phantom body, broke the power of the evil spirit, who was henceforth called only Satan. The B., like all similar sects, practised a severe asceticism, despised images, and rejected the sacraments. Instead of baptism, they placed their hands, and an apocryphal gospel of St. John, on the head of the neophyte, singing at the same time the Lord's Prayer, which they repeated seven times during the day, and five times during the night. They accepted the whole of the New Testament, but of the Old Testament only the Psalms and Prophets, which they interpreted allegorically. In 1118, that vehement hater of heretics, Alexius Comnenus, burned their leader Basilius. Persecution, however, did not put an end to the B., and at the time of the Mohammedan conquest of

Bosnia (16th c.), we find that the greatest number of the renegade Christians who embraced the religion of the conquerors belonged to this sect. There are some B. even at the present day.

BOGOTA', more fully SANTA FE DE BOGOTA, in South America, the federal capital of the united states of Colombia, formerly New Granada. It is situated within the limits of Cundinamarca, in lat. 4° 6′ N., and long. 78° 30′ W., on a table-land, which, at an elevation of 8694 feet above the sea, separates the basin of the Magdalena from that of the Orinoco. Independently of its political importance, B. occupies a commanding position in relation to commerce. It lies on the most convenient route between Quito and the Caribbean Sea; while, by navigable affluents of the Orinoco and the Magdalena, distant respectively 37 and 55 miles, it enjoys a twofold access to tide-water. Its immediate vicinity too, is favorable to the growth of a great city and the maintenance of a large population. The table-land measures about 60 miles from north to south, and about 30 from east to west, being bounded on all sides by mountains which, though lofty enough to give shelter, are yet below the line of perpetual snow.

This extensive plain—a temperate zone on the verge of the equator with a singularly genial and salubrious climate—is exceedingly fertile, yielding abundant crops of wheat and barley, as also generally of the leguminous plants cultivated in Europe; while, favored as it is with two rainy seasons in a year, it is as rich in pasture as in grain, affording ample sustenance to numerous flocks of sheep and herds of cattle. B. was founded in 1538, consisting then of 12 houses in honor of the 12 apostles. In 1800, it contained 21,464 inhabitants; and in 1831, 30,000; and now it is stated at 50,000. Prospectively, also, the surrounding mountains promise, one day, to give to industry many valuable minerals, such as iron, coal, and salt. The last two, in fact, have already been obtained to some extent. Mines of emeralds, gold, silver, and copper are also said to exist within the same district. B. is regularly and handsomely built. It has 4 public squares and 5 elegant bridges over 2 small rivulets—the San Francisco and the San Augustin. Like every place in Spanish America, it teems with churches and convents—two of the latter overhanging the city on twin hill-tops at a height of 2500 feet above the general level. B. likewise possesses, in addition to official buildings, a mint, a theater, a university, and spacious barracks. A short way from the city, the rivulets above mentioned join a stream of the same name as the town itself.—The river Bogota, otherwise called the Funcha, is in itself an object of physical interest. It is the single outlet of the waters of the table-land, which, both from geological features and from aboriginal traditions, appears to have once been a land-locked basin, somewhat like the still loftier and larger plateau of Titicaca. Be this as it may, the river B. has found, if it has not forced, a passage for itself towards the Magdalena. At the cataract of Tequendama the waters plunge over a precipice 900 feet high; and the clouds of spray clothe the adjacent grounds in the most luxuriant vegetation. About the center of this cataract, known as the Fall of Tequendama, stands the natural bridge of Icononzo, formed as if by the fortuitous jamming of rocks from the opposite sides of the cleft. Between the crest and the foot of this fearful torrent, there exists a difference of climate, which is obviously disproportioned to the mere difference of elevation; and the excess may perhaps be ascribed, in conjunction with the ceaseless moisture, to the wall-like precipice behind, which, besides intercepting the winds, increases by reflection the heat of the sun.

BOGOUSLAV, or BOGUSLAW, a town of Russia, in the government of Kiew, about 70 m. S.S.E. of the city of that name. It is situated on the Rossa, and has a pop. of 9000, chiefly Jews.

BOG SPA'VIN. This singular name has been applied to a lesion of the hock-joint of the horse, consisting in distention of the capsule enclosing the joint. It usually arises suddenly from a sprain in action. It most commonly affects young horses with defective hocks, and is associated with other indications of weakness of the injured joint.

Symptoms.—As the immediate result of a violent sprain, the hock becomes swollen, hot, and tender, and there is considerable lameness. The acute symptoms subside readily, but a circumscribed swelling remains towards the front, inner, and lower part of the joint. The swelling is soft, partly disappears on pressure, if the joint is moved; but on the horse standing firmly on its limbs, the projection is distinctly visible. At every recurring strain, lameness supervenes, but commonly passes off within a short time. If the B. S. has accidentally occurred in a young horse with good hocks, it may never be attended with inconvenience, and the acute symptoms mentioned do not relapse.

Treatment.—The treatment of B. S. consists in the application of stimulating embrocations, or mild blisters, in the early stage; in severe cases, the golden ointment of iodine is the best application; but we cannot only obtain a reduction in the inflammatory symptoms, and disappearance of the lameness. The capsular ligament which is injured is never again completely restored, and the horse is more or less blemished for life. See SPAVIN.

BOG-TROTTER, an appellation sometimes contemptuously given to the lower class of the Irish peasantry, has its origin in the ability acquired by many of them of traversing the extensive bogs of their native country, passing from tussock to tussock, where a stranger would find no secure footing, and in the frequent use which they have made of this ability to escape from soldiers, officers of police, or other pursuers.

BOGUE, REV. DAVID, the founder of the London Missionary Society, was a native of Berwickshire, being born at Hallydown, February 1750. After studying at the Edinburgh University, and obtaining his license as a preacher in connection with the Church of Scotland, he, in 1771, went to London, where he was for some time engaged in tuition. He afterwards accepted the charge of an indepent church at Gosport, where he established a seminary for the education of students who purposed to become Independent ministers, an institution which had a great influence on the connection, as well when it had this object in view as afterwards, when it became a school for the training of missionaries. B. now conceived the idea of a grand missionary scheme, which was ultimately realized in the London Missionary Society. He also took an active part in the establishment of the British and Foreign Bible Society and the Religious Tract Society. From this time until his death, which took place in October 1825, he devoted himself zealously to the cause of missions. On his death, an extraordinary meeting of the London Missionary Society was convened, and resolutions passed expressive of its sense of bereavement, and of the benefits which the deceased had conferred on the Society. B. was the author of *An Essay on the Divine Authority of the New Testament*, which has had a circulation only second to that of Bunyan's *Pilgrim's Progress*, having been translated into French, Italian, German, and Spanish; also *Discourses on the Millennium*; and in connection with Dr. James Bennet, a *History of Dissenters*, from the Revolution of 1688 to 1808.

BOHE'MIA (Ger. *Bö'hmen*), formerly one of the kingdoms of Europe, now forming a part of the Austro-Hungarian monarchy, is situated in lat. 48° 33′—51° 3′ N., and long. 12°—16° 46′ E. It is bounded N. by Saxony and Prussian Silesia, E. by Prussia and Moravia, S. by Lower Austria, and W. by Bavaria. It has an area of 19,822 sq. miles; pop. (1869), 5,140,544; (1880) 5,560,819. It is divided into thirteen circles—viz., Prague, Leitmeritz, Jung-Bunzlau, Jičin, Königgrätz, Chrudim, Caslau, Tabor, Budweis, Pisek, Pilsen, Eger, and Saaz. It contains nearly 400 cities; 250 market-towns; and 650,000 dwelling-houses. B. is surrounded on all sides by lofty mountain ranges, the principal of which are the Riesengebirge (part of the Sudetic chain) on the north-east, dividing B. from Prussia and Silesia, and attaining, in the peak of the Schneekoppe, a height of 5275 feet; on the north-west, the Erzgebirge, with a height in some places of more than 4000 feet; on the south-west, the Böhmerwald, reaching in its highest point an elevation of 4613 feet. Offsets from these traverse the interior of the country, which has an undulating surface, sloping generally to the center. B. has several fine valleys, the chief of which are those of the Moldau and the Elbe. The country belongs to the upper basin of the Elbe, which rises in the Riesengebirge range; and it is well watered by the affluents of that river, the principal of which are the Moldau—which has its source in the Böhmerwald, and which is navigable from Budweis to Melnik, where it joins the Elbe, a distance of 148 miles—the Eger, Iser, Aupa, Metau, Biela, and Erlitz. B. has no lakes of any considerable size.

The climate of B. is cold in the mountainous regions, the higher peaks being covered with snow during a great portion of the year, but mild in the valleys, and, on the whole, healthful.

The mineral wealth of B. is varied and extensive, consisting of silver, tin, copper, lead, iron, cobalt, alum, sulphur, graphite, calamine, cinnabar, porcelain clay, with several precious and ornamental stones, such as Bohemian garnet (*Pyrope*), rubies, sapphires, &c. Of coal, B. produces more than all rest of the Austrian empire together. It also yields a large supply of asphaltum. Mineral springs are abundant, and those of Carlsbad, Marienbad, Eger-Franzensbad, Teplitz, Elisenbad, &c., are celebrated places of resort.

The soil of B. is generally fertile. More than one-half of the area consists of arable land; nearly one-eighth is laid out in meadows and gardens; pastures form about a twelfth; vineyards, a very small portion; and forests cover nearly a third. The wheat raised in B. is about a seventh of the produce of the whole Austrian empire. The rye, barley, and oats are, the first a fourth, and the latter two a sixth of all the produce of these kinds of grain. This indicates an agricultural importance to the country, in relation to the Austro-Hungarian empire, not to be easily estimated. Flax and hops are important products in a manufacturing point of view; the yearly crop of flax amounts to 200,000 cwts. Bohemian hops are famous, and 50,000 cwts. are on an average produced yearly. A great variety of fruit is cultivated and ex-

ported in large quantities. The culture of the vine is confined to the vicinity of Prague and the lower part of the Elbe.

Various kinds of game are found, and the breed of pheasants is celebrated. Horned cattle, sheep, goats, and swine are reared extensively in some districts; and in the south, geese form an important item in the resources of the country.

In manufactures, B. holds a very high place among continental countries. It is the chief center of dyeing and calico-printing. The linen manufacture, which is more extensive than that of all the other Austrian provinces together, consists of damask, cambric, lawn, and other fine varieties, in addition to the ordinary qualities of cloth. Of the 403,000 spindles employed in flax-spinning in the empire, Bohemia reckons 260,400. The chief seat of the woollen manufacture is Reichenberg and its neighborhood. Another important branch of industry is the paper-manufacture, of which B. possesses more than the half. The glass-works of B. are celebrated, and very numerous and extensive, affording employment to thousands. Beet-root sugar is manufactured extensively, and there are hundreds of breweries and brandy distilleries throughout the country, but they are mostly on a small scale. The manufacture of iron is considerable. The position of B. secures it a large transit trade. Steam-packets ply on the Elbe and Moldau; the horse-railway which, till 1869, connected these rivers at Budweis and Linz, was the oldest on the continent. B. has good roads, and there is an excellent system of railways centering in the capital, Prague.

Population, Religion, and Education.—The Czechs, a Slavonic race, form the bulk of the people. They number 3,470,000, and dwell chiefly in the center and east of the country. The German population, amounting to 2,054,000, reside mainly on the outskirts, especially in the north-east. About 100,000 are Jews. The vast majority of the population (5,340,000) belong to the Roman Catholic Church, but other religions are tolerated; the Protestants only amount to 120,000, and the number of Jews, as above mentioned, is about 100,000. The Roman Catholics are under the supervision of the Archbishop of Prague, and the three bishops of Leitmeritz, Königgrätz, and Budweis. The monasteries and convents number between 120 and 130. Education is much more widely diffused than in any of the other provinces of Austria. The educational establishments include the university of Prague, 20 gymnasia, and 30 other higher schools; besides 4550 public schools. B. sends 54—about a fourth of the 203—members to the Lower House of the Austrian Reichsrath, or parliament of the western part of the empire.

History.—The *Boii* (q. v.), from whom B. derives its name, settled in the country in the 2d c. B.C., but were expelled by the Marcomanni about the beginning of the Christian era. The victors themselves soon gave place to others, and as early as the 5th c. A.D., we find B. peopled by the Czechs, a Slavic race. In the latter part of the 9th c., Swatopluk, the king of Moravia subjugated Bohemia and introduced Christianity. After his death, the dukes of Prague, who in 1061 had the title of king conferred on them, by the Emperor Henry IV., ruled the country as a state in the German Empire until 1306, when the last of the dynasty was assassinated.

From 1310 to 1437, B. was ruled by kings of the House of Luxemburg. In the time of Wenzel IV. (Wenceslas), a reformation of religion took place under John Huss (q. v.) and Jerome of Prague (q. v.). After the death of Wenzel IV., the imprudent measures adopted by the Emperor Sigismund excited in B. a war of sixteen years' duration, which ended in making B. an elective kingdom. In 1458, the shrewd and able Protestant noble, George von Podiebrad, ascended the throne. His successor, Ladislaus (1471—1516) was elected (1490) to the throne of Hungary, and removed the royal residence to Ofen, where also his son and successor, Lewis (1516—1526), resided. After his death in battle against the Turks at Mohacz (1526), B. and Hungary passed into the hands of Ferdinand I. of Austria, who had married Lewis's sister. From that time, the history of B. merges in the history of Austria (q. v.).

Bohemian Literature.—The Czechs of B. possess a literature older than that of any other people of the Slavonic stem. Its origin may be dated with certainty as early as the 10th century. Of the oldest period—or before the time of John Huss the reformer—21 poetical, or more than 50 prose works are extant. Among the former, the remains of a collection of ballads, &c., made in the 13th c., are remarkable for their poetical merit. John Huss in B., like Luther in Germany, began a new era in literature (1409—1526); but the impulse of his example was far more important than his own writings. The literary remains of the Hussite sects in the 15th c.—dogmatic, polemic, and ascetic works—are still numerous in the old libraries and archives of B., though very many of them perished in the flames the Jesuits kindled during the Thirty Years' War. Even so late as 1750, the Jesuit, Antony Konias, boasted that he had burned 60,000 Bohemian books. Of historical works of this period, some remains have been edited by Palacky in his *Scriptores Rerum Bohemicarum*, 1829.

The period 1526—1620 is regarded by the Bohemians as their golden age of literature. In this time, especially under Rudolf II. (1576—1611), the arts and sciences were generally cultivated. Prague had two universities and sixteen schools, and the Bohemian language had reached its highest point of cultivation. It cannot, however, be said, that the literary works of this period display any great originality of genius. Among the most noticeable is a Bohemian translation of the Bible, which was finished in 15 years by 8 scholars, assembled by John of Zerotin at his castle of Kralic, in Moravia, and was published 1579—1593. It is a model of pure and elegant Bohemian.

In December 1774, an imperial decree was issued, ordaining that the German language should be employed by all teachers, lecturers, &c., in the upper schools. This harsh measure excited considerable opposition; and several writers came forward to vindicate the claims of the persecuted dialect, and to develop its powers; but their efforts were attended with little success.

A new and better era began in 1818, with the discovery of valuable remains of old literature, and the publication of edicts favorable to the use of the Bohemian language in schools. Since that time, the progress of the language, as a vehicle of literature and science, has been rapid, and a love of the old dialect has been extended through all classes of society. In Bohemian poetry and belles-lettres, the names of Czelakowsky, Kollar, Holly, Langer, and Schneider, are distinguished. Among scientific writers, mention may be made of Jungmann, Schafarik, Wenzel Hanka, and Presl. In history and archæology, the names of Palacky, Tomek, Schafarik, and Wocel are worthy of notice. Papers entirely political and of mixed politics and literature circulate more largely in B. than in any other part of the empire. In 1875, 108 papers were published in Bohemian, 11 daily. Since 1831, a committee for the cultivation of Bohemian literature has been in existence. Several important works, among them Schafarik's *Slavonic Antiquities*, and Jungmann's *Large Lexicon*, and his, *Literary History*, have been published by aid of the committee.

The *Bohemian language* is one of the best dialects of the West-Slavonic; it is spoken not only in B., but also in Moravia, and among the Slowaks in Hungary. Among its sister-dialects, it is distinguished by copiousness of root-words, great flexibility in combinations, precision, and accurate grammatical structure; but, like all the Slavonic and most modern dialects, it has no specific form for the passive voice of the verb. The orthography introduced by John Huss in the 15th c. is precise and consistent with itself. Every letter of the Roman alphabet has its one distinct sound. Bohemian prosody is distinguished from that of most European languages by the use of quantity instead of accent, so that it can copy faithfully all the ancient Greek and Roman metres. No other modern language can translate the ancient classics so readily, and yet so completely and forcibly, as the Bohemian. Its grammatical forms are complicated and difficult.

BOHE'MIAN BRE'THREN is the name of a religious society which was first instituted in Prague about the middle of the 15th century. It was originally composed of remnants of the Hussites. Dissatisfied with the conduct of the Calixtines (q. v.), they betook themselves, in 1453, to the borders of Silesia and Moravia, where they settled. Here they dwelt in separate communities, and were distinguished by the name of Brothers of the Rule of Christ. Their adversaries often confounded them with the Waldenses and Picards, while, on account of their being compelled during persecution to hide in caves and solitary places, they were also called Cave-dwellers (*Grubenheimer*). In spite of oppression, such was the constancy of their faith and purity of their morals, that they became profoundly respected, and their numbers greatly increased. The chief peculiarity of their creed was the denial of the ordinary Catholic doctrine of transubstantiation; but, in truth, they rejected tradition generally, and professed to found their tenets only on the Bible. Their ecclesiastical constitution and church-discipline—of which the Lutheran reformers spoke highly—was a close imitation of that of the primitive Christian communities. They even went the length of pretically denying anything to be secular; and, under the impression that religion should consciously penetrate and characterize the entire life of men, they extended ecclesiastical authority over the very details of domestic life. Their chief functionaries were bishops, seniors and conseniors, presbyters or preachers, ædiles, and acolytes. Their first bishop was consecrated by a Waldensian bishop, though they never united themselves with the Bohemian Waldenses. It was against their principles to engage in war; and having, on several occasions, refused to take up arms, they were at last deprived of their religious privileges. The result was, that, in 1548, about a thousand of the Brethren removed to Poland and Prussia. The contract which these exiles entered into with the Polish reformers at Sandomir, 14th April 1570, and still more, the religious peace concluded by the Polish States in 1572, secured their toleration; but subsequently, in consequence of the persecution of King Sigismund III., they united themselves more closely to the Protestants, though even at the present day they retain something of their old ecclesiastical

constitution. The Brethren who remained in Bohemia and Moravia obtained a little freedom under the Emperor Maximillian II., and had their chief seat at Fulnek, in Moravia. In the 17th c., a number removed into Hungary, but during the reign of Maria Theresa, were coerced into Catholicism. The Thirty Years' War, so disastrous to the Bohemian Protestants, entirely broke up the societies of the B. B.; but afterwards they united again, though in secrecy. Their exodus about 1722 occasioned the formation, in Lusatia, of the *United Brethren*, or Herrnhuters. See MORAVIANS.

BOHEMOND I., eldest son of the Norman conqueror of Apulia and Calabria, Robert Guiscard, was born about 1056, and during his youth distinguished himself in his father's war against the Byzantine emperor, Alexis Comnenus (1081—1085). After his father's death, he was excluded from the throne of Apulia by his brother Roger, and only gained the principality of Tarentum after a long contest. He joined the crusade of 1092 with a large army—most of which he had won over from his brother's service—and took a prominent part at the fight of Dorylæum, in Cilicia, in 1096, and at the capture of Antioch, 1098. While the other Crusaders advanced to storm Jerusalem, B. remained in Antioch, where he established himself as prince. Being soon after besieged, the Christians, reduced to extremities, came out, and gave the sultan battle, and entirely routed his forces, B. greatly distinguishing himself in the fight. He was afterwards made prisoner by a Turkish emir, and remained two years in captivity. Tancred, meanwhile, looked after his interests in Antioch. B. returned to Europe to collect troops, and after defeating Alexis in several engagements, was acknowledged by that emperor as Prince of Antioch. He died in Apulia, 1111.—His son, B. II., a minor at the death of his father, assumed the government of Antioch (after Tancred had been regent for some years) in 1126, and was killed in battle, 1130.—B. III., grandson of the former, was allowed to retain sovereignty only by the clemency of Saladin, and died 1201.—B. IV. (1233—1251) and B. V. (died 1275) were insignificant princes; and with B. VI. the Christian dynasty in Syria was brought to a close.

BOHME, or BOHM, JAKOB, a German theosophist and mystic, was born of poor parents at Altseidenberg, near Görlitz, in Upper Lusatia, 1575, and spent his boyhood in tending cattle. He received no instruction till he was ten years of age; but even then, the contemplation of earth and sky had so excited his naturally pious imagination, that he conceived himself inspired. He learned the trade of a shoemaker, but continued to devote much of his time to meditation on divine things. About 1612 was published his first book, called *Aurora, or the Morning Redness*. It contains revelations and meditations upon God, Man, and Nature; betokens a remarkable knowledge of Scripture, especially of the apocalyptical books; as also a familiarity with the writings of the mystico-philosophic alchemists.

It was condemned by the ecclesiastical authorities of Görlitz; but the persecutions to which its author was subjected, had not the effect of convincing him of his errors. B.'s fundamental speculation is, that the forthcoming of the creation out of the divine unity—which is itself distinguishable into a trinity—can be contemplated by mystic illumination, and expressed in words. The object of his mystic contemplation, accordingly, is twofold: first, God himself apart from creation, or, to use some of B.'s own synonyms, the groundless, the eternal one, the silent nothing, the *temperamentum;* and, secondly, the forthcoming of the creature out of God. This forthcoming of the creation, which is also an in-going of the silent nothing, is, according to B., the principle of negation, and he calls it 'contrariety.' 'All things,' he says, 'consist in Yes and No. The Yes is pure power and life, the truth of God, or God himself. The No is the reply to the Yes, or to the truth, and is indispensable to the revelation of the truth. So, then, the silent nothing becomes something by entering into duality;' and so on into what most minds will think utter unintelligibility. Numerous attacks from theologians disturbed B.'s last years, but he bore them all with great meekness. They were probably occasioned by a tract on repentance which his friends had printed without his knowledge; and so great was the interest excited, that he was induced by the solicitations of certain courtiers and of his friends to visit Dresden for the purpose of having his doctrines investigated. The court applauded and protected him. On returning to Görlitz, he took ill, and died 27th November 1624. The first collection of his writings was published by Betke (Amsterdam 1675); the most complete in 1730, at the same place; and the latest (1831—1846) by Schiebler, at Leipsic. Next to Germany, Holland and England are the countries in which B.'s works have been received with most favor. In England, where B. was generally called Behmen, a translation in 2 vols. quarto was published in 1764. Sir Isaac Newton studied him; William Law of Oxford might be called a disciple; in 1697, Jane Lead, a fanatical disciple of B., founded a sect, called the Philadelphists, for the exposition of his writings; and John Pordage, a physician, is also famed among his English interpreters. Abraham von Frankenberg, who died in 1652, published the earliest biography of Böhme. In modern times, and in connection with speculative philosophy in Germany, his views, which had come to be regarded as empty mysticism, have acquired fresh interest and importance. This arises from the kindred character of his fundamental principle with the spirit pervading the systems of Spinoza, Schelling, and Hegel. The intellectual contemplation of the absolute, out of which the contradictions in the world of phenomena proceed, and into which they return, is common to these systems and to B.; Hegel, indeed, expressly represents B.'s negativity, the active principle of development, as an obscure foreshadowing of his own intuitions, and on that account places him at the head of modern philosophy. The terminology of his philosophy, as will be seen from what we have quoted, is utterly fantastic; but his imagination often conceives splendid ideas, which are more profoundly appreciated in the 19th than they were in the 17th century. See Hamberger's (1844), Fechner's (1857), Peip's (1860), and Harless's (1870) works on B. and his philosophy.

BOHN, HENRY G., a well-known author, translator, and publisher, of German parentage, was born in London, January 4, 1796. It is impossible to estimate too highly the services he has rendered to the community by republishing, at a cheap rate, a vast number of the most valuable works in literature, science, philosophy, theology, &c. Such collections as the Standard Library (130 vols.), the scientific Library, Library of French Memoirs, the Illustrated Library, the Classical Library (consisting of translations into English of the Greek and Latin authors), the Antiquarian Library, the Ecclesiastical Library, &c., contain the intellectual wealth both of the ancients and moderns. Mr. B. has also obtained distinction as the editor of the *Bibliotheca Parriana*, of Lowndes's *Bibliographer's Manual*, &c., and as translator of Schiller, Goethe, and Humboldt. He compiled a *Polyglot of Foreign Proverbs*, Handbooks of Geography and of Pottery and Porcelain, and a *Dictionary of English Poetical Quotations*.

BOIARDO, MATTEO MARIA, Count of Scandiano, one of the most celebrated Italian poets, was born at Scandiano in 1430 or 1434. After completing his studies at the university of Ferrara, he was introduced at the court of Duke Borso d'Este, by whose successor, Ercole I., he was promoted to several honorable offices. In 1478, he was made governor of Reggio; in 1481, governor of Modena; and six years later, he again became governor of Reggio, where he died in 1494. His chief work is the romantic chivalrous poem, *Orlando Innamorato*, which he left unfinished in three books. Former writers had described Orlando only as a cold, pure, champion of Christendom; but B. introduced the element of love, to give an additional charm to romantic adventure. The method in which he does this not only proves him to have possessed a truly creative faculty, but also brings his conception nearer to the reality of history. B. furnished to all his poetical successors, even to Ariosto himself, the personages who figure in their adaptations of the old romance. His work was printed sixteen times before 1545, and was translated into French as early as the 16th century. As it was written in the dialect of the court of Ferrara, it failed to give satisfaction to the Florentines. Accordingly, after several attempts had been made to purify its diction, Lodovico Domenichi (died 1564) produced a *Riformazione* of the poem, 1545, without making any important change in the substance. Berni, in his *Rifacimento*, proceeded further, and gave to the whole poem a tone of burlesque; but his version enjoyed such popularity that it took the place of the original, which was almost entirely forgotten, until it was republished with introduction and critical observations by Panizzi (9 vols. Lond. 1830), and afterwards by Wagner in his *Parnasso Italiano Continuato* (Leip. 1833). The other works of B. include *Sonetti e Canzoni* (Reggio, 1499); *Il Timone*, a five-act drama (1500); *Cinque Capitoli in Terza Rima* (1523); and *L'Asino d'Oro*, a version of the *Golden Ass* of Appuleius (1523; besides a translation of Herodotus (1533), and of Riccobaldi's *Chronicon Romanorum Imperatorum*.

BOI'I, the name of a Celtic people who at a very remote period seem to have inhabited either the southern part of Belgium, or a portion of France in its immediate vicinity, whence they emigrated to Italy. Having crossed the Po, they established themselves in the territory of the Umbrians, lying between that river and the Apennines, and for some hundreds of years waged a fierce war with the Romans. They were defeated at the Vadimonian Lake in 283 B.C.; at Telamon, in Etruria, in 225 B.C., during the great Gallic war, of which they were the original cause; rushed into rebellion on hearing of Hannibal's march, joined him at the battle of the Trebia in 218 B.C., destroyed the entire army of the consul Postumius in 216 B.C., took a prominent part in the revolt of the Gauls under Hamilcar, and in the destruction of Placentia, 200 B.C.; but at length, in 191 B.C., they were completely subdued by Scipio Nasica, who, besides killing a vast number, took from them nearly one-half of their land. At a later period, they were dispossessed of the whole, and driven across the Alps. Their subsequent history and geographical position are not very clear. Those

who settled south of the Danube were, after a century, exterminated by the Dacians; those who returned to Gaul, were destroyed by Cæsar. The most important migration of the B., however, was that to the north of the Danube, where they founded the extensive kingdom Boiohemum, which was overthrown by the Marcomanni under Marbod. But though the dynasty of the B. was thus destroyed, the kingdom retained the name Boiohemum—i. e., home of the B., whence comes the modern Böhmen, or Bohemia.

BOIL (allied to Lat. *bulla*, a bubble) is a hard painful swelling of the skin. It begins as a small hard point of a dusky red color, which is hot, painful, and throbbing. This point extends, and these symptoms increase in severity till about the sixth to the ninth day, when it ceases to enlarge, is of a conical form, with a broad firm base, and on the apex a whitish blister, which contains a little matter; this opens, and after a few days more there is discharged a core or slough of cellular tissue, and the small cavity left heals rapidly, leaving a white depressed scar.

Many kinds of boils have been described, but they may, like other diseases of an inflammatory nature, be divided into those which are *acute* and run a rapid course, as above described; and the *chronic*, which take three or four weeks to 'come to a head.' Boils are most common in the spring, and in young and plethoric persons, and their appearance is quite consistent with robust health. Men in training for boat-races, or others who have suddenly changed their diet and daily habits are, said to be very subject to them. There is a form of B. which generally occurs on the back of the neck, after some disorder of the stomach, in elderly people, hence it is called 'Old People's Boil.' In some, boils continue to succeed each other for a length of time; others are attacked during the night, after having experienced feelings of nausea and langnor, by postules, which are called night-boils (epinyctis).

The treatment of boils varies with the subject of them: in many they are merely critical—in other words, a natural effort 'to relieve some function of the body by a peculiar inflammation of the skin.' The intestinal canal should be cleared out by laxative medicines, and the digestive powers improved by tonics and antacids. The skin should be kept healthy by frequent washing, while the inflamed spot should be poulticed with poppy-heads or hemlock mixed with other materials. Wet lint is a sufficient application after the core has been thrown off. If the patient chooses to submit, however, to a momentary pain, he will have the greatest, most permanent, and immediate relief from a cut carried quite through the boil. John Hunter, the great surgeon, got rid of habitual boils by taking repeated doses of soda in milk.

BOIELDIEU, Adrien François, an eminent French composer, was born at Rouen 1775. His talent for music was early developed. At the age of eighteen, he brought out a one-act opera in his native town, and two years afterwards he repaired to Paris, where he produced many successful compositions. When the Conservatoire de Musique was established, B. was elected a professor. In 1803 he went to Russia, where he was appointed, by the Emperor Alexander, *maître de chapelle* at the imperial court. He remained in Russia eight years, during which time he produced several operas. In 1811, he returned to Paris, where he brought out *La Dame Blanche*, his most popular piece, *Jean de Paris*, *La Petit Chaperon Rouge*, and other works. He died in October 1835; and, as a tribute to his genius, the nation honored him with a public funeral. His native city claimed his heart, and to defray the pomp of its reception in the cathedral, the municipality voted 12,000 francs. The government further marked its sense of his merit by granting a pension to his son.

BOILEAU DESPRÉAUX, Nicolas, an illustrious French poet, was born near Paris, November 1, 1636. After hesitating for some time in the choice of a profession, he betook himself to *belles-lettres*. In 1660, his fine powers first obtained an adequate expression in the satire, entitled *Adieux d'un Poète à la Ville de Paris*. In 1666, he published his seven *Satires*. The favorable reception which they met with, induced him to continue, until he had increased the number to twelve, of which the eight and ninth are considered the best. In these satires, B. even ventures to castigate the *coryphæi* of the world of letters—Chapelain, Cotin, Scudery, &c. To his honor, however, it must be said that malice does not once animate his pen; he is always pleasant and gay, never cruel. His contemporaries are his laughing-stocks, not his victims. Between the years 1669 and 1696 appeared his *Twelve Epistles*. They indicate a riper genius than the Satires. The versification has more ease and grace; the style, a quicker movement and a firmer consistency; the thoughts are more vigorous, and more strictly concatenated; everywhere there is greater truth, color, and energy. The one addressed to Racine, who, along with B., filled the office of royal historiographer, is reckoned among his finest. In 1674, B. published *L'Art Poétique*, accompanied by a translation from the Greek of *Longinus on the Sublime*, and the greater part of *Lutrin*. These are by many French critics considered his *chefs-d'œuvre*. The first is indeed an exquisite performance, and has been copiously imitated in Pope's *Essay on Criticism*. It lays down rules for almost every species of poetry, in a clearer and more methodical manner than had ever been done before, while the whole poem is sprinkled with touches of delicate satire. The second, *Lutrin*, is a comic epic in six cantos, immensely admired by his countrymen. Besides these, B. wrote several minor pieces, both in prose and verse, such as—*Dialogue des Héros de Roman*, *Dissertation sur Joconde*, *L'Arrêt Burlesque*, and *Discours sur la Satire*. A large number of his letters have been collected. Among them are twenty to Racine. The letters of B. are in general extremely valuable, from the fact that they contain a large proportion of the literary history of the time. They also enable us to form a just idea of his character. He was high-minded, generous, and pure. In fact, his impulsive disposition and imprudent warmth of heart quite contradict the common notion of what a satirist is. When Corneille's pension was ordered to be stopped, after the death of Colbert, B. flew to the king, remonstrated against so 'barbarous a spoliation,' and threatened to resign his own, if the decree were carried into effect. He courageously denounced the persecutors of the nuns of Port-Royal; expressed his admiration of Arnauld, when the latter was on the point of being arrested; extricated out of pecuniary embarrassments many friends; and through sheer kindness of heart, forced on a reconciliation with various of his literary adversaries. An admirer of Pascal, and a friend of the Jansenists, he could yet render homage to the talents of such Jesuits as Bourdalone, Bonhours, and Rapin; but his most intimate and cherished companions were Molière, Racine, and Lafontaine. Until 1706, B. lived much in public, but after that his bodily infirmities induced him to retire to Auteuil. He died March 13, 1711. B.'s influence on French literature has been immense, and, on the whole, beneficial. Voltaire proclaimed him 'the legislator of Parnassus.'

BOILER (Fr. *Chaudière*, Ger. *kessel*), the name given to a vessel in which steam, usually for a steam-engine, is generated. In its simplest form, it consists of a close vessel made of metal plate, having apertures for the admission of water and egress of steam, fitted with apparatus for showing the level of the water and the pressure of the steam, and in connection with the furnace, either internal or external. When water is boiled in an open pan, the temperature of the water and of the steam rising from it, remains at or very near 212° F., and the tension or pressure of the steam is no more than sufficient to make its way into the atmosphere, being exactly equal to that exerted in all directions by the atmospere itself—namely, 14·7 lbs, per square inch. In a close vessel, on the other hand, the temperature or pressure to which we can raise the steam are only limited by the strength of the vessel or boiler against bursting.

The form of a boiler is determined by two considerations—namely, strength to withstand internal pressure, and efficiency in producing steam; and the object of the designer is to combine in one apparatus sufficient strength to work safely at the proposed pressure, with such a form and arrangement as shall abstract the maximum of heat from the gases of combustion, and at the same time be in all respects suitable to the special circumstances of the case. The globular form is that best adapted for strength, and was the earliest to be used. It presents to the fire, however, the minimum area in proportion to its contents, and therefore has a minimum efficiency. After spherical boilers, cylindrical ones came into use, at first set on end, and afterwards laid on their sides, and later on, these were furnished with internal cylindrical tubes for furnaces. Watt's 'wagon boiler' (so called from its shape) was used for many years, but being quite unfit for any but the lowest pressures, it has long been discarded; and the 'egg-end' boiler, or plain cylinder with hemispherical ends, also much used at one time, has now almost disapeared on account of its small evaporative efficiency. At present, it is quite common to use a working steam-pressure of 50 lbs. per square inch in ordinary factory boilers, and in some cases this is already greatly exceeded, while the tendency to use higher pressure seems to grow yearly. Under these pressures, the only forms of boiler which can be used without heavy and expensive internal stays to prevent the danger of bursting, are the globular and the cylindrical. The former shape is rejected for the reason already given, and the latter form is used almost invariably in the construction of modern boilers, as will be seen from the examples given below. The ends of the cylinders, when it is necessary to make them flat, must, of course, be strengthened by stays.

Boilers may be classified in several ways—as (1.) Horizontal and Vertical; (2.) Internally and externally fired; and (3.) Plain, Multitubular, and Tubulous. Large boilers are almost invariably horizontal, but small vertical boilers are often used. They are employed in Steam-cranes (q. v.) and other situations where great length would be an inconvenience, and often in traction-engines, where steep inclines have to be traversed, and where, if a locomotive boiler were used, one or the other end of its tubes might become uncovered, and so get burned. In Great Britain when moderately

good fuel is used, boilers with an internal furnace are generally preferred; but on the continent the common brown coal is much inferior to our fuel, and a correspondingly larger quantity of it must be used to generate a given volume of steam. As the size of a furnace limits the fuel which it can burn, this frequently involves having a much larger grate than could be conveniently arranged inside the boiler, and on this and other accounts boilers are, on the continent, more frequently externally fired than in this country. Under the head of 'plain' boilers come all ordinary cylindrical boilers, with or without internal furnaces, horizontal or vertical. They are the cheapest and simplest which can be made, and, if properly proportioned, possess a considerable evaporative efficiency. When it is necessary, however, to economize fuel, or space, or both, 'multitubular' boilers are used. These derive their name from the fact that in them the flame and gases of combustion are made to pass through a great number of small tubes (surrounded by the water) on their way to the chimney. The steam-generating power of a boiler depends greatly on the extent of surface which it presents to the flame, and it is obvious that a great number of small tubes present a much larger surface than one large tube occupying the space of them all. Thus, with the same heating surface a multitubular boiler will occupy much less space than a plain one, and at the same time the efficiency of its surface is found to be greater. It is, however, necessarily more expensive and more liable to get out of order. Tubulous boilers differ from multitubular boilers in not only containing tubes, but *consisting* of them, and having no large cylinders whatever. Their chief advantages are (*a*) their great strength, for it is easy to make a wrought-iron tube strong enough to withstand pressures far higher than any at present in use; and (*b*) the peculiarity, that if any accident happens, or explosion occurs, it will only be to one tube at a time, and not to an immense boiler shell (as with the common boiler), and its evil consequences will thus be greatly reduced. For this reason tubulous boilers are often called 'safety' boilers. It will be readily understood that there is no distinct line of demarcation between the three classes of which we have been speaking, but that on account of the immense variety of boilers which have been designed and constructed, those of one class pass through gentle gradations into those of the next.

The commonest form of boiler for factories, &c., is that known as the *Cornish*, and shown in fig. 1. It consists simply of a cylindrical shell, *a*, *a*, inclosing a much smaller cylinder, *f*. *f*, called a *flue*. The ends of the flue are open, but the space between it and the shell, which contains the water, is of course closed up and made

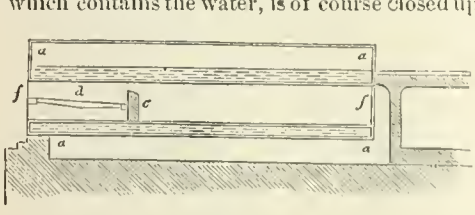


Fig. 1.

steam-tight. The fire-grate *d*, is in the interior of the flue, and at the end of it is a brick bridge, *c*, made so as to cause the flame to impinge on the upper side of the flue. The boiler is set in brickwork; and the flame, passing out at the back end of the flue, is made to traverse the whole length of the boiler twice through brick flues before passing away to the chimney.

The Cornish boiler has often two internal flues or tubes, which is a much more advantageous construction than that shown in fig. 1. The *Galloway* boiler (called after its inventor) is a very excellent modification of the Cornish, which in outward appearance it exactly resembles. It has two furnaces, but these join together in one chamber just behind the bridges, and the gases are made to pass through a space considerably narrowed by side *pockets* projecting inwards in order that they may be well mixed. From this point to the back of the boiler there is just one flue, made oval in section, and crossed by a considerable number of vertical taper tubes, which form a direct communication between the water beneath and that above the flue. These tubes (called 'Galloway tubes') both promote circulation and strengthen the flue. Multitubular boilers of many kinds are used, both for stationary engines and other purposes, but the largest number of those constructed are certainly for steamers, and a common type of marine boiler is shown in fig. 2. The shell *a*, *a*, is cylindrical, and contains one or more cylindrical furnaces; *c* is the fire-grate; *d*, a brick bridge; *e*, a combustion chamber or flame-box; *f*, the tubes through which the flame passes back to the front of the boiler; and *g*, the smoke-box at the base of the funnel, *h*. The line *k*. *k*, shows the ordinary level of the water in the boiler.

On board ship it is of course an object to take up as little space as possible with the boiler and machinery, and at the same time to have boilers which shall use as little coal as possible, both because of the saving in cost, and because of the saving in the room taken up by coal. For all these reasons, marine boilers are invariably multitubular.

The varieties of vertical boilers are as numerous as those of horizontal. When dirty water, or water containing much insoluble

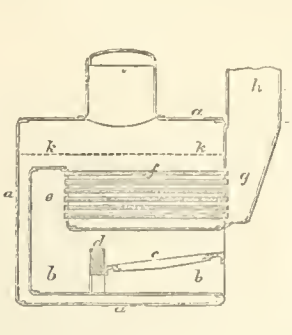


Fig. 2.

Fig. 3.

sediment, has to be used (as *e.g.* in steam-cranes frequently), they are of the simplest construction, with nothing but an inner fire-box and an outer shell (both cylindrical), the space between them being filled with water all around and over the top of the fire-box. If clean water can be had, however, and it is desired to be at all economical of fuel, some kind of multitubular vertical boiler must be used, and of these probably the best is that known as the *Field* boiler, and shown in fig. 3. The peculiarity of it consists in the tubes, which are closed at the bottom, and hang down from the top of the fire-box over the grate bars, and contain inner tubes of much smaller diameter. The latter are intended to aid the circulation of the water, which passes down the inner tube and up again through the annular space around it, where, being most exposed to the action of the flame, it is hottest. Of the different varieties of tubulous boilers, those manufactured by Messrs. Howard of Bedford have found most favor; but so far as can be said in the absence of any extended experience as to their working, Sinclair's patent boilers seem to be even more satisfactory. They consist of horizontal wrought-iron welded tubes placed in vertical rows, each row being connected at each end with a vertical tube, also of wrought-iron and of large diameter. In order that the horizontal tubes may be properly fixed in the vertical ones, a hole must be provided in the side of the latter, opposite the mouth of each of the former. That these holes may be kept tight at any pressure of steam, the ingenious device is adopted of closing them with taper plugs put in *from the inside*, so that the pressure of steam keeps them shut, and the higher the pressure the less possibility of leakage there is. Locomotive boilers are always multitubular, for much the same reasons as marine boilers. The boiler of a single locomotive often contains 1500 or 1800 square feet of heating surface, and occasionally as much as 2000 square feet.

The principal test of the efficiency of a boiler is the quantity of water (generally expressed either in pounds or gallons), which it will evaporate with the consumption of one of coal. Of course this varies very much with the quality of the fuel, but with good pit coal (not dross), a Cornish boiler should evaporate 6 to 8 pounds of water per lb. of coal, and a multitubular boiler, such as fig. 2, about 10 or 11 lb. per lb. coal. The best rate of combustion on the grate varies with the construction of the boiler, from 10 to 18 or 20 lb. per square foot of grate surface per hour.

Boilers are almost invariably made of wrought-iron plates riveted together. The parts most exposed to the action of the flame are made of the best quality of iron, and the other parts of inferior qualities, according to their position in reference to the flame. Occasionally boilers are made of steel, where lightness is the chief requisite, but makers have not yet sufficient confidence in steel plates to use them very largely. Copper is often used in the fire-boxes of locomotives, but seldom in any other description of boiler. Brass boiler tubes are often seen, and on account of its better conducting qualities, brass is to be preferred to iron, but its dearness prevents it superseding iron in the great majority of cases.

Every boiler has, to render it complete and workable a number of *fittings* or *mountings*, of which the following are the principal: A glass gauge to show the level of the water inside the boiler, and gauge-cocks for the same purpose; a gauge to show the pressure of the steam; a cock for admitting water; a cock at the bottom for emptying or 'blowing off;' a valve for the discharge of the steam; one or two safety valves, weighted so that, when the pressure of steam in the boiler reaches a certain height, they open and allow the steam to rush into the air; a door by which a man can get in to clean the boiler, &c.

In order to induce a current of air through the furnace so that a proper combustion may be maintained, stationary boilers are generally provided with a chimney of considerable height, and

made of brick or sheet-iron, to which the products of combustion are conducted after they have left the boiler. In locomotive boilers, and in some other cases where a sufficiently tall chimney cannot be made use of, a very powerful current is made by the ejection of the waste steam through a blast-pipe with a contracted nozzle at the base of the chimney. To prevent loss of heat by radiation, and the consequent waste of fuel, boilers should always be covered, in all parts exposed to the atmosphere, with non-conducting composition.

For further details see also BOILING, MANOMETER, SAFETY-VALVE, STEAM, STEAM-ENGINE, and STEAM-CRANE.

BOILING (of Liquids)—BOILING-POINT. When heat is applied to a vessel containing water, the temperature gradually rises, and vapor comes silently off the surface; but at a certain degree of heat, steam (q. v.) begins to be formed in small explosive bursts at the bottom, and rising through the liquid in considerable bubbles, throws it into a commotion. If, after this, the steam is allowed to freely escape, the temperature of the water rises no higher, however great the heat of the fire. The water is then said to *boil*, and the temperature at which it remains permanent is its *boiling-point*. The boiling-point of water is ordinarily 212°; but every liquid has a point of its own. Thus sulphuric ether boils at 96°; alcohol, at 176°; oil of turpentine, at 316°; sulphuric acid, at 620°; and mercury, 662°. The boiling-point of liquids is constant, under the same conditions, but is liable to be altered by various circumstances. Water with common salt in it, e. g., requires greater heat to make it boil than pure water. The nature of the vessel, too, exerts an influence; in a glass vessel, the boiling-point of water is a degree or two higher than in one of metal, owing to the greater attraction that there is between water and glass than between water and a metal. But what most affects the boiling-point is variation of pressure. It is only when the barometer stands at 30 inches, showing an atmospheric pressure of 15 lbs. on the square inch, that the boiling-point of water is 212°. When the barometer falls, or when part of the pressure is in any other way removed, it boils before coming to 212°, and when the pressure is increased, the boiling-point rises.—Thus, in elevated positions, where there is less air above the liquid to press on its surface, the boiling-point is lower than at the level of the sea An elevation of 510 feet above the sea-level, makes a diminution of a degree; at higher levels, the difference of elevation correspoding to a degree of temperature in the boiling-point increases; but the rate of variation once aecertained, a method is thus furnished of measuring the heights of mountains. See HEIGHTS, MEASUREMENT OF. At the city of Mexico, 7000 feet above the sea, water boils at 200°; at Quito, 9000 feet, at 194°; and on Donkia Mountain, in the Himalaya, at the height of 18,000 feet, Dr. Hooker found it to boil at 180°. Boiling water is thus not always equally hot, and in elevated places, many substances cannot be cooked by boiling. Under the receiver of an air-pump the same effect is still more strikingly seen; water may be made to boil at the temperature of summer, and ether when colder than ice. In complete vacuo, liquids, in general, boil at a temperature 140° lower than in the open air. The knowledge of this effect of diminished pressure is now largely turned to account in sugar boiling, in distilling vegetable essences, and in other processes where the substances are apt to be injured by a high temperature.—By increasing the pressure, again, water may be heated to any degree without boiling. Papin's Digester (q. v.) is formed on this principle. Under a pressure of two atmospheres, the boiling-point rises to 234°; of four atmospheres, it is 294°; often atmospheres, 359°; of fifty atmospheres, 510°.

In a deep vessel, the water at the bottom has to sustain the pressure not only of the atmosphere, but also of the water above it. At a depth of 34 feet, the pressure of the water above is equal to an atmosphere, or 15 lbs. on the square inch; and thus, at the bottom of a vessel of that depth, the water must be heated to 234° before it is at its boiling-point. This principle has been successfully applied to explain the phenomena of the Geysers (q. v.).

If a small quantity of water be poured into a silver basin, heated above the boiling-point, but below redness, it will begin to boil violently, or perhaps burst into steam at once. But if the basin is heated to redness, the water will gather itself into a globule, and roll about on the hot surface, without becoming heated to the boiling-point. For the explanation of this and other interesting phenomena connected with it, see SPHEROIDAL CONDITION OF LIQUIDS.

BOILING, in Cookery. One important preliminary rule in boiling rests on the fact, explained in the preceding article, that water cannot be heated in an open vessel, or in one with the ordinary fitting lid of a cooking utensil, to a higher point than 212°. When a vessel, then, has once begun to boil, a stronger fire than is just sufficient to keep it boiling will only evaporate, or waste, the water in steam, but will not cook the food any faster; on the contrary, the outside will be rendered so hard by the quick boiling, that the interior will not be reached by the heat.

By long soaking in cold or tepid water, fresh meat loses much of its albumen and nutritive juice. When a piece of meat is to be boiled, it is necessary, for the preservation of these juices, and its consequent tenderness and nutritious quality, that the outside should be sealed up, by immersing it in boiling water, and keeping up the temperature for a minute; this closes up the pores, and coagulates the albumen of the exterior. The boiling water should then be taken off, and as much cold be put in as will reduce it to a tepid state; it should then be gradually warmed until it reaches a degree *slightly* under the boiling-point, called simmering; at this point it must be kept without suffering any interruption of the heat, till the time elapses that is allowed for cooking the food. 'The cooking goes on through the agency of the natural moisture of the flesh. Converted into vapor by the heat, a kind of steaming takes place within the piece of meat; it is, when skilfully done, cooked by its own steam.'

To prepare meat for B., it should be trimmed, washed, and dried before it is placed in the water. As it simmers, the water should be kept well skimmed with a skimming-spoon, as frequently as any scum is thrown up, but with due remembrance of the fact, that raising the lid of the vessel lowers the temperature of the water; and the preservation of an equal degree of heat throughout the operation is of the greatest importance.

For fresh meat, 20 minutes is the allowance for each pound The weather must also be considered: in frosty weather, or with very thick joints, extra 20 minutes should be given. Mutton loses in boiling, in 1 lb., 3½ oz.; beef, in 1 lb., 4 oz. Meat that has been salted and dried has its outer coat already sealed up; it requires, therefore, to be thoroughly washed, soaked for two hours in cold water, dried, and put to boil in cold water, gradually brought to the boiling-point, and kept simmering for a time, proportioned to the size of the piece. Hams and tongues to be eaten cold, should be allowed to cool in the water in which they have been boiled. The following is a time-table for the cooking of these meats, reckoning from the time the water boils: A ham of 16 lbs. takes 4 hours; a tongue of 16 lbs., 2 to 4 hours; a pig's face of 16 lbs., 2 hours; a piece of bacon of 4 lbs., 2 hours.

Poultry, and white meats, as veal or rabbit, should be put at once into tepid water, gradually brought to the boiling-point, drawn back immediately, and simmered, carefully skimming the water as scum rises. A chicken, or small fowl, or rabbit, will take 35 minutes; a fowl, or old rabbit, an hour, or an hour and a half, according to size. Some cooks add milk to the water, but this is apt to cause the scum to stick to the meat in streaks; some also use a cloth to enclose the meat, but this frequently imparts to it a disagreeable taste. Having trimmed, washed, and dried the meat, all that is necessary to keep it white, is to use a perfectly clean utensil, to be attentive to the skimming, and careful that no soot falls from the lid into the pot when doing this. Meat should only just be covered with water; if it wastes, a cupful of water at the same temperature should be added. The liquor in which fresh meat has been boiled, is an excellant foundation for soups and gravies.

Fish should be well cleaned and scraped; liver and roe should be carefully preserved, and boiled with the fish, in a fine net: they are used to garnish the fish. The sound of cod should be carefully cleaned, and left in the fish. Fish should be placed in cold water, in which a tablespoonful of salt and one of vinegar is mixed; should be gradually brought to the boiling-point, and simmered carefully, lest the outer part should crack before the thick part is done. If on drawing up the fish-plate, a thin knife will easily divide the flesh from the bone in the thick parts, and if the eyes contract, and become like balls, the fish is sufficiently cooked. Drain by laying the plate across the kettle covered with the lid, and dish perfectly dry on the strainer, which should be covered with a napkin.

Vegetables require generally to be well washed, and placed in boiling water, in which is mixed a large spoonful of salt. When they sink, they are done. Green vegetables should be well picked, soaked in salt and water, drained and boiled in plenty of water, in a vessel without a lid. Cabbage requires two waters; spinnach, very little, as it is full of moisture. Pease and beans should not soak, but be merely rinsed in a colander. Winter potatoes should soak for an hour or more; whether they should be placed in cold or B. water, depends on the sort. A piece of soda the size of a small marble assists the B. of pease and cabbage, if the water is very hard.

For B. meat, the best vessel is one made of iron, tinned inside or not, but one kept perfectly dry, and free from grease or rust. Tinned vessels are proper for B. fish and vegetables; they require to be kept very dry, the moisture entering between the metals rust the iron, and makes holes that cannot be mended. A tinned vessel in daily use should be polished once a week with fine whiting and oil; two frequent polish wears off the tin. The advantage of a tin over an iron utensil is, that it gains heat sooner.

BOIS BLANC, an island of the United States of America, situated in Lake Huron, between Michillimackinac and Michigan.

It measures ten miles by three, and has a light-house at its east end.

BOIS-DE-BOULOGNE. See BOULOGNE.

BOIS-LE-DUC (Dutch, *'s Hertogenbosch*, 'Duke's Forest'), the capital of the Netherlands province of N. Brabant, is situated at the junction of the Dommel and the Aa. The fortifications are greatly strengthened by the natural situation, as the surrounding country can be flooded, leaving only two roads passable. It is a clean, well-built town, about five miles in circumference, intersected by canals, and has a citidel called Papenbril. B. has a very fine cathedral, an academy of arts, a grammar-school, several hospitals, &c. Iron-founding, book-printing, the making of ultramarine, beer, spirits, linen-thread, ribbons, and cutlery, are the principal industries. Pop (1879) 24,678. B. was founded in 1184 by Godfrey III., Duke of Brabant. His son Henry strengthened the town with walls. B. was ineffectually besieged in 1601 and 1603, but surrendered to the Dutch in 1629. In 1794, B. was taken by the French; and in 1814, retaken by the Prussians.

BOISÉ CITY, capital of the territory of Idaho, U. S., stands on the Boisé River, on the site of an old trading post of the Hudson's Bay Company. B., which is 520 miles N.E. of San Francisco, had in 1880 a pop. of 1899.

BOISSERÉE, SULPIZ, a celebrated archæologist, was born at Cologne in 1783. A visit which he and his brother Melchior (born 1786), along with their friend Joh. Bapt. Bertram, paid to Paris in 1803, inspired the trio with the idea of collecting and preserving the scattered specimens of early German art. The realization of this idea became the single object of their lives. After many years of patient and unwearied research, they gathered together 200 pictures, which received the name of 'the Boisserean Collection.' The king of Würtemberg having presented the brothers with a spacious edifice in Stuttgart, the pictures were transferred thither, and skilfully arranged, according to their age and importance. This brought to light a very important historical fact, previously unknown—viz., that in the 14th c., Germany possessed a school of art based on Byzantine traditions. Great light was also thrown upon many of the Flemish masters, and especially on the influence exerted by Jan Van Eyck. The collection was divided into three sections corresponding to three historical periods—the first comprising the works of the Cologne school in the 14th c.; the second, those of Van Eyck and his disciples in the 15th; and the third, those of the German painters at the close of the 15th and beginning of the 16th centuries. In 1827, the collection was sold to the king of Bavaria; and in 1836 was transferred to the picture-gallery (*Pinakothek*) in Munich, whither the brothers followed it. Sulpiz died in 1841, and Melchior in 1851. The former has left several interesting and valuable works; such as, *Monuments of Architecture on the Lower Rhine, from the 7th to the 13th c.* (Munich, 1830—1833); *Concerning the Temple of the Holy Grail*, 1834; *Collection of Old Low and High German Paintings, with Notices of the Early Painters, by Sulpiz and Melchior B. and Joh. Bapt. Bertram, lithographed by J. V. Strixner* (1822—1839); and a very magnificent work, entitled *Views, Plans, Sections, and Details of the Cathedral of Cologne, with Restorations after the Original Plan, accompanied by Researches on the Architecture of Ancient Cathedrals*, &c. (1823—1832).

BOISSONADE, JOHN FRANCIS, a distinguished classical scholar, born at Paris, August 12, 1774, of a noble Gascon family. He was originally intended for the administrative career, but after experiencing some of its more violent viscissitudes, he renounced it for philology, in which he had always found his favorite recreation. He soon made himself known to the critical world by his acute and learned contributions to the literary journals, was appointed Professor of Greek in the Academy of Paris in 1809, and entered on the active duties of the chair in 1812. In 1813, he was admitted into the Academy of Inscriptions; and in 1828 he succeeded Gail as Professor of Greek Literature in the College of France. Beyond this high position he never aspired, but pursued his investigations with an energy which no mere social or public ambition could distract. His more important works are these: *Philostrati Heroica* (Paris, 1806); *Marini Vita Procli* (Leip. 1814); *Tiberius Rhetor de Figuris* (Lond. 1815); *Sylloge Poetarum Græcorum* (Paris, 1823—1826); *Babrii Fabulæ* (Paris, 1844); &c. He contributed in his earlier years numerous papers on philological subjects to Parisian, English, and German journals, and gave the cause of classical study in France a powerful and still perceptible impulse by his eloquent and attractive lectures from his chair. In spite of his many and laborious philological works, he also signalized himself as a French lexicographer and belle-lettrist, and was one of the most copious and valued contributors to the *Biographie Universelle*. He died in 1859, leaving behind him a reputation for learning almost German in its profundity, and more than English in its elegance.

BOISSY D'ANGLAS, FRANÇOIS ANTOINE, COUNT, an eminent French statesman, was born at St. Jean Chambre, in the department of Ardèche, December 8, 1756. After filling for some time the office of major-domo to the Count of Provence (Louis XVIII.), he was about to devote himself to the peaceful pursuits of science, when he was elected a deputy to the States-general. While a member of the Constituent National Assembly, he was accused of having a design to change the French monarchy into a Protestant Republic. During the Reign of Terror, fear of 'the Mountain' kept him quiet; but, yielding to the solicitations of Tallien and Barère, he joined the conspiracy against Robespierre. Two months after the execution of the tyrant, he was elected secretary of the Convention; and shortly after, a member of the Committee of Public Safety, in which capacity he displayed remarkable talent and discretion. As director of the supply of provisons for Paris, he was exposed to popular hatred and great peril during the riotous and sanguinary proceedings of the 12th Germinal and 1st Prairial in the year 3 of the Republic; but firmness and presence of mind preserved him. He was afterwards president of the Council of Five Hundred; was called into the senate by Napoleon; and made a peer by Louis XVIII. Through all the changes of the times, he maintained the principles with which he had commenced his career. He died in Paris October 20, 1826. His chief writings are *Recherches sur la Vie, les Ecrits, et les Opinions de Malesherbes*, 1819, and *Études Littéraires et Poétiques d'un Vieillard*, 1825; but, in addition to these, he published numerous essays, pamphlets, and letters.

BOJADO'R, CAPE, a headland on the west coast of Africa, in lat. 26° 7′ N., long. 14° 29′ W., forming the western extremity of the Jebel Khal (or Black Mountains), a rocky ridge running eastward into the Sahara. In consequence of its extreme flatness, and the shoreward tendency of the currents, the coast, extending northwards to Cape Nun, is one of the most dangerous that mariners have to encounter, and is frequently the scene of shipping casualties. The Portuguese doubled this cape in 1433, and from them it received its name B. C., signifying 'a round cape.'

BOJA'NO, a town in the province of Campobasso, Italy, 13 m. S. W. of the town of Campobasso. It is situated on the Biferno, in a deep gorge at the foot of the mountain-range of Matese; has a cathedral and some ancient remains. It has suffered greatly from earthquakes, and especially from one which occurred in 1805. Pop. 3500. B. is said to occupy the site of the famous Samnite city of *Bovianum*, but T. Mommsen thinks that Bovianum lay 20 miles to the north. Unsuccessfully besieged by the Romans in 314 B.C., it was taken by them in 311, and yielded immense spoils. Passing out of their hands, it was retaken by them in 305 B.C.; and once more reverting to its original owners, was a third time captured by the Romans, in 298 B.C. During the second Punic War, it formed the head-quarters of the Roman army on more than one occasion; and in the great Social War, the confederates, on the fall of Corfinium, made it their capital and the seat of their general council. Surprised by Sulla, it was retaken by the Marsic general, Pompædius Silo. Cæser established a military colony here; and afterwards, under the Roman empire, the town seems to have recovered considerably from the ruin which overtook it on the general devastation of Samnium.

BOJAR (pronounced *Boyar*), a word originally of the same meaning as Czech, Lech, and Bolgarin, i. e., free proprietor of the soil. The Bojars, in old Russia, were the order next to the knjazes or knjeses (ruling princes). They formed the immediate 'following' of the princes, and bore somewhat of the same relation to them as the lesser English and Scottish knights of the feudal ages did to the great barons Percy, Douglas, &c. They had their own partisans, who served them as a kind of body-guard; they gave their services to a prince of their own choice, whom, however, they left again at their pleasure, and, in consequence of this, the knjazes could only secure their allegiance by the bestowment of privileges which were often abused. They held exclusively the highest military and civil offices, and were so universally looked up to by the mass of the people, that the most powerful rulers, even Ivan the Cruel, considered it prudent to use this form of expression in their ukases: 'The Emperor has ordered it; the Bojars have approved it.' Rank among the Bojars was always proportioned to length of state-service, and was observed with the utmost rigor, so that the B. who had obtained an office, as it were, yesterday, looked down with proud contempt on him who only entered on his to-day. This singular mode of securing gradation of rank was called *miestniczestwo*. It was a most peculiar phenomenon of Slavic life, equally unlike feudalism and modern aristocracy, and must be regarded as a strictly national development. In their house-keeping the Bojars were excessively fond of splendor, and their contempt for the serfs or 'lower orders' was immeasurable. In the lapse of time, many Chinese customs—as might be expected from their theory of rank—crept into their public life. Their power, and the respect which was paid them, acted as a wholesome check upon the otherwise unbridled authority of the princes; in consequence of which, the latter

became their bitter enemies, and often sought to destroy their power. This was finally done by Peter the Great, who abolished the order of Bojars by giving them a place among the Russian nobility, but, at the same time, stripping them of their peculiar privileges. The last B., Knjaz Ivan Jurjewicz Trubeckoj, died 16th January 1750.

In Moldavia and Walachia, bojars still exist. They have a seat and vote in the council of the Prince, and, as recent history shows, exercise at times a most extensive influence.

BOKHA'RA (i. e., Eastland), or USBEKISTAN, is the name given to the countries of Independent Tartary, under the rule of the khan of Bokhara. The most important part of it formed the ancient Sogdiana. The extent of the khanate of B. has been constantly undergoing changes. Until recently, it included the whole basin of the Zar-afshan; but the Russians have now annexed Samarcand, and the lower basin of the river forms the essential part of the territory. The population of the present khanate has been estimated at from 1,000,000 to 2,500,000.

Only in the neighborhood of the rivers is cultivation possible. The rest of the soil of B. is composed of a stiff arid clay, interspersed with low sand-hills. B. belongs exclusively to the basin of the Sea of Aral. It has only three rivers of any importance—the Amu or Jihun (anciently the *Oxus*), the Zar-afshan, and the Kurshi. Entering B. at Kushtuppa, the Amu flows through the country in a west-north-west direction to the Sea of Aral. Its banks in some parts are very fertile, especially in the neighborhood of Balkh. The Zar-afshan, which rises in the spurs of the Thianshan Mountains, after a course of about 200 miles, issues out into the plain near Samarcand, and thence fertilizes the district (Mecankal) to the city of Bokhara. Before reaching the city, it sends out a northern branch, which, after a fertilizing course of several miles, is absorbed in the sand. The southern branch passes B. to the north, and terminates in the lake of Kara-kool, a sheet of salt water about 25 miles in circumference, which is connected with the Amu by irrigating canals. The valley of the Zar-afshan is the richest as well as the most populous in Bokhara. The Kurshi has a course of about 60 miles before it is lost in the desert.

The climate of B. is moderate and healthy. Its geographical position secures B. the transit-trade between Russia and the south of Asia. The rains usually commence and end with February. Violent sand-storms are frequent, and occasion ophthalmia among the inhabitants, who are also subject to the attacks of the guinea-worm, which penetrates into the flesh, causing great pain and annoyance.

Minerals are scarce. The sands of the Oxus yield gold. Salt deposits are numerous. Alum and sulphur are found in the vicinity of Samarcand, and sal-ammoniac in the moutainous districts. The other products include rice and cotton, wheat, barley, beet-root, vegetables, hemp—which is only used in the preparation of an intoxicating liquor called *bhang*—silk, fruits in immense abundance, and tobacco. The camel's thorn, a plant that grows luxuriantly in Samarcand and Kurshi, exudes a saccharine gum or manna, extensively used as sugar.

Sheep and goats form a great source of wealth. Camels are numerous and valuable; the horses are celebrated for their strength and endurance; and the breed of asses is excellent.

The industry includes the manufacture of silk-stuffs, cotton-thread, shagreen, jewelry, cutlery, and fire-arms. The population, like that of the other khanates of Turkestan, consists chiefly of Tajiks of Persian, and of Usbeks and Turkomans of Turkish origin.

B. was conquered by the Arabs in the beginning of the 8th c., who were dispossessed of it in 1232 by Genghis Khan. It fell into the hands of Timur in 1303, and was taken by the Usbeks in 1505, and it has since remained under the rule of the same Turkish race. During the 18th c., the khans were characterized by the worst abominations of eastern vice and fanaticism; and Bokhara lost its pre-eminence among the khanates of Turkestan. The canals, which alone gave fertility to the country, were neglected; and large areas were again overspread by the desert; the population diminished; B. became a center of corruption and anarchy. About thirty years ago, it was ruled by the Khan Nasrullah, a barbarous and incapable tyrant. It was he who caused, in 1843, the murder of Colonel Stoddart and Captain Connolly, who went on a mission to B. Dr. Wolff, who visited the country in 1844, with a view to ascertain their fate, narrowly escaped with his life, after a detention of some months. After the capture of Tashkend by the Russians in 1865 (see TURKESTAN), a religious war was preached against the Russians, and the khan, Muzaffer-Eddin, was compelled to oppose them. He was defeated at the battle of Idjar on 20th May 1866, and in May 1868, Samarcand (q. v.), one of the most important cities of B., was taken. The command of the upper course of the Zar-afshan, which fertilizes the central part of B., placed the khan entirely under the power of Russia. On the 30th July 1868, a peace was concluded, by which Samarcand was ceded to the czar, and stipulations were entered into, favorable to Russian trade. The treaty caused great dissatisfaction to the fanatic Mussulmans of B. They rose in rebellion, placing at their head Kahn Abdul Malik Mirza, the son and heir of the khan. The Russians, on the intercession of the khan, aided him; and in October the rebels were defeated near Karchi. The rebel prince sought refuge in Afghanistan. Shere Ali, the ameer, gave him a warm welcome, and would have invaded Bokhara had he not been restrained by Lord Mayo, the Indian viceroy, who told him that England could not encourage him in any attack on his neighbors. While Shere Ali was meditating an invasion of B., Abdulrahman, a nephew of Shere Ali, who had married a daughter of the khan of B., endeavored to obtain Russian aid in invading Afghan Turkestan with a Bokharian army. But, in this case, Russia opposed the enterprise (see AFGHANISTAN). During the invasion of Khiva in 1873, the khan of B. efficiently assisted the Russians, and was rewarded by a large addition to his territory from the Khivan possessions on the right bank of the Oxus, under the treaty entered into between Russia and Khiva in July 1873.—See *History of Bokhara from the Earliest Period to the Present Time*, by Arminius Vambery (1873).

BOKHA'RA (honored with the title of the 'Treasury of Sciences'), a famous city of Central Asia, capital of the above khanate, is situated on a plain in lat. 39° 48′ N., long. 64° 26′ E., in the midst of trees and gardens. It is between 8 and 9 miles in circumference, and surrounded by embattled mud-walls, about 24 feet high, and pierced by 11 gates. The houses, which are small, ill-lighted, and, with the exception of those belonging to the wealthy, uncomfortable inside, are built of sun-burnt bricks on a wooden framework; and the roofs of all are flat. The streets are ill-paved and very narrow, the widest barely sufficing for the passage of a loaded camel, while others are not more than 3 or 4 feet across. The palace of the khan occupies an eminence of between 200 and 300 feet in height in the center of the city. It is surrounded by a brick wall of 60 or 70 feet high. The area includes, besides the palace, the harem, which is quite embosomed in trees; various public offices, the residences of the vizier and other important state-functionaries, the barracks, royal stables, &c., and three mosques. The mosques, which are said (fabulously) to be 360 in number, necessarily form one of the greatest features of Bokhara. The most imposing one occupies a square of 300 feet, and has a cupola 100 feet high, ornamented with blue tiles. Attached to it is a tower of about twice the height, built by Timur, from which criminals are hurled. B. is celebrated as a center of learning, and has, in addition to a vast number of schools, about 80 colleges, which are attended, it is stated, by about 5000 students. As a commercial town, B. is the most important in Central Asia. A canal intersects the city, but during the summer months it is often dried up, and water becomes very scarce. Pop. estimated at 70,000. See TURKESTAN.

BOKHARA CLOVER. See MELILOT.

BO'LA BO'LA, or BONA BONA, or BORA BORA—the liquids *l*, *n*, *r* being interchangeable, or rather, perhaps, undistinguishable in the languages of Polynesia—one of the Society Islands, about 200 miles to the north-west of Tahiti. It is in lat. 16° 32′ S., and long. 151° 52′ W., presenting a valuable landmark in a double-peaked mountain of considerable height. It contains about 1800 inhabitants; and it is about 24 miles round, beset by coral-reefs, some of them rising into islets.

BOLA'N PASS, a hollow route ascending in a generally west direction from Sinde, on the Indus, through Beloochistan to Candahar and Ghuzni. Its entrance and its outlet are respectively 800 and 5793 feet above the level of the sea. The total ascent, therefore, is about 5000 feet, which, on a length of barely 55 miles, gives an average of fully 90 feet to the mile. Along the bottom of the pass descends a torrent, which the road generally follows. The route, without being impracticable, is highly defensible in a military point of view. It is bounded throughout by eminences of at least 500 feet in height; and yet, in 1839, a division of the British army, which invaded Afghanistan, accomplished, with a heavy train of artillery, the whole distance in 6 days. From the outlet of the B. P. there is no fall towards the west, the spacious plateau of the Dasht-i-Bedowlut retaining the level of the upper extremity.

BOLBEC, a well-built town of France, in the department of Seine-Inférieure, about 18 miles north-east of Havre, on the railway between that place and Paris. B. is situated on a stream of the same name, which supplies the water-power for several mills, where woollen, linen, cotton, and chemicals are manufactured. Pop. (1876) 9778.

BOLE is the term applied to an earthy mineral resembling clay in structure, and consisting essentially of silica, alumina, and red oxide of iron. It occurs in nests and veins in basalt and other trap rocks, in Scotland, Ireland, France, Armenia, Italy, Saxony, and South America. It feels more or less greasy when placed between the fingers; is of different colors—yellow, red, brown, and

black; has a dull resinous lustre, but a shining streak; is readily friable; and often adheres to the tongue when brought in contact therewith. *Armenian B.* has a red tint, is often used for coloring false anchovies, and is also employed in coloring tooth-powders. *Lemnian Earth* is the B. from the island of Lemnos, is red in color, and was at one time prescribed by medical men as a tonic and astringent medicine; and acted beneficially, no doubt from the large percentage of oxide of iron present. The boles which are employed in veterinary practice in Europe are generally made from Armenian bole. The savage tribes in South America eat B. to allay the pangs of hunger; and the inhabitants of Java use cakes made of it, under the name of *Tanaampo*, when they wish to become slender. When B. is calcined, it becomes hard; and when afterwards levigated, a coarse red kind is used as a pigment in Germany under the names of *English red* and *Berlin red*. *French B.* is pale-red; *Bohemian B.*, reddish-yellow; *Silesian B.*, pale-yellow; and *Blois B.* is yellow.

BOLE'RO, a Spanish national dance, mostly in the time of a minuet, with a sharp, marked, and peculiar rhythm. It is accompanied with the castanets and the cithern, and frequently with the voice; and the dancer in the movements seeks to represent the different degrees of feeling from coyness to the highest ecstasies of love.

BOLE'TUS, a genus of *Fungi* (q. v.) of the division *Hymenomycetes*, subdivision *Polyporei*. The older botanists included in it the numerous species now forming the genus *Polyporus* (see AMADOU, DRY ROT, and POLYPORUS) and other genera; but even as now restricted, it is a very extensive genus. Most of the species resemble the common mushroom and other species of *Agaricus* in form; but instead of gills, the under side of the cap (*pileus*) is occupied by a layer quite distinct from it in substance, and pierced by pores so as to be composed of a multitude of small tubes united together, on the inside of which the *spore-cases* or seed-vessels are produced. Some of the species are edible. *B. edulis* is much used in France, also in Germany, Hungary, Russia, &c. It is the *Ceps ordinaire* of the French markets. It grows on the ground in thin woods of oak, chestnut, or beech, and sometimes in mountainous districts, in places covered with moss, heath, or grass. In moist warm summers it sometimes appears in prodigious quantities. It has also been partially cultivated, by enclosing a portion of a wood, and watering the ground with water in which the plant has been steeped, thus, in fact, sowing its minute seeds or spores. In Britain, it is comparatively rare. The cap is smooth, 6 or 7 inches across, with a thick margin, varying in color from light-brown to brownish-black; the tubes at first white, then yellow and finally yellowish-green; the stem thick and solid, beautifully reticulated. The tubes are removed along with the skin and stem, and only the flesh of the cap is eaten, which is firm, white, delicate, of agreeable smell, and is prepared like the common mushroom, dried to flavor sauces, ragouts, &c., or eaten raw with salt and pepper. It is wholesome and nutritious, and this is certainly to be reckoned one of the very best of the edible fungi, and deserves much more attention than it has yet received in Britain.—*B. scaber* is another edible British species, but much inferior.—*B. æneus* is the *Ceps noir* of the French markets, and *B. aurantiacus* is the *Gyrole rouge* or *Roussile*. They are used like *B. edulis*.

Boletus edulis.

BOLEYN, ANNE, wife of Henry VIII., king of England, was born about the year 1507. Her father was Sir Thomas B., afterwards Viscount Rochford and Earl of Wiltshire; her mother, the daughter of the Duke of Norfolk. In her seventh or eighth year, Anne B. went to France with Mary, sister of Henry VIII., and remained in France after Mary—who had married Louis XII.—returned to England as a widow, under the protection of Queen Claude, wife of Francis I., who was much pleased with her beauty and liveliness. It is not known exactly when she returned to England, but it is certain that she was one of Queen Catharine's maids of honor in 1527, in which year the king appears to have conceived and expressed a passion for her, to which she apparently refused to listen on other condition than that she should become his wife. Henry's religious scruples regarding the lawfulness of his marriage with Catharine, whether he had entertained them before (as is alleged) or not, certainly became much more impatient than they had hitherto been—much too urgent, indeed, for the slow decision of the court of Rome. He, accordingly, without waiting for the award of his Holiness, entered privately into matrimonial relationship with Anne B., in January 1533, or, as some authorities have it, in the November previous. In September 1533, the Princess—afterwards Queen—Elizabeth was born. The new queen, naturally light and gay of heart, and educated at the French court, where these qualities were likely to be developed to the utmost, conducted herself towards the courtiers with an easy familiarity not customary in England for one in her position. Concerning the first two years of her married life, we have little information, only it is known that she was favorable to the Reformation, and promoted a translation of the Bible. In 1535, the affections of the king appear to have become alienated from her. According to some historians, the amorous monarch had already fixed upon a successor to Anne B.; others make out that his passion had nothing to do with her death, and assert that Henry contracted his unseemly hasty marriage with Jane Seymour solely at the request of the peers and privy council. If this latter statement could be thoroughly relied on, it would no doubt tell strongly against Anne B., as there would then be no apparent motive for Henry seeking her condemnation if she were innocent.

Between conflicting historians, one may well hesitate to decide on this point. In February, 1536, the queen gave birth to a son, still-born. The king now became more and more estranged from her; and her freedom of manners had given but too good grounds for her enemies to speak evil of her. On the 1st of May, the annual tournament was held at Greenwich, in presence of the king and queen. The tilting had commenced, the challengers being Viscount Rochford, brother to the queen, and Sir Henry Norris, one of the gentlemen of the king's privy chamber. Suddenly the king rose—his outward bearing manifesting inward disturbance—left the tourney, and with a small party rode up to London, leaving the queen at Greenwich. The popular account is, that the king's sudden departure was occasioned by the discovery of a handkerchief belonging to the queen in the possession of Norris; but the necessity for any such romantic and sudden cause of jealousy is obviated by the fact, that, in the previous week, a commission, composed of members of the privy council, had been secretly engaged in examining into charges of adultery against Anne; and two of her alleged accomplices in the crime, Sir William Brereton, a gentleman of the king's household, and Mark Smeton, a musician at court, had been already arrested. The queen remained at Greenwich that night. On the following morning, she was examined before the privy council, under the presidency of the Duke of Norfolk, her uncle, but a bigoted Roman Catholic, and protested her innocence. In the afternoon, however, she was sent up the river to the Tower. Sir Henry Norris, and Sir Francis Weston, another courtier, along with Smeton, were also examined, and all at first declared their innocence of the charge imputed to them; but afterwards the musician confessed to the crime. Norris, too, it is said, made a like confession; but he indignantly repudiated it the next day, on the ground that he had been entrapped into it unwittingly. In the Tower, the queen's every action and word were watched and reported on; but anything she said while a prisoner seems quite as compatible with innocence as guilt, although her words unquestionably prove her to have exhibited a dangerous levity towards the courtiers; for which, however, her French education may be held to account. Her letter to Henry, written on the 6th May, speaks decidedly in her favor. On the 10th May, the grand jury of Middlesex found a 'true bill' on the indictment, which charged the queen with committing adultery with no less than five persons, including her own brother, Lord Rochford, and of conspiring with them, jointly and severally, against the life of the king, the adultery being alleged to extend over a period of nearly three years. On the 11th, the grand jury of Kent found a true bill likewise. On the 12th, the four commoners, Brereton, Weston, Norris, and Smeton, were found guilty, the last confessing to the charge of adultery only, the other three pleading not guilty to both charges.

On the 15th, the queen and her brother were tried before twenty-seven peers, the president being the Duke of Norfolk. They affirmed their innocence; but they were found guilty, and condemned, the queen to be burned or beheaded on the Tower green. On the 17th, Smeton was hanged, and the other four beheaded; general protestations of unworthiness by them at the hour of death being regarded by some historians as evidence of particular guilt. On the 19th, the queen was beheaded—having previously confessed to Cranmer some engagement that rendered her marriage with the king illegal—with her last words praying a blessing on Henry, who, she said, had ever been to her a good and gentle lord, but making no confession of guilt.

It is difficult, if not impossible, to form anything like a just and satisfactory estimate of the character of Anne B.; historians, for the most part having made her but a lay-figure upon which to hang the drapery of religious partisanship, or to display the colors of individual sympathy. That with the courtiers, she maintained not that dignity which becomes a queen, but was unguarded in manner, and thoughtlessly free of speech, there can be no question; there is much room to doubt that she was guilty of the heinous offences laid to her charge. A woman who resisted for years the criminal solicitations of the king, was not likely to seduce systematically grooms of the chamber; nor is it at all probable that one so diabolically bad as she must have been, if the charges alleged against her were true, could be so utterly devoid of that cunning necessary

to the practice of successful wickedness. Again, it seems scarcely possible that such an extensive system of conspiracy and crime could have been carried on for nearly three years without being noticed by the lynx eyes, and blown upon by the calumnious tongues, of her numerous and powerful enemies, especially if there were truth in the statement in the indictment, that her accomplices were 'very jealous of each other.' On the other hand, it appears monstrous to suppose that seventy noblemen and commoners of England, before whom the case in its various stages came, against most of whom even slander had not a word to say, should have deliberately condemned a queen and five of her associates, and their own, without conclusive evidence. In the absence of the evidence which they had before them, however, it appears to us that the proper verdict for history to pronounce is the intermediate one of *not proven*.

BO'LI, or BOLY, a town of Asia Minor, in the paspalic of Anatolia, on the left bank of the river Boli, and on or near the site of the Roman Hadrianopolis, 136 miles east from Constantinople. The town occupies an eminence, at the extremity of a fertile plain. It has several mosques. There are mineral springs near the town, and baths much frequented by the Turks. It is on the caravan route from Constantinople to Erzeroum. Pop. 10,000.

BOLINGBROKE, Henry St. John, Viscount, born at Battersea, October 1, 1678, was educated at Eton and Oxford, after which he traveled for about two years on the continent, and in 1700, shortly after his return, married the daughter of Sir Henry Winchcomb, from whom, however, he soon separated. Up to this period, he was chiefly notable for his extreme dissipation; but having entered parliament in 1701, he devoted himself to politics, and joining the Tory party, soon made himself prominent as an orator. In 1704, he was made Secretary at War. This office he retained till 1708, when the Whigs came into power, after which he retired from politics, and gave himself up to study, but still retained great influence as the queen's favorite counsellor. On the fall of the Whig party in 1710, he was made Secretary of State for Foreign Affairs. In 1712, he was called to the House of Lords by the title of Viscount Bolingbroke, and in 1713, against the wish of nearly the entire nation, concluded the peace of Utrecht. Having previously quarrelled with his old friend Harley—now Earl of Oxford, and his most powerful rival—he contrived his dismissal in July 1714, and immediately proceeded to form a strong Jacobite ministry, in accordance with the well-known predilections of his royal mistress, whose death, however, a few days after, disconcerted his dangerous and unprincipled schemes. The accession of George I. proved a death-blow to his prospects. On the 28th of August, he was deposed from office; in March 1715, he fled to France; and in August of the same year was attainted. For some time he held the office of Secretary of State to the Pretender; but his restless and ambitious spirit yearned for the 'large excitement' of English politics. His efforts to obtain a pardon not proving in the meantime successful, he retired to a small estate which he had purchased near Orleans. In 1718, his first wife died, and in 1720 he married the rich widow of the Marquis de Vilette. A judicious use of this lady's wealth enabled him to return to England in September 1724. His property was restored to him, but he was never permitted to take his seat in parliament. He therefore betook himself to his villa at Dawley, near Uxbridge, where he occasionally enjoyed the society of Swift, Pope, and others of his old friends with whom he had corresponded in his exile, and where he diversified his moral and metaphysical studies by his attacks on the ministry in his periodical the *Craftsman*, in which the letters forming his *Dissertation on Parties* first appeared. In 1735, finding his political hopes clouded for ever, he went back to France, in deep chagrin, and continued there till 1742. During this second residence abroad he wrote his *Letters on the Study of History*, in which he violently attacked the Christian religion. He died, after a long illness, 1751. His talents were brilliant and versatile; his style of writing was polished and eloquent; but the fatal lack of sincerity and honest purpose which characterized him, and the low and unscrupulous ambition which made him scramble for power with a selfish indifference to national security, hindered him from looking wisely and deeply into any question. His philosophical theories are not profound, nor his conclusions solid, while his criticism of passing history is worthless in the extreme. He was one of those clever, unscrupulous men, unhappily too common, who forget that God has something to do with the government of the world as well as themselves, and who, in spite of their ability, can never see that swift destruction treads, like Nemesis, on the heels of those who dare to trifle with the interests and destinies of a great people. His collected writings were published by Mallet (5 vols., Lond. 1753—1754).

BOLIVAR, Simon (named *El Libertador*, for having rescued South America from the Spanish yoke), was born at Caracas, July 25, 1783, descended from a noble and wealthy family. Having studied law at Madrid, he traveled extensively on the continent, married, and returned to his native country, where his wife soon after died. On her death, he again visited Europe, and in 1809 the United States, from which he returned with the determination to free his country from foreign despotism. Arriving at Venezuela, he at once associated himself with the patriots there; and after the insurrection of Caracas, April 19, 1810, he was sent to London with a view to interest the British cabinet in their aims. The British government, however, declaring its neutrality, B. speedily returned, and fought under General Miranda in several successful engagements. The Spaniards having again obtained possession of Venezuela, B. had to flee to Curaçoa. He did not, however, remain long inactive. Sympathized with by the republican president of New Granada, he raised a force of volunteers; defeated the Spaniards several times, his army increasing with each victory; and on August 4, 1813, entered Caracas as a conqueror, was hailed as the liberator of Venezuela, and made absolute dictator in all civil and military affairs. After defeating the Spaniards in several engagements, he was himself worsted at the battle of La Puerta, and again in August at San Mateo, where he had a narrow escape. He now went to Carthagena, and afterwards to Kingston, in Jamaica, where an assassin, hired by the Spaniards, tracked his steps, but, by mistake, murdered his secretary. Having visited Hayti, and assembled there the insurgent refugees, he landed with them on the island of Margarita, December 1816, where he convoked a congress, instituted a government, proclaimed the abolition of slavery, and immediately manumitted his own slaves. The following two years were marked by successes over Morillo. In February 1819, a congress was opened at Angostura, and B. chosen president, was armed with the power of dictator. Having conducted his forces over the almost impassable Cordilleras to New Granada, he achieved the victories or Tunja and Bojaca, and soon afterwards declared New Granada united with Venezuela as a republic, under the name of Colombia. The office of president was conferred upon him. 1822 saw the new republic cleared of royalist troops, and B. was summoned the same year to help the Peruvians, and was named dictator of Peru. After two years' fighting, the Spaniards were driven from Peru also.

B. now made a tour through the southern provinces of Peru, where he was hailed with every demonstration of rejoicing. The name of the country was changed in his honor to Bolivia (q. v.), and a million of dollars was given him, which he devoted to the liberation of 1000 slaves. The Bolivian code was adopted by Bolivia in December 1826, and in the following year by the congress of Lima, where B. was made president for life. In the meantime, dissatisfaction prevailed in Colombia, to which he returned, and, notwithstanding some dissent, was confirmed in the presidency in 1826, and again in 1828. About this time a conspiracy threatened his life, but was suppressed by the execution of the leaders and the banishment of seventy accomplices. Meanwhile, his famous code was renounced in Peru, and B. was ejected from the presidency. In 1829, Venezuela separated itself from the republic of Colombia, which was generally disturbed by faction, and B.'s ambition was loudly denounced. B. accordingly laid down his authority in January 1830, notwithstanding earnest entreaties to retain it, and retired, in failing health, to Carthagena. The congress of Bogota voted him a pension of 30,000 piastres, and awarded him the thanks of the Colombian people. He died at San Pedro, December 1830, having shortly before his death written a farewell address to the people of Colombia, in which he vindicated his character from the aspersions that had been cast on it, and complained bitterly of ingratitude. The war of liberation and the peculiar elements with which he had to deal, compelled him to assume dictatorial power; but there is no proof that he was ever insincere in his devotion to liberty. His property was mainly devoted to the service of his country. He has been described as the Washington of South America. Like other great men, he was rightly estimated after his death. By a resolution of congress, New Granada, 1842, his ashes were removed with great pomp from Santa Marta to Caracas, where a triumphal arch was erected to his memory.

BOLI'VIA, or UPPER PERU', a republican state on the west side of South America, deriving the former name from Bolivar (q. v.), and the latter from the fact that it had originally been subject to the Incas. It extends between lat 10° and 23° S., and long. 57° 30' and 70° 10' W., touching the Pacific on the S.W., Peru on the W. and N., Brazil on the N. and E., and lastly, the Plate Provinces and Chili on the S.; its area, now better defined than formerly, by treaties made with Chili and Brazil in 1866 and 1867, being about 536,000 square miles. In 1861, the population of European origin was estimated to be 1,742,352; later returns give 2,325,000. The aboriginal element is by far the most important. B. is divided into the departments of La Paz, Potosi, Oruro, Chuquisaca or Sucre, Cochabamba, Beni, Santa Cruz, Tarija, and Atacama. Hydrographically, the country may be regarded as unique. Its maritime territory, known, in fact, as the Desert of Atacama, is a sandy waste, which, with the inconsiderable excep-

tion of the Loa, does not send a single stream that is worthy of notice into the Pacific. Again, the plateau, chiefly Bolivian, of Titicaca, shut out alike from either ocean, loses its entire drainage in the Lake of Para. Lastly, the region to the east of the Andes is a cradle at once of the Plata and the Amazon, gathering for the former the Pilcomayo and the Paraguay, and for the latter the Beni, the Mamore, and the Guapai. In each section of B., the hydrography may be said to be a clue to the rainfall. On the almost riverless shore of the Pacific, the air is nearly as dry as the earth; to the east of the mountains, the trade-wind vapors from the Atlantic are copious enough not only to feed, but to flood the parent-streams of the mightiest rivers on the globe; and within the valley of Titicaca, which has a minimum height of 12,441 feet, the clouds barely supply the comparatively scanty evaporation of so lofty a surface. With regard to temperature, B., almost entirely a tropical region, may claim to embrace all the zones in the world. Each locality, excepting, of course, the sandy wastes on the Pacific, has its own peculiar vegetation. Even the arid brows of the Andes yield a coarse grass, which forms the favorite food of the guanaca, llama, alpaca, and vicuuha—animals almost as independent of water as the camel. The table-land of Titicaca produces abundantly maize, rye, barley, and wheat. Hitherto, however, B. has been remarkable mainly for its mineral productions.

The silver mines of Potosi, after having, on a well-founded estimate, completed the full tale of 2000 millions of dollars, are believed to be inexhaustible; while gold, lead, tin, salt, sulphur, nitre, and copper are abundant. The foreign trade labors under heavy disadvantages. In the days of Spanish connection, it was almost exclusively carried on—though quite as much by land as by water—along the line of the Plata; but since then, it has found its most convenient channel through the Peruvian marts of Arica and Tacua. With the aid of steam, however, the external traffic might make for itself great highways of the Plata and the Amazon. The imports, confined to articles of the highest value or of the first necessity, are principally iron, hardware, and silks; and the exports, besides the precious metals, are copper, guano, nitre, cacao, Jesuits' bark, skins, tobacco, and native manufactures. The total imports in 1875 were valued at £1,150,000; the exports at £1,000,000. In 1881, B. exported to Great Britain goods valued at £327,781; the imports from thence amounted to £118,283. The constitution of the republic, as founded by Bolivar, has suffered important modifications. According to the constitution, the executive is vested in a president, elected for four years, while the legislature consists of a congress of two chambers, called the Senate, and the House of Representatives, both elected by universal suffrage; but in reality, the fundamental law of the republic requiring the election of the president every four years has fallen into disuse; and since the presidency of Marshal Santa Cruz (from May 1828 to January 1839), the history of B. is a history of military insurrections, the supreme power having been almost invariably seized by successful commanders. In 1880—1881, the estimated revenue was £693,158, and the expenditure £959,845. The republic had in 1880 a debt of £6,000,000, including a foreign debt, consisting of a six per cent. loan of £1,700,000 nominal capital—issued at the price of 68—contracted in England in 1872, 'to subsidize the National Bolivian Navigation Company.' The army consists of about 3000 men. The seat of the executive government, formerly La Paz, was transferred in 1869 to Oruro. In 1879 a war broke out between Chili and B. allied with Peru. The issue was disastrous to the allies. The terms of peace offered by the Chilians in 1883 were severe, and demanded the cession to Chili by B. of its western seaboard districts. There are three short railways in B.

BOLKHO'V, an ancient town of Russia, in the government of Orel. B. is chiefly built of wood, and has upwards of twenty churches. It manufactures gloves, hosiery, leather, and trades in tallow, hemp, hides, and oil. Pop. (1880) 19,224.

BOLL, an old dry measure in Scotland, varying in quantity according to locality and the article measured. It is sufficient to say that a B. of oats is equal to six bushels, or six-eighths of an imperial quarter. Although superseded by imperial measures, the B. is still very commonly in use; but, as in the case of all old weights and measures, bargains by it cannot be legally enforced. See WEIGHTS AND MEASURES.

BO'LLANDISTS, an association or succession of Jesuits by whom the *Acta Sanctorum* (q. v.), or Lives of the Saints of the Christian Church, were collected and published (1643—1794). They received their name from JOHN BOLLAND, born in the Netherlands 1596, died 1665, who, with the help of Gottfried Henschen, edited the first 5 vols., containing the month of January, in 2 vols., published in 1643, and the month of February, in 3 vols., published in 1658. The project had been undertaken by a Flemish Jesuit, Herbert of Rosweyd, and on his death in 1629, his collections were entrusted to Bolland, who established himself in Antwerp, opened a correspondence all over Europe, and associated young men of his order with himself in the work. Several distinguished names are ranked among the B., as Godfried Henschen (died 1681), Daniel Papebroek (1714), Conrad Janning (1723), Peter Bosch (1736), Suyskens (1771), Hubens (1782), Dom Anselmo Berthod (1788), and Jos. Ghesquière (1802). The abolition of the order of Jesuits in 1773 caused the removal of the Bollandist Society to the monastery of Candenberg, in Brussels, till the persecutions under Joseph II. brought about its dissolution. In 1789, the Abbey of Tongerloo, in Brabant, took up the colossal task of carrying on the *Acta Sanctorum*; but scarcely had the 53d vol. appeared in May 1794, when the French occupation put an end to the work. It was not till 1837 that a new Bollandist association of Jesuits was formed, under the patronage of the Belgian government, which set aside a yearly sum of 6000 francs for this object. In 1845 this new society published, in two parts, the 54th vol. of the work, containing, among others, the life of St. Theresa, extending to 671 folio pages. Other volumes have since appeared, and more are in preparation, so that there is room to hope that at least the next generation may see the completion of this vast work, of which Gibbon has truly said, that 'through the medium of fable and superstition it communicates much historical and philosophical instruction.' M. Guizot, having ascertained that the 3 vols. for April contain 1472 lives, estimates that the 53 vols., published before the French revolution suspended the progress of the undertaking, contain more than 25,000 lives of saints.

BOLO'GNA, a province of the kingdom of Italy, formerly one of the delegations of the Papal States. It is bounded N. and E. by the provinces of Ferrara and Ravenna, and W. and S. by those of Modena and Florence. The area of the province is 1374 square miles; population in 1881, 457,506. Sloping gradually up from the plains of Lombardy in the north, its surface becomes mountainous in the south, which is traversed by offsets from the Apennines. B. is well watered, and the streams are extensively used in the irrigation of rice-fields. It is very productive, yielding corn, wine of middling quality, olive-oil, fruit, vegetables of all kinds, hemp, flax, and saffron. Silk-worms are reared in great numbers. Marble, chalk, and gypsum are the mineral products; hemp, rice, and silk the principal articles of trade.

BOLO'GNA, one of the most ancient cities of Italy, is beautifully situated on a fertile plain at the foot of the lower slopes of the Apennine Mountains, in lat. 44° 30 N., long. 11° 21' E. It is enclosed by a high brick-wall, some five or six miles in extent, but without fortifications; the canal of Reno intersects it, and, on either side, the rivers Reno and Savena sweep past its walls. B. was, next to Rome, the most important city of the Papal States. The streets in the newer parts of the city are spacious and well paved, with rich and varied colonnades, affording shelter alike from sun and rain; in the older portion, the streets are narrow, crooked, and dirty, and the arcades correspondingly low and gloomy. The city is adorned with many fine palaces of the nobility, which are rich in fresco-paintings by the great masters. Pre-eminently worthy of notice is the Piazzo Maggiore, 'the Forum of B. in the middle ages,' which includes among other fine buildings, the Palazzo Maggiore del Pubblico, and the Palazzo del Podestà. Among the fine frescoed rooms and galleries of the former, that of the Sala Farnese is the most imposing; the latter is interesting as having been the prison and death-scene, in 1272, of Enzius, the son of the Emperor Frederick II., and also as containing the archives of the city.

The great feature of B., however, is its religious edifices, which are remarkable both in the beauty of their architecture, and the abundance and splendor of the art-treasures they contain. It has more than 70 churches, the most remarkable of which are San Stefano, which is rich in relics, ancient tombs, and Madonnas, Lombard architecture, and Greek frescoes of the 11th and 12th centuries; San Petronio—which, though unfinished, is the largest church in B.—a noble specimen of Italian Gothic, with a meridian traced on the floor by the astronomer Cassini, and numerous bas-reliefs by Jacopo della Quercia and Tribolo, as well as master-pieces by other artists both in sculpture and in painting; San Domenico, with works by Michael Angelo and Niccolò di Pisa, and many other eminent sculptors—and paintings and frescoes by Guido, Francia, Lodovico Caracci, Marchesi, Simone da Bologna, Colonna, and others; and the cathedral dedicated to St. Peter, also rich in works of art, and interesting historical associations, which, indeed, cluster around all the structures mentioned. In the center of the city are two remarkable leaning towers, constructed about the beginning of the 12th c.: the tallest, called the Asinella, has a height of 256 feet, with, in 1706, an inclination of 3 feet two inches. In 1813, a careful measurement showed that this inclination had slightly increased. The other tower, the Garisenda—which is alluded to in the 31st canto of Dante's *Inferno*—has an elevation of 130 feet, with a lean of 8 feet. The university of B. is said to date its origin from the 5th c., when it was founded by Theodosius II., and to have been afterwards restored by Charlemagne. It was not, however, until the

12th c., when it was founded anew by Irnerius or Wernerus, that it attained celebrity. Its reputation during that century was so great, chiefly on account of its school of jurisprudence, that students from all parts of Europe were attracted to it. In 1262, the number receiving instruction is stated to have been 10,000, and it was found necessary to appoint professors specially for the students from each country. The university is also celebrated as the first school for the practice of dissection of the human body, as well as for the fact, that for centuries learned female professors have prelected within its walls. The famous linguist, Cardinal Mezzofanti, was a professor here. Though the number of students is now comparatively small the university of B. still holds a first place among Italian educational institutions. Medicine is now the principal study. The university library contains 200,000 vols., and 6000 MSS., 20,000 vols. having been presented by Benedict XIV. Many of the books are very rare and valuable. In the church of San Domenico there is a public library of 90,000 vols., accessible on holidays, when all others are closed. The Accademia delle Belle Arte is particularly rich in the works of those native artists who founded the far-famed Bolognese school of painting, and it has also some fine specimens of other schools. Besides being the birthplace of those painters that have made its name illustrious, B. gave to the pontificial chair Honorius II., Lucius II., Gregory XIII., Innocent IX., Gregory XV., and Benedict XIV.

B. has some important manufactures, including silk goods, velvet, crape, wax-candles, musical instruments, chemical products, paper, and sausages almost as celebrated as its paintings. Pop. (1881) 103,998.

B. owes its origin, which is said to be much more remote than that of Rome, to the Etruscans, by whom it was called *Felsina*. It afterwards fell into the hands of the Boii, from whom it passed to the Romans, who made it a colony, under the name of *Bononia* (189 B.C.). In 53 A.D., it was nearly destroyed by fire, but was restored by Claudius. After the fall of the Roman empire, it passed into the hands of the Longobards, from whom it was taken by the Franks. Charlemagne made it a free city, and its independence was confirmed by a charter from Henry V., in 1112, which also invested the citizens with the choice of their own judges, consuls, and magistrates. The feuds of the Guelph and Ghibeline factions led to the downfall of the republic, and the supremacy of the papal see, B. being made a delegation in 1513. In 1796, B. was taken by the French, and was constituted the chief town of the Cispadane Republic; and afterwards, when the kingdom of Italy was established, capital of the department Del Reno. It reverted to the pope in 1815. After that time, B. made several efforts to throw off the authority of the pope. One in 1831, was successful, but the papal authority was restored in the following year. In 1848, the Austrians attempted to obtain possession of B., but were repulsed. In the following year, however, they succeeded in capturing the city after a siege of ten days. B. was then, like the rest of the Romagna, declared to be in a state of siege, and was made the head-quarters of the Austrian second Italian corps. From the commencement of the Italian campaign of 1859, the Bolognese gave an active sympathy to the national cause; and long before the peace-negotiations at Zurich had been brought to a close, they had intimated their intention of placing themselves under the rule of Victor Emmanuel, as a part of the new kingdom of Italy. Notwithstanding the menaces of the Vatican, they persisted in their resolve; and when the question of 'Annexation to Piedmont, or separate government,' was submitted to the universal vote of the people, in March 1860, the votes for annexation were 1000 to 1. For BOLOGNESE SCHOOL of painting, see CARACCI.

BOLO'GNA PHI'AL, or PHILOSOPHICAL PHIAL, is a short, thick, narrow glass vessel, close at one end, and open at the other, which the glass-blower prepares from each pot of metal before employing it in the fashioning of tumblers, glasses, bottles, &c. See GLASS. It serves the purpose of enabling the glass-manufacturer to judge of the color and other conditions of the fused glass or metal; and as the jar is not subjected to annealing, it is very friable, and a small angular fragment of any mineral allowed to drop into it, at once causes it to fly in pieces. It is curious to notice, however, that a B. P. will bear a very heavy blow on the outside without being fractured.

BOLO'GNA STONE, an old popular name of a radiated variety of heavy spar or sulphate of barium (see BARYTA), found near Bologna, which is phosphorescent in the dark. It has been also called Bologna Phosphorus; but this name more strictly belongs to it when calcined, pulverized, and made into little cakes with gum-water. These, after being exposed to a vivid sunlight, are very phosphorescent, either in the air or under water.

BO'LOR-TA'GH, a supposed lofty mountain-chain of Central Asia, extending from lat. 35° to 45° N., and from long. 70° to 75° E., which was said to divide Turkestan (q. v.) into an eastern and western portion. It was described as being connected with the Thian-shan range and others farther north, as well as with the Hindu Kush on the south. Recent explorations have shown, however, that no such range exists, and that all that corresponds to it is a lofty mountainous region which sinks abruptly down on the east side, to the relative depression known as the Western Gobi or the Tarim Basin. See PAMIR.

BOLSE'NA, an Italian town, in the province of Rome, about 20 miles north-north-west of the town of Viterbo. It is situated on the north shore of the Lake of Bolsena (*Lacus Volsiniensis*), on the road from Florence by Siena to Rome. It has now little more than 2000 inhabitants; but in early ages it was a place of great importance, forming one of the twelve Etruscan cities, under the name of Volsinii. When finally subjugated by the Romans (280 B.C.), as many as 2000 statues are said to have been taken from it; but, though this is doubtless an exaggeration, we may gather from it that the Volsinians had achieved a high reputation for wealth and artistic skill. The Romans razed the Etruscan city to the ground, but built another in its place, which, however, is not much celebrated in history, except as the birthplace of Sejanus, the favorite and minister of Tiberius. Pliny records that it was the scene of supernatural occurrences, King Porsenna having here called down fire from heaven to destroy a monster, Volta, that was ravaging the surrounding country. In later ages, according to the traditions of the Roman Catholic Church, a doubting Bohemian priest was here convinced of the truth of the doctrine of transubstantiation, by witnessing the flow of blood from the Host he was consecrating; and in commemoration of the supernatural occurrence, Urban IV. instituted the festival of the Corpus Domini. Raphael has immortalized the incident. Half a mile from B. are a few traces of the Etruscan city, and many fragments of the Roman one remain. The Lake Bolsena is a fine expanse of water about 10 m. long and 8 broad, but its shores are very unhealthy. The Marta river carries its waters into the Mediterranean. It has two islands, Bisentina and Martana, favorite autumnal retreats of Pope Leo X.

BOLSWA'RD (Lat. *Bolverda*), an old town in the Netherlands, province of Friesland, lies 15 miles south-west from Leeuwarden. It is surrounded by a high earthen wall and broad canal. The church of St. Martin, in the Gothic style, is the largest and handsomest in Friesland. There are several benevolent institutions, and a grammar-school. The trade is chiefly in butter, cheese, and cattle. Ship-building, tanning leather, making brick and coarse pottery, spinning worsted, carding wool, &c., are the principal industries. Pop. (1880) 5613.

BO'LTON (-LE-MOO'RS), an important English manufacturing town, in South Lancashire, on the Croal, 11 miles north-west of Manchester. It was celebrated as far back as the time of Henry VIII. for its cotton and its woollen manufactures, introduced by Flemish clothiers in the 14th century. Emigrants from France and the Palatinate of the Rhine subsequently introduced new branches of manufacture; and the improvements in cotton-spinning of the middle of the 18th c., rapidly increased the trade of the town. Though Arkwright and Crompton belonged to B., the opposition of the working-classes long retarded the adoption, in their native town, of their inventions—the spinning-frame and the mule. B., containing more than 70 cotton-mills, with 2½ million of spindles, is now one of the principal seats of the cotton manufacture in Lancashire. Muslins, fine calicoes, quiltings, counterpanes, dimities, &c., are manufactured. There are 40 foundries and iron-works, and numerous dye-works. The town-hall, of Corinthian architecture, which cost in all £166,000, was opened in 1873. During the civil war, the Parliament garrisoned Bolton; in 1644, it was stormed by the Earl of Derby. Pop. (1871) 92,655; (1881) 105,973. Since 1832 it has returned two members to parliament. B. parish has numerous coal-mines.

BOLTON PRIORY is situated in a highly picturesque district on the river Wharfe, about 6 miles from Ilkley, Yorkshire. It was built for Augustinian canons about 1150. The remains are partly Transition Norman; of the church only the nave (restored) is perfect. The old barn of the priory is still in use, and an old gateway has been incorporated in Bolton Hall, a seat of the Duke of Devonshire.

BO'LT-ROPE, in the rigging of a ship, is the rope to which the edges of sails are sewn, to strengthen and prevent them from tearing. It is called a *leech*-rope up the perpendicular edge of the sail, a *foot*-rope along the bottom edge, and a *head*-rope along the top edge. All the cordage employed in furling and unfurling the sail is fastened to the bolt-rope.

BOLTS, in ship-building, are usually either of iron or copper; they are employed either for bolting together certain of the timbers, or for fastening any loose body. The B. are of various sizes and shapes, and the heads variously fashioned, according to the services to be rendered. The heads are named 'common,' 'saucer,' 'collar,' 'tee,' 'calking,' 'conical,' &c. The B. vary from half an inch to nearly three inches in diameter, and from a few inches to

many feet in length. The longest are driven through the dead-wood and through the knee of the head; others are used for securing the great guns, the stoppers of the cable, &c.; but the greater number penetrate the timbers of the ship. Some of the smaller are secured at the points by riveting, clinching, or forelocking.

BO'LUS (Gr. *bolos*, a clod or lump), a soft mass of any kind of medicine, intended to be swallowed at once; a B. differs from a pill in being larger.

BO'MARSUND. See ALAND ISLANDS.

BOMB, a missile which also receives the names of *bomb-shell* and *shell*. It is a hollow ball, usually of cast iron, fired from a mortar or other large piece of ordnance, and filled with combustibles which work great havoc when the ball bursts by the firing. All such projectiles were formerly fired from mortars only, and there was thus a definite relation between the B. and the mortar; but since the invention of shell-guns, and other modern pieces of artillery, the name *shell* has been generally substituted for that of *bomb*. The 13-inch B., which is the largest size used in ordinary warfare (instances of exceptional magnitude are noticed under MORTAR), weighs about 195 lbs., with a thickness of metal varying from 1½ to 2 inches at different parts; it bursts with about 8 lbs. of powder. The vent through which it is filled with powder is, after the filling, closed with a plug called a *fuse*, which sets fire to the powder, and at the proper moment bursts the B. into fragments. The 10-inch B., weighing about 90 lbs., is proportionately less in all dimensions than that just described; and so on for those of smaller diameters. It should be understood, however, that the above are conventional quantities prescribed and adopted more than half a century ago. Modern artillerists try experiments on bombs of various degrees of thickness, and various charges and fuses. Some of the results of these experiments, and some of the modern achievements in B.-practice in actual warfare, are noticed under MORTAR and SHELL.

BO'MBA, a kind of nickname given to Francis II., king of Naples and Sicily, in consequence of his cruel bombardment of Messina, in September 1848, in which the slaughter and the destruction of buildings was immense.

BOMBA'CEÆ. See STERCULIACEÆ.

BO'MBARD, among the now disused engines of war, was a piece of ordnance very short, thick, and wide in the bore. It differed from the Balista (q. v.) in being worked with gunpowder instead of by mechanical force; and from the mortar, in shooting forth stones instead of iron shells. Some of the bombards used in the 15th c. propelled stones weighing 200 to 500 lbs each.

BOMBARDIE'R is an artilleryman versed in that department of arms which relates especially to bombs and shells, mortars and howitzers, grenades and fuses. He has learned to load shells and grenades, fix fuses, prepare composition for fuses and tubes, &c.; and on the field or at sieges, he fires the mortars. In some foreign armies, the Bombardiers form a separate corps; but in the English army, there are some attached to every battery.

BOMBARDIE'R BEE''TLE, a name common to many species of Coleopterous (q. v.) insects of the genera *Brachinus* and *Aptinus*, of the tribe *Carabidæ* (q. v.). They have received this name in consequence of the remarkable power which they possess of discharging, for their own defense, an extremely acrid volatile fluid from the abdomen, which diffuses around them a pungent odor, and which explodes on coming in contact with the air. The species of the genus *Aptinus* have no membranous wings beneath their elytra; those of the genus *Brachinus* have. Both are found chiefly under stones. The larger and more brilliant species are tropical. Several small species of *Brachinus* are natives of England. The most common English species is only about four lines long. When roughly handled, it will make more than a dozen discharges in rapid succession. When the reservoir which contains the liquid is opened by dissection, it effervesces and evaporates instantaneously. It changes blue vegetable colors to red, and then to yellow; produces sharp pain when applied to the tongue; and leaves a yellow spot upon its surface, like that produced by a drop of nitric acid.

BOMBA'RDMENT is an attack upon a fortress or fortified town by means of shells, red-hot shot, carcasses, rockets, &c., to burn and destroy the buildings and kill the people. A bombardment is most likely to be successful when the place is destitute of bomb-proof cover; or when the governor is too humane to expose the unoffending inhabitants to this dreadful ordeal; or when the population is strong enough to compel him to yield. A bombardment requires little engineering science; whereas to reduce a place by regular siege requires the aid of engineers to direct the attack against fortifications, guns, and soldiery, leaving the inhabitants and buildings untouched. Military engineers generally regard a B. as a cruel operation; it is especially directed against the civilians and their buildings, as a means of inducing or compelling the governor to surrender the place, and terminate their miseries. In a well-defended place, the soldiers, the ammunition, and the defence-works suffer comparatively little, seeing that the bombardiers aim at pitching their terrible missiles into the heart of the place. In modern times, a B. is mostly adopted as an adjunct to a siege, distracting the governor by an incessant fire of mortars day and night. At Sebastapol, for instance, the mortars fired shells into the center of the city, to weaken the defence of the forts which were cannonaded by the siege-guns. B. is more frequently a naval than a military operation. The stores required for a vigorous B. are immense. Thus, in 1759, Rodney threw 20,000 shells and carcasses into Havre; in 1792, the Duke of Saxe-Teschen threw 36,000 shot and shell into Lille in 140 hours; in 1795, Pichegru threw 8000 shells into Mannheim in 16 hours; and in 1807, the English threw 11,000 shot and shell into Copenhagen in 3 days.

BO'MBAX. See SILK-COTTON TREE.

BOMBAY', an island of 8 miles by 3 on the west of Hindustan, having its southern extremity in lat. 18° 57′ N., and long. 72° 52′ E. It consists of two rocky ridges, which embrace a valley so low as to require embankments against the tide. Its productions, of course, are scanty and unimportant. The rain-fall, with an annual mean of 80 inches, gave, in 1831, 99·64, and in 1838, only 50·78. The temperature, ranging between 70° and 100°, averages, during the year about 80°. The climate, at one time very unhealthy, has latterly been so much improved by drainage and other appliances, that, in favorable seasons, the proportion of deaths is said very little to exceed that of London. In 1509, about a year before the capture of Goa, the Portuguese visited the island; and by 1530, they had made it their own. In 1661, they ceded it to Charles II. of England, as part of the dowry of his bride, the Infanta Catherine. In 1668, his majesty granted it to the East India Company, which in 1685, transferred what was then its principal presidency to B. from Surat. The name of the island, though manifestly a corruption of the native *Mambai*, may yet, with reference to the goodness of the harbor, have owed its specific form to the Portuguese *buon bahia*. The bay towards the mainland, even in its natural state, presents one of the finest havens in India, more particularly as being one of the few on the east side of the Arabian Sea which are accessible during the south-west monsoon. Anchoring-ground, of about 50 square miles, available for vessels of any burden, is sheltered on the north by Trombay and Salsette, and on the west by B. itself and its two insular appendages—Old Woman's Isle and Colaba; and lastly, the open passage at south, which thus makes an entering wind of the monsoon already mentioned, is narrowed on the east by the island of Caranja. Art also has done much to aid nature. The islands on the north and west—all but Trombay, which, in fact, is itself enclosed—are welded into one by three causeways; while, at the south end of this continuous breakwater, the light-house of Colaba, 150 feet high, indicates to mariners the entrance of the port along a radius of 20 miles.

BOMBAY' (City) occupies the entire breadth of the south end of the island, bordering at once on the harbor inside, and on Back Bay outside. Next to Old Woman's Isle, which, along with Colaba, may be regarded as a suburb, is the European town; about a mile to the north is the much larger Black Town; and between them is the esplanade with the barracks and the railway terminus. The population, which is exceedingly heterogeneous and dense—as many as 31 persons on an average, inhabiting each house—amounted, in 1881, to 773,196. The Hindus form the largest section; the Parsees number about 50,000; and the rest are Mussulmans, native Christians, Europeans, Indo-Portuguese, Jews, &c. Amid these various classes, the Parsees or Persians, descendants of fire-worshipers driven from their homes by Mohammedan bigotry, rank next to the English, grade for grade, in respectability and influence. The late Sir Jamsetjee Jeejeebhoy, in fact, stands forth, to say nothing of fabulous wealth, as the faultless model of a merchant-prince in enterprise and integrity, in munificence and patriotism; and ever since the introduction of the ship-building business in 1735, the Lowji family, assisted chiefly by operatives of the same race, has been at the very head of this, one of the most important interests of the city—not merely the Indian navy, to be noticed more at large under the next subdivision, but likewise several imperial men-of-war, both frigates and line-of-battle ships, having been almost exclusively the work of Parsees. Besides the dockyard, which covers about 200 acres, at the south-east of the European town, the objects most worthy of note are the town-hall, the Library of the Asiatic Society, the Mint, Cathedral, and Custom-house; the Post-office, and Public Works Office; the Missionary Houses, the Elphinstone Institution, the Grant Medical College, the University, and Sassoon's High School; the Jamsetjee Hospital, and the Jamsetjee Obstetric Hospital. The city also possesses a Chamber of Commerce, offices of the Agra Bank, Government Savings Bank, B. Steam-Navigation Company, and several insurance companies. Always favorably situated for foreign trade, B. has profited largely by the reopening of the ancient thoroughfare through Egypt, as saving more distance in proportion than any other emporium in the East, and

also as being on the direct line between Madras and Calcutta on the one side, and Aden on the other. When the civil war in the United States caused a sudden cessation of the American supplies, cotton began to be exported from B. in vast quantity; and although the re-opening of the southern ports soon checked the extraordinary activity of trade, B. was permanently benefited by the stimulus its commerce then received. It now presses Calcutta closely as the commercial capital of India; in 1880–81, 42·17 per cent of the trade of India was done through Calcutta, and 39·53 through Bombay. The chief articles of export are cotton, shawls, opium, coffee, pepper, ivory, and gums; the chief imports, piece-goods, thread, yarn, metals, wine, beer, tea, and silk. The chief mail line to India is now by Suez, Aden, and B.; and from B., letters are sent on by rail.

BOMBAY′ (Presidency) has become what it is mainly in the present century. During ninety years, it was confined, with now and then a temporary and insignificant exception, to the island and the two rocky islets on the south. Even the adjacent islands, such as Salsette and Caranja, were acquired only in 1775—the very year in which a younger presidency, after absorbing Bengal, Bahar, and Orissa, annexed Benares. With the exception of the detached territory of Sinde, this presidency, reared principally at the expense of Mahratta dominion, physically divides itself into three parts: the two Concans, between the Western Ghauts and the Arabian Sea; the eastward slope of the Western Ghauts; and, to the north of both these divisions, the alluvial tracts towards the mouths of the Taptree and the Nerbudda. Of these three regions, the first, though in a higher latitude than the second, is by far the hottest—its temperature occasionally reaching 115°. The first two differ widely as to rainfall. In the Concans, the vapors of the south-west monsoon, intercepted by the mountains, have been known to yield, at three different places in the same year, 106, 130, and 248 inches; while, almost as a necessary consequence, the eastward slope is generally liable to suffer from droughts. Without anticipating details, which will be given under the respective districts, it may be stated that B., including Sinde, contains 191,737 sq. m., of which 66,319 are in native states, with (1881) 23,359,937 inhabitants. The British part of the presidency has an area of 125,418 sq. m., and a pop. of 16,454,414. The revenue in 1880–81 was £11,431,230, and the expenditure £11,499,044. The administration is vested in a governor and three councillors, subject, however, to the control of the governor-general of India. The ecclesiastical establishment consists of a bishop of the Church of England, who has under him an archdeacon and many clergymen; and a number of chaplains of the Church of Scotland. The schools are of two classes—seminaries under the various missions, and schools managed by a board of education—the latter being by far the more numerous. The majority of the scholars use merely the vernacular tongues. In 1879—1880, the entire number of schools and colleges aided by government, or under its inspection, was 4875, with 275,133 pupils; and there are 290 girls' schools. The university of B. was founded in 1857; 436 candidates passed for admission in 1879—1880. There were 87 libraries, and 83 newspapers (81 vernacular), in 1879—1880. During the mutiny of 1857, the local army remained, on the whole, steady and faithful; and it was, in fact, a portion of it which, under Sir Hugh Rose, acted, if not actually the first, at least the second part in the suppression of the insurrection. It is to this presidency that the naval force of all the presidencies belongs.

To the island of Bombay, as to Great Britain itself, 'wooden walls' were from the beginning a necessary of life, more especially on waters proverbial for piracy from time immemorial. Accordingly, from 1670 onwards, the Company's navy have done battle for the crown. B. has benefited vastly from the establishment and extension of the Indian railway system. The first railway in Hindustan was opened in B. in 1853. There are now five main railway lines in B., giving direct communication with Ahmedabad, Calcutta, and Madras. A cable telegraph from B. to Aden was laid in 1869. Of late years, the manufacturing industries have been extremely active in B. Silk, paper, and cotton mills have been erected, and the presidency, commanding the richest cotton-fields in India, has improved to the utmost its natural advantages, by adding English machinery to its cheap labor and ready material. Government has been liberal in supplying money for public works.

BOMBAY ARMY. See East India Army.

BOMBAY DUCK. See Bummaloti.

BOMBAZI′NE is a plain fabric of cloth, for dresses, in which the distinguishing characteristic is that the warp is silk and the weft worsted. The cloth has thus a bare look. It is rather fine and light in the make, and may be of any color; and is about 24 inches in width. The fabric is now little used. It was extensively made, and chiefly at Norwich, from about 1816.

BO′MB-PROOF BUILDINGS are military structures of such immense thickness and strength that bomb-shells and cannon-balls cannot penetrate them. Two of the chief kinds will be found noticed under Casemate and Magazine.

BO′MB-VESSEL. The various kinds of *B.*, *bomb-ketch*, *mortar-vessel*, and *mortar-boat*, may all be conveniently described under Mortar-vessel.

BO′MBYX. See Silk-worm.

BOM JARDIM (i. e., Good Garden), a town of Brazil, in the province of Ceara, 20 miles south-by-east from Crato, in a rich and beautiful mountain valley. It is the center of an extensive district, yielding mandioc, sugar, &c. Pop. 6000.

BO′MMEL (Dutch, *Zalt-Boemel*), a town in the Netherlands province of Gelderland, situated on the Waal. The wide streets and houses, with gardens attached, give the town a pleasant appearance. Besides a large trade in farm produce, book-printing, making soap, beer, leather, nails, tinned pans, cigars, weaving silks, and ribbons, &c. are carried on. There is a Reformed, a Roman Catholic Church, a synagogue, and grammar-school. The former defences are now promenades. Pop. (1879) 3812. B. is a station on the railway from Utrecht to Bois-le-duc.

BO′MMELERWAARD, an island in Dutch Gelderland, formed by the Waal and Maas. It contains twelve parishes, is 16 miles in length, and its greatest breadth is 6 miles. Pop. 19,056, two-thirds of whom are Protestants. The district is extremely fertile, and besides other farm produce, flax and hops are largely grown. The town of Bommel is situated in the island, which contains many thriving villages. Fort St. André defends it on the east, and Fort Loevsteen on the west.

BO′NA, a seaport town of Algeria, in the province of Constantine, situated on a bay of the Mediterranean, in lat. 36° 54′ N., long. 7° 46′ E., and known among the Arabs by the name of Beled-el-Areb. The town, divided into two parts, Upper and Lower B., is situated in a beautiful, but unhealthy district, at the foot of a hill near the embouchure of the Sebus; is surrounded by walls flanked with square towers, and further defended by Fort Cigogne, on the top of the hill. Pop. about 20,000. Since the occupation of B. by the French in 1832, the town has been much improved, and has now good bazaars, shops, markets, reading-rooms, &c.; manufactures of tapestry, saddlery, and native clothing, and a trade in wool, hides, corn, coral, and wax. A telegraph cable was laid between B. and Marseille in 1870; and there is regular steam communication with France, Algiers, and Tunis. Among the public buildings, the Catholic church, and the convent of the Sisters of Mercy, are most remarkable. Near B. are some scanty remains of the once famous city Hippo Regius, the favorite residence of the Numidian kings, and the episcopal seat of St. Augustine, who died here in 430. This city was probably connected with the ancient *Aphrodisium* (the present Bona) by a canal, of which the outline may still be seen in a morass. Hippo Regius, in early Christian times, was the central station of commerce and civilization in North Africa, and was celebrated for its schools, theater, aqueducts, palaces, and temples, afterwards changed into churches and monasteries. It was totally destroyed by the Mohammedans under the Calif Osman in 646.

BO′NA itself, a Latin vocable, literally signifying 'goods,' and often used in pleading, and otherwise technically to designate personal estate, has several applications in the law of England, of which the following are instances: *Bona Confiscata* are forfeitures of land and goods for offences, and form a branch of the ordinary revenue of the crown.—*Bona Notabilia* are chattels to the value of 100 shillings, or personal estate of £5 or upwards, excepting in London, where the sum is £10. Where such small estate was in different dioceses or jurisdictions, it was to be proved in the prerogative court of the archbishop of the province; and so late as the year 1847, an act of parliament was passed (10 and 11 Vict. c. 98), by the 4th section of which it is enacted that the law of bona notabilia should be continued unaltered. But now, by the 20 and 21 Vict. c. 77, amended by the 21 and 22 Vict. c. 95, the whole jurisdiction and authority in relation to granting administration is exercised by the new Court of Probate.—*Bona Vacantia*, or stray goods—such as wrecks, treasure-trove, waifs, and estrays, contrary to the general rule, which gives such things to the finder—vest in the crown—*Bona Waviata* are also given to the crown. They consist of goods waived or thrown away by a thief in his flight, for fear of being apprehended.

BO′NA DE′A (the good goddess), a mysterious Roman divinity, who is variously described as the wife, sister, or daughter of Faunus. She was worshiped at Rome from the most ancient times, but only by women, even her name being concealed from men. Her sanctuary was a grotto on Mons Aventinus, which had been consecrated to her by the virgin Claudia; her festival however (the 1st of May), was not celebrated there, but in the house of the consul, inasmuch as the sacrifices were then offered up for the whole Roman nation. The solemnities were performed generally by aristocratic vestals. At this celebration no males were allowed to be

present; even portraits of men were veiled. The wine consumed was called milk, in order that its name might not be discovered, and the vessel in which it was served *Mellarium*. The symbol of the goddess was a serpent, indicating her healing powers, and certain herbs were sold in her temple.

BO'NA FI'DÉS, a Latin expression literally signifying good faith, enters largely into the consideration of legal questions, particularly matters of agreement, contract, damage, trusts, and other departments of the law; and in all of them it implies the absence of fraud, or unfair dealing or acting. This term, however, does not appear to occupy any formal or technical place in the law of England. It is the foundation of many just and enlightened maxims in the Roman jurisprudence, which in this respect, as in many others, has been followed by the legal system of Scotland. In the law of that country, a person who possesses and enjoys property upon a title which he honestly believes to be good, although it may be bad, is protected against the consequences of this illegal position by his *B. F.*, and he is entitled to retain the fruits or profits which he has reaped or received during his *bona-fide* occupancy. But such *B. F.* ends when the possessor becomes aware of the insufficiency of his title, whether by private knowledge or otherwise. In the Scotch law, again, while *B. F.* gives no support to the parties, or either of them, in a second marriage, the first subsisting, it would, it is thought, have the effect of rendering the children of such second marriage—that is, children born while the *B. F.* continues—*legitimate*. The reason of this is, that legitimacy in Scotland is not the result merely of a lawful marriage, but may be otherwise acquired; and no offence against the laws being intended by one or both of the parties, it is inexpedient to impose bastardy on the issue. The contract itself is null, because, otherwise, a sanction would be given to bigamy. But the contract having been entered into *in bona fide*, the law considers that it ought to attribute to it all the effects of a valid marriage; and such appears to have been the Scotch law from very ancient times. The law of England is not so indulgent, for there, children born under such circumstances would certainly be deemed bastards. See BASTARDS, BASTARDY; and see on the subject of this article generally, CONTRACT, DAMAGE, MARRIAGE, GUARDIAN, EXECUTOR, TRUSTEE.

The interpretation of the term *Bona Fide Traveler* has given no little trouble to the magistrates of Scotland in reference to the famous 'Forbes Mackenzie Act' (q. v.).

BONALD, LOUIS GABRIEL AMBROISE, VICOMTE DE, a celebrated publicist, was born in 1753 at Monna, near Milhau, in Aveyron. Compelled to emigrate during the French Revolution, he joined the emigrant corps, and, when it was dissolved, removed to Heidelberg, where he employed his pen in the composition of politico-philosophic works on behalf of monarchy. His first important work, *Théorie du Pouvoir Politique et Religieux* (3 vols., 1796), was seized by the Directory. It prophesied the restoration of the Bourbons. Having returned to France, B. was induced to accept the patronage of the Bonaparte family, and in 1808 was appointed Minister of Instruction. In 1815—as deputy for his department—he voted for the ultra-montane or theocratic party in the *Chambre Introuvable* (q. v.), and was one of the most influential members of the Chamber of Deputies in abolishing the revolutionary law of divorce, against which he had written in 1806; in opposing all projects of electoral reform, the alienation of forests, the efforts to get rid of the Swiss mercenaries the freedom of the press, &c. In 1823, he was elevated to the peerage by Louis XVIII. The July revolution brought his public career to a close, as he refused to take the oath of allegiance to the new dynasty. He died at Monna, 1840. His most important writings are: *Législation Primitive* (3 vols., Par. 1802), and *Recherches Philosophiques sur les Premiers Objets des Connaissances Morales* (2. vols., Par. 1818), which have been immensely applauded by his own party Their non-agreement with the fundamental facts of history has been proved by impartial criticism. His florid and incorrect style is often detrimenal to his logic; and even his admirers must admit that his faith in papal infallibility, and his veneration of the Jesuits, were carried beyond all reasonable bounds. A complete edition of his works, in 12 vols., was published under his own supervision (Par. 1817—1819).—His son, LOUIS JACQUES MAURICE B., Archbishop of Lyon, 1839, made a cardinal in 1842, faithfully adhered to his father's political and religious principles. He died, February 24, 1870.

BONAPARTE (pron. in Ital. in four syllables; in Eng., usually in three), FAMILY OF. In the 13th c., and afterwards, several families named B. appear in Italian records—at Florence, San Miniato, Sarzano, and Genoa; and towards the close of the 15th c., a branch of the Genoese B. family settled at Ajaccio, in Corsica, where they occupied a respectable position as patricians, *padre del commune* or *cittadini*, in the middle of the 16th century. In the 18th c., this family was represented by three male descendants, all residing at Ajaccio; the archdeacon, Lucien B.; his brother, Napoleon B.; and their nephew, Charles.—CHARLES BONAPARTE, father of the Emperor Napoleon, was born March 29, 1746; studied law at Pisa; and married in 1767—without the consent of his uncles—a beautiful young patrician, named Letizia Ramolino. In 1768, he removed with his family, accompanied by his uncle Napoleon, to Corte, in order to assist General Paoli in defending the island against the French invasion. As the French prevailed, and further resistance was useless, Charles B. attached himself to the French interest, and in 1771 was included by Louis XV. in the election of 400 Corsican families to form a nobility. In 1773, through the influence of Marbœuf, governor of Corsica, Charles B. was appointed royal counsellor and assessor of the town and province of Ajaccio. In 1777, he was a member of the deputation of Corsican nobles to the court of France. In this capacity he resided for some time in Paris, where he gained for his son Napoleon, through the interest of Count Marbœuf, a free admission into the Military School at Brienne. In 1779, he returned to Corsica, and in 1785 went to Montpellier, for the benefit of his health, where he died of cancer in the stomach, February 24, 1785. He was a man of prepossessing exterior and amiable character. By his marriage with Letizia, he left eight children: Joseph B., king of Spain; Napoleon (q. v.) Emperor of the French; Lucien B., Prince of Canino; Maria Anna (afterwards named Elise), Princess of Lucca and Piombino, wife of Prince Bacciochi; Louis B., king of Holland; Carlotta (afterwards named Marie Pauline), Princess Borghese; Annunciata (afterwards named Caroline), wife of Murat, king of Naples; Jerome B., king of Westphalia. These members of the B. family, with the children of Beauharnais (q. v.), adopted by the Emperor Napoleon when he married Josephine, are distinguished as the *Napoleonidæ* of modern French history. By a decree of the senate, November 6, 1804, the right of succession to the throne was restricted to Napoleon and his brothers Joseph and Louis, with their offspring. Lucien and Jerome were excluded on account of their unequal marriages. Napoleon intended to give the right of succession also to Lucien, by the additional act of April 22, 1815; but this was never concluded. As Joseph, the eldest brother of the emperor, had no son, the descendants of Louis became nearest heirs to the throne.—MARIA LETIZIA RAMOLINO, mother of Napoleon I., lived to see her family placed on the thrones of Europe, and also witnessed their downfall. She was born at Ajaccio, August 24, 1750. After the death of her husband, she lived for some time in Corsica, and in 1793, when the island came under British rule, removed with her family to Marseille, where she lived in poverty, mainly supported by the pension given to Corsican refugees.

After her son became First Consul, she removed to Paris, and when her son was crowned in 1804, received the title of Madame Mère. A brilliant court-household was given to her, which, however, was never pleasing to her modest tastes. Remembering former adversities, and foreboding reverses of the splendid success of her sons, she was prepared for all that followed. After the downfall of Napoleon, Letizia lived with her step-brother, Cardinal Fesch, in winter at Rome, and in summer at Albano, and submitted to her change of fortune with remarkable dignity. She died February 2, 1836, leaving a considerable property, the result of saving habits during prosperity.

BONAPARTE, JOSEPH, eldest brother of Napoleon, was born at Corte, in Corsica, January 7, 1768, and was educated at Autun. On the death of his father, he returned to Corsica, exerted himself to support the younger members of the family, and removed with them to Marseille in 1793. In 1797 he was elected a member of the Council of Five Hundred, and in the same year was sent as ambassador from the republic to Rome. In 1800, after he had proved his ability in several offices of state, he was chosen by the First Consul as plenipotentiary to conclude a treaty of friendship with the United States of North America. He signed the treaty of peace at Luneville, February 9, 1801, and that of Amiens, 1802; and with Cretet and Bernier conducted the negotiations relative to the *concordat*. After the coronation of Napoleon, new honors fell to the share of Joseph B., who was made commander-in-chief of the army of Naples; in 1805, ruler of the Two Sicilies; and in 1806, king of Naples. Though, during his reign, some beneficial changes of government were effected—such as the abolition of feudality, the suppression of convents, the formation of roads, the repression of banditti, the organization of laws, &c. —yet these reforms were not managed judiciously; and the collision that frequently occurred between his own humane endeavors and the reckless promptings of his imperial brother, who looked upon Naples simply as a province of the French empire, exposed only too well to the Neapolitans the weakness and dependence of their new sovereign. But, in truth, he was far too fond of the fine arts to be a vigorous ruler in stormy times; and he is accused of leaving affairs too much in the hands of his minister, the subtle Salicetti. In 1808, Joseph B. was summarily transferred by his brother to the throne of Spain, and Murat took his place as king of Naples. For Joseph, this was no favorable change; he found himself unprepared to cope with the Spanish insurgents, and after the defeat of the French at Vittoria, he re-

turned to his estate at Morfontaine, in France. In 1813, when Napoleon recognized Ferdinand VII. as king of Spain, Joseph B. refused, at first, to abdicate, though he had many times before implored his brother to release him from his royal chains; but he soon submitted, as in all other matters, to the Emperor's will.

After the battle of Waterloo, he accompanied Napoleon to Rochefort, whence they intended to sail separately for North America. In his last interview with Napoleon, Joseph generously offered to give up the vessel hired for his own escape, but meanwhile Napoleon had determined to surrender himself into the hands of the English. After a residence of some years at Point-Breeze, in New Jersey, United States, where he employed himself in agriculture, and was highly esteemed by his neighbors, Joseph B. came to England in 1832, having previously, on hearing of the July revolution, written a letter to the House of Deputies, in which he advocated the claims of his nephew, the late Emperor of France, and in 1841 was allowed to return to his wife, who had remained in Italy since 1815. He died in Florence, July 28, 1844. Joseph was the only one of his brothers for whom Napoleon professed to care anything. He was a handsome, intelligent-looking man, distinguished by the elegance of his manners and conversation. His wife, JULIE MARIE CLARY, born December 26, 1777, was the daughter of a wealthy citizen of Marseille, and the sister-in-law of Bernadotte, king of Sweden. She was a quiet and unambitious woman, with no taste for the splendors of royalty, which fell to her share during a few weeks only at Naples, for she never went to Spain. Ill health seems to have prevented her accompanying her husband to America. She died in Florence, April 7, 1845. By her marriage with Joseph B., she had two daughters 1. Zenaide Charlotte Julie, born July 8, 1801, died 1854, who became the wife of Lucien B.'s son, Prince of Canino; 2. Charlotte Napoléone, born October 31, 1802, died March 3, 1839, who married Louis Napoleon, second son of Louis B., king of Holland. Her husband died March 17, 1831.

BONAPARTE, LUCIEN, Prince of Canino, and brother of Napoleon, was born at Ajaccio in 1775, and received his education in the college of Autun, the military school at Brienne, and the seminary at Aix. Rising gradually from one office to another, he was elected deputy for the department Liamone, and in the Council of Five Hundred, spoke against the squandering of state-property, and formed a party favorable to the views of his brother Napoleon. Shortly before the 18th Brumaire, he was elected president of the Council of Five Hundred, and was the hero of that day. During the ferment which followed Napoleon's entrance, Lucien left his seat, mounted his horse, and riding through the ranks of the assembled troops, called upon them to rescue their general from assassins. Afterwards appointed Minister of the Interior, he was active in the encouragement of education, art, and science, and organized the prefectures. As ambassador to Madrid, 1800, he contrived to gain the confidence of King Charles IV. and his favorite Godoy, thus putting aside the British influence which had until then been exercised at the Court of Spain. It is said that for his services in the treaty of peace concluded between Spain and Portugal, September 29, 1801, he received 5,000,000 francs.

His constant opposition to Napoleon's progress towards monarchy involved Lucien in several misunderstandings with his brother; and their quarrel was brought to an issue by Lucien's second marriage against the views of Napoleon. On condition that he would divorce his wife, the crowns of Italy and Spain were offered to Lucien; but he refused them, and preferred living in retirement at his estate of Canino, in the province of Viterbo, near the frontiers of Tuscany, where he devoted his time to art and science. Here he enjoyed the friendship of the pope, who created him Prince of Canino and Musignano; but having denounced in his private capacity the arrogant and cruel policy of his brother towards the court of Rome, he was 'advised' to leave the city in which he was at that period residing. In 1810, he took ship for America, but fell into the hands of the English; was brought to England; and after a debate in parliament, was declared to be a prisoner, but treated with distinction. After his brother's downfall, he returned to Rome.

After the defeat at Waterloo, Lucien B. alone seems to have preserved his presence of mind. He immediately advised his brother to dissolve the chambers, and assume the place of absolute dictator. After the second ascent of the throne by Louis XVIII., Lucien lived for some time in and near Rome. In 1830, he went to England, visited Germany in 1838, and died at Viterbo, June 30, 1840. Lucien B. possessed considerable talents and firmness of character. He was in his early years a keen republican, but the weakness of the Directory convinced him that a military consulship was necessary to allay the social anarchy of France. He consequently threw himself eagerly into the designs of his brother, but protested against Napoleon giving way to his desire for a hereditary monarchy. As a writer, he was by no means successful. His long and tedious epic poem, *Charlemagne ou l'Eglise Délivrée*, in 24 cantos, was written and published in London, and was dedicated to the pope, 1814. Another heroic poem, *La Cyrnéide ou la Corse Sauvée*, followed in 1819. The *Mémoires Secrets sur la Vie Privée Politique et Littéraire de Lucien B.* (2 vols. Lond. 1819), of which Alphonse de Beauchamp is supposed to be the author, is an untrustworthy book. Lucien B. was the father of a numerous family. In 1795, he married Christine Boyer, the daughter of a citizen of St. Maximin. After her death, he married, in 1803, the widow of a stockbroker, Madame Jouberthon, who was his survivor. By his first marriage, he had two daughters, Charlotte, born 1796, died 1865, who married Prince Gabrielli of Rome; and Christine, born 1798, died 1847, who married first a Swedish count named Posse, and then Lord Dudley-Stuart. By his second marriage, Lucien had nine children: the eldest daughter, LETIZIA B., born 1804, died 1871; married, in 1824, Mr. (afterwards Sir) T. Wyse, an Irish gentleman; but a separation took place in a few years.—The second daughter, JEANNE B., distinguished by her beauty and taste for poetry, was born in 1806, and died soon after her marriage with the Marchese Honorati.—The third daughter, ALEXANDRINE MARIE B., born in 1818, married, in 1836, Count Vincenzo Valentini de Canino, and gave birth to two sons and one daughter.—CONSTANZE, the youngest daughter of Lucien B., was born in 1823.—CHARLES LUCIEN JULES LAURENT B. (eldest son of Lucien B.), Prince of Canino and Musignano, was born at Paris in 1803. He never exhibited any inclination for political life, preferring the more quiet and wholesome pursuits of literature and science. He acquired a considerable reputation as a naturalist, and especially as a writer on ornithology.

He died 29th July 1857. He was a member of the principal academies of Europe and America. His chief publications are a continuation of Wilson's *Ornitholygy of America*, and the *Iconografia della Fauna Italica*.—The second son, PAUL MARIE B., born in 1806, took a part in the Greek war of liberation, and died by the accidental discharge of a pistol, 1827.—The third son, LOUIS LUCIEN, B., born January 4, 1813, has distinguished himself by his studies in chemistry, mineralogy, and languages, and has lived much in England.—PIERRE NAPOLEON B., the fourth son, born September 12, 1815, passed through many changes of fortune in America, Italy, and Belgium, and returned to France in 1848. In 1871, he shot a journalist, Victor Noir; and being tried, was acquitted of the charge of murder, but condemned to pay £1000 to Victor Noir's relatives. He died 8th April 1881.—The youngest son, ANTOINE B., born Oct. 31, 1816, fled to America after an affair with the papal troops in 1836, and returned to France in 1848, where he was elected into the National Assembly, 1849, but retired from politics in 1851.

BONAPARTE, LOUIS, third brother of Napoleon, was born September 2, 1778, and was educated in the artillery school at Chalons, where he imbibed anti-republican principles. After rising from one honor to another, he was made king of Holland, 1806; but, in fact, he was never more than a French governor of Holland, subordinate to the will of his brother. Amid all the faults which marked his reign, it must be remembered to his advantage that on several occasions he firmly withstood the demands of France; that he replied to one requisition by saying that, since he had been placed on the throne of Holland, he had 'become a Dutchman;' that he nobly refused to accept the tendered crown of Spain; and lastly, that he did not enrich himself during his reign. After the restoration of the House of Orange, Louis considered himself free from all responsibility, and returned to Paris, January 1, 1814, where he was coldly received by the emperor. After living for some years in Rome—where he separated from his wife—he removed in 1826 to Florence, where he lived in retirement. On the escape of his son, Louis Napoleon, from the prison of Ham, the ex-king of Holland was removed as an invalid to Livorno, where he died, July 15, 1846. Louis B. was the writer of several works: *Marie, ou les Hollandaises*, 1814, a novel, giving some sketches of Dutch manners; *Documents Historiques, &c., sur le Gouvernement de la Hollande* (3 vols., Lond. 1821); *Histoire du Parlement Anglais*, 1820; and a critique on M. de Norvin's *History of Napoleon*. Louis B. was married in 1802 to Hortense Beauharnais, daughter of General Beauharnais (q. v.) by his wife Josephine, afterwards Empress of the French. As this marriage was wholly a matter of submission to his brother's will, and put aside a former engagement, it naturally ended in unhappiness and separation.

The amiable and accomplished HORTENSE EUGENIE BEAUHARNAIS, the adopted daughter of Napoleon, queen of Holland, and Countess St. Leu, was born in Paris, April 10, 1783. After the execution of her father, she lived for some time in humble circumstances, until Napoleon's marriage with Josephine. In obedience to the plans of her step-father, she rejected her intended husband, General Desaix, and married Louis B. in 1802. In 1814, she was the only one of all the *Napoleonidæ* who remained in Paris. After the Hundred Days, she visited Augsburg and Italy, and then fixed her residence at Arenenberg, a mansion in the canton Thurgau, where she lived in retirement, sometimes spending a winter in Italy. In 1831, when her two sons had implicated them-

selves in the Italian insurrection, the countess traveled in search of them through many dangers, and found the elder deceased, and the younger, the late Emperor of the French, ill at a place near Ancona. Returning with her son to Paris, she was pleasantly received by Louis Philippe and by Casimir Périer, but was obliged, in the course of a few weeks, to remove with her son to England. After some stay there, she removed to her country seat, Arenberg, where she died, after severe suffering, October 3, 1837, and was buried near the remains of her mother, Josephine, at Ruel, near Paris. She was the authoress of *La Reine Hortense en Italie, en France, et en Angleterre, pendant l'année* 1831, and wrote several excellent songs. She likewise composed some deservedly popular airs; among others the well-known *Partant pour la Syrie*, which the late Emperor of the French, with a delicate union of political tact and filial pride, made the national air of France. Of her three sons, the eldest, NAPOLEON LOUIS CHARLES, born 1803, died in childhood, March 5, 1807. The second, LOUIS NAPOLEON, born 1804, crown-prince of Holland, married his cousin Charlotte, daughter of Joseph B., and died at Forli, March 17, 1831. The third, CHARLES LOUIS NAPOLEON, became Emperor of the French. See LOUIS NAPOLEON.

BONAPARTE, JEROME, youngest brother of Napoleon, was born at Ajaccio, November 15, 1784. After receiving his education in the college at Juilly, he served as naval lieutenant in the expedition to Hayti. When war broke out between France and England in 1803, Jerome was cruising off the West Indies, but he was soon compelled to take refuge in the port of New York. While in America, he married Elizabeth Patterson, daughter of a merchant in Baltimore, December 27, 1803. Subsequently, he was employed by Napoleon in the liberation of Genoese prisoners who had been captured by the Dey of Algiers. In the war with Prussia, he commanded, in concert with General Vandamme, the tenth corps in Silesia, and on the 1st December 1807, was made king of Westphalia.

He was recognized with great pomp at Cassel, where he lived in splendor, caring very little for government, not even taking the pains to acquire the vernacular language of the country. After the war with Austria, the finances of Westphalia, through mismanagement, plunder and extravagance, as well as war expenditure, were found in an exhausted condition. The battle of Leipsic brought the reign of Jerome to a close. After the peace of 1814, he left France, and resided in Switzerland, at Grätz, and in the beginning of 1815, at Trieste. He was made a peer when Napoleon returned from Elba, and fought by the side of the Emperor at Ligny and at Waterloo. After his brother's abdication, he left Paris, June 27, and visited Switzerland and Austria, but ultimately settled in Florence. His request to be allowed to return to France was rejected in 1847, by the Chamber of Peers, but was afterwards granted, and at the outbreak of the February revolution, Jerome B. was in Paris, where he was appointed governor of the Invalides in 1848, and in 1850 was made a French marshal. He died in 1860.

His marriage with Elizabeth Patterson having been declared null by Napoleon, Jerome was forced, after he had gained the Westphalian crown, to marry Sophia Dorothea, daughter of King Frederick I. of Würtemberg. After the battle of Waterloo, her father wished to annul the marriage; but the wife of Jerome declared her resolution to share through life the fortunes of her husband. Jerome B. left in America one son by his first marriage, and had three children by his second wife—JEROME B., the elder son, born August 24, 1814, died May 12, 1847; MATHILDE LETITIA WILHELMINE B., Princess of Montfort, born at Trieste, May 27, 1820, married the Russian Count Anatol Demidov, and lived with her husband at the court of Louis Napoleon during his presidency. The younger son, NAPOLEON JOSEPH CHARLES PAUL B., born at Trieste, September 9, 1822, passed his youth in Italy; entered the military service of Würtemburg, 1837; afterwards traveled in several countries of Europe; and was banished from France, 1845, on account of his intercourse with the republican party. He returned to Paris with his father, 1847, and after February 1848, was elected into the Legislative National Assembly. He commanded an infantry division of reserve at the battles of Alma and Inkerman the following year. In 1859, he married the Princess Clotilde, by whom he has two sons and a daughter. When war with Prussia was declared in 1870, Prince N. proceeded on a diplomatic mission to his father-in-law, at Florence, but failed to obtain the co-operation of Italy with his cousin. After the fall of the empire, he took up his residence in England, but returned to France in 1872.

BONA'SIA, a genus of gallinaceous birds of the Grouse (q. v.) family or *Tetraonidæ*, perhaps more properly only a sub-genus of Grouse (*Tetrao*), distinguished by having the toes and the lower part of the tarsus (or shanks) destitute of feathers; also by the elongated feathers of the upper part of the head. To this genus belong the Hazel Grouse of the continent of Europe (*Tetrao Bonasia* of Linnæus), a species which, although not found in Britain, is very widely distributed from Siberia to Africa, and throughout that continent. In size, it scarcely exceeds the common partridge, is prettily mottled with gray and reddish brown, and has a black band near the extremity of the latteral tail-feathers. It loves the deepest solitudes of forests. The eggs are 12—18 in number. The flesh of this bird is highly prized, and German etiquette has long assigned it a place above all other dishes at the tables of princes, as the only dish which may be served twice in succession. —Another species of B. is the Ruffed Grouse of America (*B. Umbellus*, or *Tetrao Umbellus*), known also in some parts of the United States by the names of Pheasant and Partridge. It is nearly equal in size to the black-cock of Europe. Besides having the feathers of the upper part of the head elongated, the male has a large shoulder-tuft on each side. This bird is found in almost all parts of North America, from the Gulf of Mexico to Hudson's Bay, and from the Atlantic to the Pacific Ocean. It is polygamous, and in the spring the males make a noise called *drumming*, by rapid clapping of their wings, to attract the attention of the other sex, whilst they also strut with erected ruff and tail, and with wings depressed, after the manner of the turkey-cock. At this time they have fierce battles with one another, and advantage is sometimes taken of their jealous pugnacity to attract them within shot by an imitation of their drumming, accomplished by means of a bladder and a stick. The nest is formed on the ground in the woods, often under a bush, and 5—12 eggs are laid in it. The flesh, of the Ruffed Grouse is much esteemed, and the markets of the American cities and towns are well supplied with it in the winter months.— It seems probable that both these species of B. might be easily introduced into Britain, and they would be very desirable additions to the game of woods and plantations.

BONA'SUS, or BONA'SSUS. See BISON.

BONAVENTU'RA, ST., one of the most eminent Catholic theologians, whose real name was John of Fidanza, was born in 1221 at Bagnorea, in Tuscany. In 1248, he became a Franciscan monk; in 1253, a theological teacher at Paris, where he had studied; and in 1256, general of his order, which he governed strictly, but affectionately. The influence of his character now began to penetrate the church; and it was mainly through his eloquent persuasion that the differences which had sprung up among the cardinals on the death of Clement IV. in 1268 were reconciled, and all induced to unite in electing to the papal dignity Tedaldus Visconti (Gregory X.). The new pope created B. Bishop of Albano, and cardinal in 1273, when he accompanied Gregory to the Council of Lyon, where he died, July 15, 1274, from sheer ascetic exhaustion. He was honored with a splendid funeral, which was attended by the pope, the king, and all the cardinals.

On account of his unspotted character from his earliest youth, as well as the miracles ascribed to him, he enjoyed, even during his lifetime, especial veneration. Dante, who wrote shortly after, places him among the saints of his Paradiso; in 1482, he was formally canonized by Sixtus IV.; and in 1587, was ranked by Sixtus V. as the sixth of the great doctors of the church. The religious fervor of his style procured for him the title of *Doctor Seraphicus*, and his own order are as proud of him as the Dominicans are of Thomas Aquinas. A great part of his writings is devoted to the praise of his order, and to the defence of Mariolatry, celibacy, transubstantiation, communion in one kind, and other doctrines and practices of the middle ages, which he attempts to deal with in a philosophical manner. His most important works, the *Breviloquium* and *Centiloquium*, are properly text-books on dogmatics. Unfortunately, his efforts to philosophize the church creed, and that deep mysticism in which his spirit revelled, make him often obscure and unintelligible even in his most popular treatises. With B., theology is the goal of all art and science; and in his *Itinerarium Mentis in Deum*, as also in his *Reductio Artium in Theologiam*, he represents union with God, to which the soul attains through six stages, as the highest good. He did more than any other of the early theologians to give a scientific form to the mystical theology. His *Biblia Pauperum*, or 'Poor Man's Bible,' is a mystico-allegoric explanation of the plain contents of the sacred books for the benefit of the laity. In warmth of religious feeling, however, and in the practical tendency of his ethics, he far excels the hair-splitting scholastics. In his commentary on the *Sententiæ* of Peter the Lombard, he acutely argued against the eternity of the world, and also advanced some original proofs of the immortality of the soul. The most complete edition of his works appeared at Rome (8 vols. 1588—1596).

BONA VISTA, a bay and cape on the east coast of Newfoundland, in lat. 48° 42 N., and long. 53° 8 W.

BONCHAMP, CHARLES MELCHIOR ARTHUR MARQUIS DE, one of the bravest leaders of the Vendean party in the civil war consequent upon the French Revolution, was born at Jouverdeil, in the old province of Anjou, May 10, 1760; took part, like many young French officers, in the American war of liberation; and when he returned to France, was made captain. Of strong royal-

ist principles, he looked with disfavor on the revolution. After living for some eighteen months in solitude, he allowed himself to be chosen leader of the Anjou insurgents. The army of La Vendée would have been more formidable if B.'s tactics had been adopted, but this was not done until it was too late. In the sanguinary encounter at Chollet, October 17, 1793, B. received a fatal shot in the breast, and when his followers vowed to revenge his death on five thousand republican prisoners, the dying hero exclaimed: 'Spare your prisoners. I command it.' This last command was obeyed.

BOND, in Masonry, is the connection established among the stones or bricks in a wall, by disposing them so as to overlap one another. See BRICKLAYING.

BOND, in Law, is an instrument on stamped paper, by which the party granting it becomes bound to pay a sum of money, or perform any act or duty, according to the terms of agreement. In England, a B. is said to be an instrument under seal, whereby one person becomes bound to another for the payment of a sum of money, or for the performance of any other act or thing. The person who is thus bound is called the obligor, and he to whom the B. is given, the obligee; and this obligation may be either by or to one or several persons. The B. may be unconditional simply for the payment of money, or it may be accompanied with a condition, the performance of which is secured by a penalty; but in any event the debt created by a B. is of the high nature of a *Speciality Debt* (q. v.).

The requisites of a good B. are as follow: 1. The B. must have an obligor and obligee. In regard to such parties, it is to be observed that in general no person who is under any legal disability to contract, can become an obligor, though it is otherwise of an obligee. Thus, B. by a married woman neither binds herself nor her husband, but is absolutely void. This is a rule, however, which is liable to some qualifications. See HUSBAND AND WIFE. Nor can an infant bind himself, unless the B. be for necessaries. But although a married woman is incapable of executing a B., yet one given to her is valid, and the interest in it will vest in her husband, without whose concurrence in its acceptance indeed the B. will lose its force. In the same way, a B. may be given to an infant, a lunatic, or an alien. 2. The next requisite of a B. is, that it must state the precise sum in which the obligor is bound; any omission in this respect will invalidate the instrument. If, however, the sum be merely erroneously stated, the courts will make the necessary correction, and construe the B. so as to give effect to the intention of the parties. In practice, the sum stated is generally double the sum intended to be secured—the excess being meant to cover the interest and any costs. 3. A B. must be so expressed as to create a clear legal obligation. But for this purpose no particular form of words is necessary; any mode of expression by which the intention appears, will suffice. A B., again, may be in the first or third person, only it must be expressed in the English language, and not in Latin or French. 4. The B. must be duly executed. Such execution, in general, is the same as that of deeds, the sealing being the essential solemnity; and although it is usual for the obligor to sign the B., his signature is not necessary to its validity. Then the B. must be delivered, but it need not be dated; a B. has even been held good, though it bear a false or impossible date, on the principle that deeds take effect from, and have relation to, the time of their delivery, and not in reference to their date. Such, in general, is the form and structure of an English B., and it is used in an infinite variety of contracts.

In Scotland, the B.—personal B., as it is called—differs in several points of form from the English instrument. Its general structure is different, and it is executed in a different manner, with much solemnity and particularity, but without sealing; it does not bear to be for double the sum due, or any sum other than the correct one, which it states with precision, with a liquidate penalty, which is usually one-fifth of the principal sum; and it must have a *true* date, and be very specific in all its details. As in English practice, there are in Scotland two kinds of these instruments: first, bonds for money simply; and secondly, bonds for the performance and accomplishment of some act, or, as they are called in the Scotch practice, bonds *ad facta præstanda*.

A mortgage over land or other real estate is also in Scotland in the form of a B., by which name, indeed, the mortgage is technically described. Thus, there is the *heritable B.*, and the *B. and disposition in security*, the latter being the more modern form. By these mortgage bonds, the borrower not only becomes personally bound in the repayment of the loan, but 'in further security and more sure payment' he also conveys to the lender the land, or other real property, itself, on which the sum is to be made a charge, within a certain event and under certain conditions, a power of sale, by means of which the creditor, on the debtor's default, may recover his money. There are, in England, bonds by which expectant heirs may operate on their reversions, and these are called *post obit bonds*.

According to the law of both countries, certain bonds are void; such as a B. conditioned either to do something which the law considers wrong in itself, or which is legally prohibited, or to omit doing something which is a duty, or to encourage the performance of anything which is in the nature of a crime or offence against the law. In like manner, bonds to procure marriage, called marriage brocage bonds, or to restrain marriage, or for immoral considerations, or in restraint of trade, are void. A B., however, may be valid in part, or void in part, if such parts are separable. See MORTGAGE BROCAGE BONDS TO PROCURE MARRIAGE, SPECIALTY DEBT.

BOND CRE'DITOR, in England, is the name sometimes given to a creditor whose debt is secured by a bond, and therefore privileged as a specialty. See preceding article.

BO'NDAGER, the term applied in Scotland to a rural laborer who rents a cottage from a farmer under an obligation to work for him at current wages at certain seasons. There are male and female bondagers, but the arrangement in each case is the same. The origin of the bondager system is the want of a sufficient rural population for the field-work of the neighborhood. To induce the settlement of laborers, a landlord gives a certain number of cottages along with each farm, and the tenant-farmer has the privilege of letting these, with a view to securing casual assistants, such as at turnip-hoeing and harvest. When wanted, they are obliged to turn out, though it may be at a sacrifice in point of wages or feeling. Such are bondagers, a class of cottagers over whom the landlord has no direct control; and as the farmer for the most part looks alone to their physical capacity, their moral and social condition is not generally creditable.

BONDED WAREHOUSE. See WAREHOUSING SYSTEM.

BONDI, CLEMENTE, a modern Italian poet, was born in 1742 at Mizzano, in Parma. He was educated by the Jesuits; and when still very young, appointed to deliver lectures in rhetoric, in the Royal Convent at Parma. Here he produced his first work, *Giornata Villereccia* (Parma, 1773), which is a not very lively picture of the rural pleasures of the brotherhood. Having celebrated in verse the abolition of the Jesuit order, he was subjected to a priestly persecution, and compelled to conceal himself in the mountains of the Tyrol; but ultimately he found a patron in the Austrian Archduke Ferdinand. He fixed his residence in Vienna, where he died in 1821. His poems are lyrical, descriptive, satirical, and elegiac. They please cultivated men, but more especially women of delicate sensibilities, by the light-flowing elegance of their versification, and the rare purity of their style. Among his larger works may be mentioned, *La Conversazione*, *La Felicità*, and *Il Governo Pacifico*. Italians consider B.'s translation of the *Æneid* to possess remarkable excellence. His entire works were published at Vienna in 1808.

BONDOU', or BONDU, a country of Senegambia, West Africa, lying between lat. 14°—15° N., and long. 11°—13° W. The population is estimated at 1,500,000, who are principally engaged in the cultivation of the soil, which is fertile, producing cotton, indigo, millet, maize, tobacco, &c. The weaving of cotton-cloth, which, besides being made up into articles of dress, is used as currency, also forms part of the industry of the people. The surface of B. is level, with elevations in the north and central parts; the climate generally healthy, and vegetation luxuriant alike in field and forest. Iron is said to be plentiful, though not much worked, and gold is obtained in small quantity. Wild animals are numerous; and the principal river on the eastern border of the country, the Falemé, abounds with crocodiles. The inhabitants of B. profess Mohammedanism, but they trust greatly in sorcerers. The sovereign is absolute. B. exports cattle, corn, and gums; and has a transit trade in slaves, gold-dust, iron, salt and butter. The capital, Bulibani, is situated in a plain bounded by rocky hills and forests, on the left bank of the Falemé. Its streets are unpaved and dirty, and its buildings mean and miserable; mud-walls surround it, and in its center is an extensive but rude palace of the sovereign. Pop. about 2200, composed in great part of slaves, from the sale of which the ruler derives a considerable revenue.

BONE, HENRY, R.A., a celebrated enamel-painter, was born at Truro, in Cornwall, in 1755. Apprenticed to a china-manufacturer in Bristol, he removed from thence to London in 1779, where he was employed in enamel-painting for lockets, brooches, &c. An enamel-portrait of his wife, exhibited at the Royal Academy in 1780, first attracted public attention; and he soon obtained a position which rendered it no longer necessary for him to continue his drudgery for the jewelers. In 1800, he was appointed enamel-painter to the Prince of Wales, a position which he retained when the prince became king; and he also stood in a similar relationship to George III. and William IV. The Royal Academy made him an Associate in 1801, and a full Academician ten years later. Between this time and 1831, when advancing years compelled him to desist from his labors, he produced a large series of works re-

markable alike for their beauty and dimensions; in the latter quality they were unapproached by any former or contemporary artist, and the principal of which are 'Bacchus and Ariadne,' after Titian, which was sold for 2200 guineas, and is now in the National Gallery; the 'Death of Dido;' 'Hope Nursing Love,' after Sir J. Reynolds; 'Venus,' &c. He also executed a large number of historical portraits of great merit; and altogether his name is one of the highest, if not the highest in his profession. He died December 1834.

BONE is the hard material of the skeletons or frameworks of mammalian animals, reptiles, and birds. In its earliest stages, it is termed temporary cartilage (q. v.), and consists of cells massed together, except in the flat bones, as those of the skull and shoulder-blade, of which the primary foundations are to a great extent of fibrous tissue. Points or centers of ossification form, the cells alter their form and arrangement, and a deposit of earthy materials, phosphate and carbonate of lime, takes place, rendering the former flexible substance rigid. By soaking a B. in a dilute mineral acid, we can dissolve these earthy matters, and render it again flexible; on the other hand, if we expose it to intense heat, the animal matter (gelatine) is got rid of, and though the bone retains at first its form, the slightest touch will cause its now unsupported earthy matter to crumble away. We see, in the ill-nourished children of large towns, too many examples of how necessary a proper relation of these two elements of B. to each other is; in the disease called rickets, the earthy matter is deficient, and the too flexible leg-bones bend under the weight of the trunk. In the aged person, again, the B. substance becomes more densely packed with earthy matter, and becomes brittle, rendering them peculiarly liable to fractures.

Transverse Section of Bone
Showing its microscopic structure.

The bones of the skeleton are classified according to their shapes—viz., as long bones, e. g., the thigh-bone and arm-bone; flat bones, as the shoulder-blade and skull-bones; short and irregular bones, as those of the wrist or the vertebræ. The substance of bones is arranged differently in different parts—either hard and close, which is called the condensed substance, or loose and reticulated, called the cancellated structure. *Long Bones* have a shaft of hard substance terminating at each end in soft or cancellated structure; in the latter situations, the B. is more expanded and rounded off to enter into the formation of a joint. *Irregular Bones* consist of a shell of condensed tissue, enclosing a mass of cancellated structure, and are smoothed off into surfaces adapted to those of the adjoining bones. *Flat Bones* consist of two layers of hard tissue, with an intermediate cancellated structure. Anatomists also talk of *mixed* bones, those which are both long and flat, as the ribs, the breast-bone, and the lower jaw.

The shaft of a long B. is hollow, and filled with an oily substance, the marrow (q. v.); the space in which the marrow lies is called the medullary canal. This fatty substance is also found in the cancellated structure of short and mixed, and in the diploë of flat bones, and even in the condensed tissue. Bones are covered externally by periosteum (q. v.), and on the surfaces of the cavities within by a fine membrane called internal periosteum or medullary membrane. B. is largely supplied with blood-vessels, which are continued into it from those of the periosteum; the largest are those which enter the cancellated ends of the long bones. The medullary membrane receives a special artery for the supply of the compact tissue next the canal. This vessel enters the bone generally rather above its middle, and divides into two branches, one of which runs up, the other downwards, both dividing into numerous branches, anastomosing with the vessels we have alluded to as entering the cancellated tissue. After the arteries enter the compact tissue of bones, they run in small capillary canals, invisible to the naked eye, which permeate the bone, and anastomose, leaving oblong loops or meshes. The veins of B. are also contained in these canals, but they are larger than the arteries, and possess at irregular intervals, where branches meet, dilatations or reservoirs for the blood.

These canals, named Haversian, after their discoverer, Clopton Havers, an old English anatomist, vary in diameter from $\frac{1}{2500}$ to $\frac{1}{250}$ of an inch. They take a longitudinal direction, and if a transverse section is examined under the microscope, it appears pierced with holes, which are the Haversian canals cut across. Each canal is surrounded by its own layers of condensed structure, forming in the aggregate a hollow rod or pin, called the Haversian system, running through the plates of which the B. is composed, and securing their cohesion. In addition to these, there are to be seen a number of minute spaces or *lacunæ*, generally oval in man; from these pass numerous pores or *canaliculi*, which are directed to the nearest vessels: those in the periosteal, or outer lamella, pass into the B. from orifices on its surface, and the lacunæ face outwards. The pores of the internal layer, open on the medullary canal, and its lacunæ face towards it, and the lacunæ in the layers around each Haversian canal face towards, and their pores open into it.

Nerves may be seen entering B., and the acute pain felt in some of its diseased conditions prove their existence, but they have not yet been actually demonstrated in the osseous tissue; neither have *absorbents*, though we suppose from analogy that bones are supplied with them.

The several bones composing the animal frame will be treated of under the head SKELETON. Any important peculiarities in the bones of different classes of animals, are noticed under the heads of these classes.

Chemical Composition of Bone.—The principal chemical ingredients present in B. are gelatine and phosphate of lime; and the following table represents the composition in 100 parts of B. of average quality:

	Human Bones.	Ox Bones.
Gelatine	33·30	33·30
Phosphate of Lime	53·04	57·35
Carbonate of Lime	11·30	3·85
Phosphate of Magnesia	1·16	2·05
Soda and Chloride of Sodium (common salt)	1·20	3·45
	100·00	100·00

When a B. is digested in dilute hydrochloric acid at a summer heat, the earthy matters are gradually dissolved out, leaving the gelatine of the size and shape of the original B., but now soft, somewhat transparent, flexible, and even elastic. If this soft gelatinous residue of B. be boiled with water, it dissolves in great part therein, and yields a solution which *sets* or gelatinizes on cooling. A more common way of extracting the gelatine from B. is to heat the bones covered with water in a digester to a temperature of 270°—280° F., when much of the gelatine dissolves out, and leaves the earthy salts with the remainder of the gelatine. Besides the marrow (q. v.), a little fat is generally found permeating the entire structure of the B., which can be extracted by throwing the bones into hot water, when the grease or fat exudes and floats to the surface. In some of the larger bones of man and other mammalia, there is a central cavity containing a considerable amount of fatty matter, popularly known as *marrow*. These cavities are not found in the bones of the young animal, but gradually form as the animal approaches maturity. In the sloth, cetacea, seals, and a few other animals, the cavities are not found. Occasionally, as in man, the elephant, giraffe, &c., the bones in the head have cavities filled with air instead of marrow. The uses to which a B. may be put are various. In the cooking of soups, bones form a constant ingredient, and become useful in supplying gelatine, which gives a *body* to the soup it would not otherwise possess. Where the soup is required of great lightness for an invalid with weak digestive powers, the shavings of stag's horns may be employed, and these yield a *hartshorn jelly* free from oil, and which therefore sits lightly upon the stomach. How far gelatine is of itself nutritious, is a disputed question. See GELATINE and NUTRITION. Animals, however, like the dog, which masticate, devour, and digest the entire B., do derive benefit therefrom, in part from the gelatine, and in other part from the earthy substances; and the same remark applies to the use sometimes made of small fish, where, after being thoroughly browned, they are entirely eaten. In times of scarcity in Norway and Sweden, the poorer people even eat the bones of mackerel and other fish.

B. is largely used in making the handles of small brushes, the more common table-knives and forks, and penknives, and in the manufactures of the cheaper sorts of combs (q. v.). Our forefathers, before the metals were known, fashioned fish-hooks out of B., and used the spines in the tail and back-fin of certain fishes for pointing arrows. These uses of B., coupled with the employment of the serrated teeth of sharks as a war-weapon, are still practised by many uncivilized tribes. The fatty and other organic matters in B. allow of its being employed as a fuel where coal or wood cannot be obtained, as in the pampas of South America and the steppes of Tatary. In these regions, it is considered that the heat evolved during the combustion of the bones of an ox suffices to cook the flesh.

B. is likewise serviceable in the arts in yielding B.-ash (q. v.), B.-black (q. v.), B.-dust (q. v.), Dissolved Bones, (see BONES, DISSOLVED). Phosphorus (q. v.), and superphosphates, also certain oils and fats (see DIPPEL'S ANIMAL OIL), which are employed in forming lampblack (q. v.), and in the manufacture of soap (q. v.). See also BONES AS MANURE.

BONE-ASH, or BONE-EARTH, is obtained by the complete combustion of bones in an open furnace, when the oxygen of the

air burns away the organic matter or gelatine, and leaves the earthy constituents as a white friable mass, the size of the original bone, but readily reducible to the condition of coarse powder which is bone-ash. A very large quantity of B. is exported from South America to other countries, especially Britain. The used up bone-black of the sugar-refiner is also employed as a source of B., by being heated in a furnace exposed to the air. B. of good quality contains about 80 per cent. of phosphate of lime, and 20 per cent. of carbonate of lime, phosphate of magnesia, soda, and chloride of sodium (common salt); but it is occasionally found mixed with sand, especially that procured from South America. B. is employed to some extent as a source of phosphorus (q. v.), and in the making of cupels (q. v.) for the process of assaying (q. v.); but the most extensive use in the manufacture of artificial manures, such as dissolved bones (q. v.) and superphosphates.

BO'NE-BLACK, A'NIMAL CHARCOAL, or IVORY-BLACK, is prepared from bones by heating them in close retorts till they undergo the process of destructive distillation, when combustible gases and water, together with the vapors of various salts of ammonia, and oil, are given off, and B. is left in the retort. It is generally reduced to coarse grains from about the size of small peas down to large pinheads, and is extensively used in the arts for decolorizing liquids, such as sirup of sugar, and solutions of argol (impure cream of tartar) and of the alkaloids, as also in filters (q. v.), for separating chemical impurities from water. The general mode of using the B. is to allow the colored liquid to percolate through a layer of the charcoal, when all color is arrested, and the sirup or water runs clear and colorless from under the stratum of charcoal.

This power of absorbing coloring matters is also observable in vegetable (peat or wood) charcoal, but not to such an extent as in bone-black. The application of heat to the liquids before filtration greatly facilitates the decolorization, and where the volume of liquid to be operated upon is not great, the most expeditious method is to boil the liquid and B. together, and then strain through filtering-paper or cloth. The composition of B. in 100 parts is 10 of pure charcoal, associated with 90 of earthy salts—that is, in the proportion of 1 of pure charcoal in 10 of the commercial bone-black. The power of absorbing colors appears to be due to the porosity of the substance, and if not resident simply in the pure charcoal; indeed, the earthy matters (principally phosphate of lime and carbonate of lime) can be dissolved out of the B. by dilute hydrochloric acid, and the pure charcoal thus obtained only possesses about one-third the decolorizing power of the total amount of B. it was obtained from. Thus, if 100 parts of ordinary B. have the power of arresting the color from *ten* volumes of a given colored liquid, then the 10 parts of pure charcoal which can be obtained from the 100 parts of B. will be found to decolorize only *three* volumes of the same colored liquid; so that it is apparent the earthy matters in the B. influence and increase the absorption of the coloring matter, and thus render a given weight of the charcoal of greater commercial value. When sirup of sugar and other liquids have been run through B. for some time, the pores of the latter appear to get clogged with the color, and the clarifying influence ceases, and then the B. requires to undergo the process of *revivication*, which consists in reheating it carefully in ovens, or iron pipes enclosed in a furnace, when the absorbed color is charred, and the B. can be of service once again as an arrester of color. After several re-burnings, the B. becomes of very inferior absorptive quality, and is then disposed of for the manufacture of bone-ash and dissolved bones (q. v.). B. has likewise a great power of absorbing odors, especially those of a disagreeable nature, and can thus be employed to deodorize apartments, clothing, out-houses, &c., or wherever animal matter may be passing into a state of active putrefaction.

BO'NE-DUST, is obtained by reducing bones to a fine state of division, either under heavy revolving wheels, or by passing them through toothed iron rollers. In order to facilitate the pulverization of the bone, it is occasionally first subjected to the action of hot water and steam in a digester at a temperature of 270°—280° F., which dissolves out two-thirds of the gelatine, and leaves a very friable mass, which can be reduced to powder even when pressed between the fingers. B. is used in agriculture as a fertilizing agent, either in its ordinary insoluble condition, when the beneficial effects on the land are prolonged over a series of years, or as dissolved bones (q. v.), when the fertilizing force is exerted principally the first year. See BONES AS MANURE.

BONE-GE'LATINE. See GELATINE.

BONER, ULRICH, one of the oldest German fabulists, was a preaching friar of Bern, and is frequently mentioned in documents of the years 1324—1349. He flourished just when the minnesingers and poets of chivalry had passed away. His collection of 100 fables, or 'examples,' as they used to be called, was entitled *Der Edelstein* (The Precious Stone), and was first printed at Bamberg, 1461. It is marked by purity of style, and by clear and vivid delineation. This book is one of the greatest of all bibliographical rarities, for, at present, only one copy—that in the Wolfenbüttel Library—is known. It is decorated with wood-cuts. Bodmer and Breitinger published a complete edition of the work at Zürich in 1757.

BONES, DISSOLVED, a manure prepared by acting upon bone-dust by sulphuric acid of specific gravity 1600. About 15 cwt. of sulphuric acid (of specific gravity 1600) is added to every ton of bone-dust in a mixing vessel, where the whole can be thoroughly incorporated together. The resulting mass is allowed to lie in a heap for several months, during which time it dries up, and when sent into market is a dark-colored, coarse, soft powder. The original bone-dust contains a large percentage of insoluble or tribasic phosphate of lime (CaO,CaO,CaO,PO_5); and two equivalents of sulphuric acid ($HO.SO_3$) acting thereon, abstract two of the atoms of lime, and form two equivalents of sulphate of lime ($CaO.SO_3$), and one atom of the acid phosphate of lime ($HO,HO,CaO.PO_5$), which are soluble in water. As the gelatine of the B. hinders the sulphuric acid from acting fully on the earthy matter, it is customary to use a good proportion of bone-ash along with the bone-dust, and the absence of gelatine in the former admits of the acid doing its proper work. Very often, bone-ash is alone used in the preparation of Dissolved B., and then the manufactured material, containing no gelatine or animal matter, receives the name of *superphosphate of lime*, or, simply *superphosphate*. In place of bone-ash, much bony matter or phosphate of lime, in the form of APATITE (q. v.) and COPROLITES (q. v.), is now employed in part in the manufacture of some varieties of dissolved bones. The present value of Dissolved B. ranges from £6 to £8 per ton according to quality; and they contain from 20 to 35 per cent. of soluble phosphate of lime, and 15 to 3 per cent. of undissolved or insoluble phosphates. This material is very largely employed as a manure in Britain, and is eminently suitable for the cultivation of the root-crops, such as turnips, mangel-wurzel, &c.; and associated with 12 to 20 per cent. of sulphate of ammonia (q. v.), or nitrate of soda, it rivals Peruvian guano in its fertilizing effects on land where cereals—wheat, barley, oats, &c.—are growing.

BONES AS MANU'RE. The employment of bones as manure is one of the greatest modern improvements in agriculture. They are applied either simply reduced to small fragments or a coarse powder called *Bone Dust* (q. v.), or, after undergoing chemical preparations of various kinds, as the basis of highly valuable artificial manures.—See BONEASH, and BONES, DISSOLVED.—All the substances which enter into the composition of bones are desirable additions to the soil, but particularly the phosphates. Phosphoric acid, usually found in combination with magnesia, and more particularly lime, enters into the structure of every plant and animal; it is a substance, therefore, which cannot be dispensed with either in the vegetable or animal economy. Being very sparingly diffused through most soils, it is often essential to add it artificially. The productiveness in many districts of Britain had become much impaired by the diminution of phosphoric acid in the soil, owing to the quantity taken off in corn, cheese, and the B. of animals, which were annually raised and exported. The fine red sandstone loams of Cheshire were comparatively sterile in the end of the last century, which was entirely owing to the deficiency of phosphoric acid in the soil, no doubt partly to be attributed to the quantity yearly abstracted by the dairy produce sent to the market. So much was this the case, that a liberal dressing of common or calcined B. had the effect of at once doubling the value of the worn-out pastures. In other parts of Britain, however, such as the clay-soils of Suffolk—which at one time were under dairy-farms—the soil is rich in phosphates, and the application of B. as a manure is there attended with little effect. It becomes, therefore, of practical importance to ascertain when this substance should be added, and when it is not necessary to do so. It is important to observe, that although phosphoric acid is as essential to one crop as to another, yet some crops, such as turnips, require a far more liberal *artificial* supply of it than others, or wheat, which actually require as much to build up their structure. We will shortly state the principles which should regulate the practice of bone-manuring.

All perennial plants, such as grasses, are enabled to extract phosphoric acid from the soil more readily than annual plants, owing to their numerous and well-developed roots, which are ready, even at the beginning of the growing season, to draw supplies from a large mass of soil. Grasses, therefore, are only benefited by phosphoric manures when the soil is more than usually deficient in phosphates. If grass-lands are sterile, it is easy to ascertain if a deficiency of phosphoric acid is the cause, by adding calcined or crushed B., and watching their effect. An experiment of this sort is a much better guide than any analysis of the soil. In Cheshire, the quantity of B. applied to the pastures is from half a ton to a ton per acre; and this dressing will last from 16 to 25 years.

Wheat, also, from the long time it occupies the ground before it is ready to be reaped, and its slow growth during its early stages, can thrive with a small supply of phosphates. These sub-

stances are, therefore, comparatively seldom applied directly as a manure for this crop. So, also, with early-sown oats or barley. When these latter crops, however, are late sown, and the rapidly growing conditions of heat and moisture exist, phosphates are often applied with great benefit.

It is as an application to the turnip that phosphoric acid is so marked in its effects, even when the soil already contains it in considerable quantity. The reason of this is not difficult to trace. The seed of the turnip is small, and it is sown at the warm season, when the growth is rapid. The seeds themselves have only a limited quantity of phosphates stored up for the benefit of the roots and leaves of the young plants. Unless the roots, therefore, while yet short, meet with a concentrated supply, the other elements of the food of the plant—carbonic acid, water, and ammonia—however abundantly they may be present, cannot be assimilated, and its growth is arrested. Besides, a liberal supply of phosphates has the effect of pushing on the turnip through its early stages, when it is so liable to injury from various insects.

The effects of B. as a manure for the turnip are greatly increased by dissolving them in sulphuric acid, and manufacturing the soluble superphosphate of lime. Liebig suggested such a use of sulphuric acid in 1839, and since then, hundreds of manufactories of this manure have arisen over the land. The utility of the discovery, however, is not at present so great as is sometimes represented, owing to the large supply of phosphoric guanos now in the market. In these the phosphate of lime is in a finely divided state, and is readily enough taken up by plants without being dissolved by acids. No doubt, as the scarcity of guano begins to be experienced, and its price rises, it will again become a much greater object than at present to manufacture superphosphate from mineral phosphates or bones. Three to four cwts. of dissolved B. or of phosphatic guano is the quantity usually applied to an acre of turnips.

The value of B. as a manure has been long known in some parts of England, but their use was merely local, until more than two decades of the 19th c. had passed; and they were merely broken by a hammer, or rudely and imperfectly crushed by being laid in ruts where cart-wheels might pass over them. The first machines for bone-crushing were employed in Yorkshire and Lincolnshire in 1814 or 1815, and reduced them only to pieces about the size of a walnut, much larger than the coarsest or 'rough' bone-dust now in use. The employment of this manure did not become general in Scotland till 1830, although it had been introduced in East Lothian some years before. Its use has now extended to different parts of the continent of Europe, and to North America.

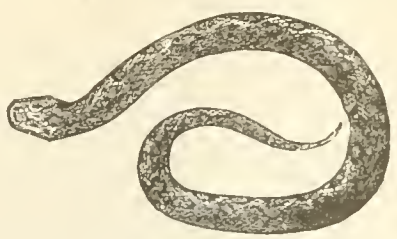
BONET, John Paul, a Spaniard of the 17th c., one of the first instructors of deaf mutes. Only one person before him had been at all successful in the art, and about him, B. does not appear to have known anything, so that he is really entitled to the claim of originality in his method, which consisted in imparting instruction by the sight instead of by the ear—gestures, writing, a manal alphabet, and an artificial pronunciation, being the means employed. His plan is minutely detailed in a volume published by him at Madrid in 1620, entitled *Reduccion de las Lettras, y Arte para enseñar a hablar los Mudos*. The manual alphabet now in use at almost all deaf and dumb institutions in Europe and America, differs little from that introduced by Bonet.

BO'NFIRE, a fire kindled for some purpose of public rejoicing, usually in an open conspicuous place, as the top of a hill, or the center of a village-green. The burning materials consist of tar-barrels, coal, and other combustibles. The practice of kindling fires of this kind is of so great antiquity in England, Ireland, and Scotland, as to be traced to pagan rites. See Beltein. It was customary to kindle one of these fires in token of rejoicing on Midsummer Eve—the evening before the 24th of June, which day was appropriated by the church for the feast of St. John the Baptist. Reference is made to bonfires on this occasion by Googe in his translation of the poet Naogeorgus:

> Then doth the joyfull feast of John the Baptist take his turne,
> When bonfiers great, with loftie flame, in everie towne doe burne;
> And young men round about with maides doe dance in everie streete,
> With garlands wrought of motherwort, or else with vervain sweete, &c.

For much antiquarian lore on the subject, see Brand's *Popular Antiquities*, edited by Sir Henry Ellis, vol. i. The origin of the word B. has been very puzzling to etymologists. In Scotland, the popular term is *banefire* or *bainfire*, which Jamieson says is apparently a corruption of bailfire, which may be doubted. Skeat holds the word was first used of the fires for burning the bones of saints and other relics in the time of Henry VIII. Another etymology is the Welsh *ban*, high, whence *ban-ffagl*, a lofty blaze, a bonfire. The hills that in English are called *Beacons*, are in Welsh *Bans* or *Vans*.

BO'NGAR (*Bungarus* or *Pseudoboa*), a genus of venomous serpents, allied to the general *Elaps* and *Naja*, and distinguished by a much keeled back, which has a row of hexagonal scales larger than the rest. The head is broad and depressed, with very strong bones. The species, which appear to be few—only two being certainly known—are natives of the East Indies. They are called



Bongar or Rock Snake.

Rock Snakes in India. *B. annularis*, which has the body surrounded with rings of black and yellow, attains a length of six or eight feet.

BONGA'RDIA, a genus of herbaceous plants of the natural order *Berberideæ* (q. v.) natives of the East. One species (*B. Rauwolfi*) produces tubers, which are eaten, either boiled or roasted, in Persia, and the leaves of another (*B. chrysogonum*) have an acid taste, and are eaten as a salad.

BONGAY', an island of the East Indian Archipelago, to the east of Celebes. It gives name to a group of islets, which supplies the neighborhood with slaves and wood.

BONHEUR, Rosalie (more commonly called Rosa), a female French artist, born at Bordeaux on the 22d of March 1822. Her first master was her own father, Raymond Bonheur, an artist of merit, who died in 1853. In 1841, Mademoiselle B. contributed for the first time two small pictures to the French Exhibition, 'Two Rabbits,' and 'Goats and Sheep,' which indicated the department in which she was to attain such eminence. These were followed by a succession of highly finished compositions; the year 1849 producing what some consider her finest picture, 'Tillage in Nivernais,' which has been placed in the collection of the Luxembourg. In 1853, her famous 'Horse Fair' was the principal attraction of the Parisian exhibition, and in 1865 she exhibited a large landscape, 'Haymaking in Auvergne.' 'On the Alert' was a study of stags; and 'A Foraging Party' of swine was exhibited in 1881. Mademoiselle B. long directed a School of Design for young girls. During the siege of Paris, 1870—1871, her studio and residence at Fontainebleau were spared and respected by special order of the Crown Prince of Prussia.

BO'NI, or BO'NY, a kingdom of the south-west peninsula of the island of Celebes, in the South Pacific Ocean. It was formerly the most powerful state in Celebes, but since 1859 has been practically a Dutch dependency. In the north, the scenery is fine, and the soil fertile—rice, sago, and cassia being produced. The inhabitants engage in agriculture and in the manufacture of cotton, and articles of gold and iron, in which they have a large trade. Their institutions, said to be very ancient, partake of the character of a constitutional monarchy. The British have twice attacked the Bonese for injuring their commerce, and selling the crews of British ships into slavery. In the second attack, in 1814, the Bonese king was killed. Pop. 200,000.—B., Gulf of, separates the south-east and south-west peninsulas of Celebes. It is 200 m. long, and 40—80 m. broad. Numerous shoals render its navigation difficult.

BONIFACE, St, is 'the Apostle of Germany,' whose original name was Winfried, was born in Devonshire, England, about 680. He first entered a monastery in Exeter, at the age of 13, and afterwards removed to that of Nutcell, where he taught rhetoric, history, and theology, and became a priest at the age of 30. At that time, a movement, proceeding from England and Ireland, was going on for the conversion of the still heathen peoples of Europe, in 614, Gallus and Emmeran had been sent to Alemannia, Kilian (murdered 689) to Bavaria, Willibrord (died 696) to the country of the Franks, Swidvert to Friesland, and Siegfried to Sweden. Winfried also took the resolution (715) of preaching Christianity to the Frisians, among whom it had as yet found no entrance. But a war broke out between Charles Martel and the king of the Frisians, and Winfried returned from Utrecht to his convent, of which he became abbot. Still bent upon his design, he repaired to Rome in 718, and received the authorization of Pope Gregory II. to preach the gospel to all the tribes of Germany. He went first to Thuringia and Bavaria, then labored three years in Friesland, and traveled through Hesse and Saxony, everywhere baptizing multitudes, and consecrating their idolatrous groves as churches. In 723, Gregory II. called him to Rome; made him bishop, with the name of Bonifacius; furnished him with new instructions or canons, and with letters to Charles Martel and all princes and bishops, requesting their aid in his pious work. Returning to Hesse (724), he destroyed the objects of heathen worship (among which are mentioned an oak near Geismar, sacred to Thor, and an idol named Stuffo, on a summit of the

Harz, still called Stuffenberg), founded churches and convents, and called to his aid priests, monks, and nuns from England, whom he distributed through the various countries. In recognition of his eminent services, Gregory III. sent him (732) the pallium, and named him archbishop and primate of all Germany, with power to establish bishopries wherever he saw fit. B. now made a third journey to Rome (738), and was appointed papal legate for Germany. The bishopries of Regensburg, Erfurt, Paderborn, Würzburg, Eichstädt, Salzburg, and several others, owe their establishment to St. Boniface. The famous Abbey of Fulda is also one of his foundations. He was named Archbishop of Mainz by Pipin, whom he consecrated as king of the Franks at Soissons (752), and he presided in the council held at that place. In 754 he resumed anew his apostolical labors among the Frisians; and at Dokkum, about 18 miles north-east of Leeuwarden, in West Friesland, this venerable Christian hero was fallen upon by a mob of armed heathens, and killed, along with the congregation of converts that were with him (755). His remains were taken first to Utrecht, then to Mainz, and finally to Fulda. In the abbey, there are still shown a copy of the gospels written by him, and a leaf stained with his blood. A collection of his letters, and the canons he promulgated for the discipline of the newly established churches, have been preserved, and are instructive as to the state of Germany at the time. The completest edition of the Letters (Epistolæ) is that of Würdtwein (Mainz, 1789). In 1811, a monument was erected to St. B. on a hill near Altenberga, in the principality of Gotha, where, according to tradition, he had erected (724) the first Christian church in North Germany. A statue by Henschel of Cassel was also erected to him in Fulda in 1842. Rittberg, *Kirchengeschichte Deutschlands* (vols. i. and ii., Gott. 1845).

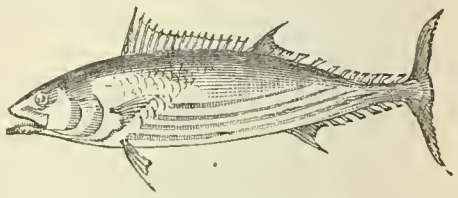
BONIFACE, the name of nine popes, most of whom are of no historic note.—B. I. (418—422) was appointed, contrary to canonical rule, by the Emperor Theodosius II., upon account of prevailing party divisions. He was the first who assumed as Bishop of Rome the title of First Bishop of Christendom.—Boniface III., who was pope only for ten months in the year 607, was the first to whom the title of Universal Bishop of Christendom was conceded by the Greek Emperor (Phocas).—B. VIII., previously Benedict Cajetan, a native of Anagni, was elected pope on December 24, 1294. His inauguration was distinguished by great pomp: the kings of Hungary and Sicily held the reins of his horse as he proceeded to the Lateran, and with their crowns upon their heads, served him at table. He failed, however, in his attempts to assert a feudal superiority over Sicily, and to exercise his papal authority in the disputes between France and England. Philip the Fair of France, supported by his states and clergy, maintained the independence of the kingdom, disregarding many bulls and briefs, and even the sentence of excommunication to which the pope proceeded. Philip at last, with the aid of Italian enemies of B., made him prisoner at Anagni, to which he had fled; and although he was liberated by the people of Anagni after two days' imprisonment, he died within about a month (1303 A.D.), in consequence of having refused food during these two days, through fear of poison. He instituted the Roman jubilee in the year 1300. If the charges, however, which Philip the Fair brought against B. in self-defence—viz., heresy, simony, licentiousness, &c.—were well founded, and regarding the second there can be no doubt, Dante was quite justified in giving him a place in hell. Apart from the question of his personal character, B. was undoubtedly one of those dangerous ecclesiastics in whose downfall civilization exults.—B. IX. (Peter Tomacelli), a native of Naples, succeeded Urban VI. as pope at Rome in 1389, whilst Clement VII. was pope at Avignon. He exceeded all his predecessors in the shameless sale of ecclesiastical offices and benefices, and of dispensations and indulgences. He acquired, after a struggle, a most despotic power in Rome, which he kept in awe by fortresses; but to secure himself against external enemies, particularly Louis of Anjou, whose claim to the crown of Naples he had opposed, he was obliged to give away part of his territory in fiefs, as Ferrara to the House of Este. He died in 1404.

BONIFA'CIO, STRAIT OF, the modern name of the strait between Corsica and Sardinia, the *Fretum Gallicum* of the Romans. At the narrowest part, it is only 7 miles wide. The navigation is difficult, owing to the great number of rocks, which, however, are favorable to the production of coral, and the coral and tunny fisheries are actively prosecuted. At the eastern entrance of the strait lie the Bucinarie or Magdalen Islands, the *Insulæ Caniculariæ* of the ancients, principally inhabited by Corsicans, but mostly belonging to Sardinia. The strait receives its name from the small town of Bonifacio in Corsica, strongly situated upon a rocky promontory, with an excellent harbor and 3300 inhabitants. It was a place of much consequence to the Genoese for the security of their trade in these seas, and a number of very fine churches still attest its former greatness.

BONI'LLO, a town of Spain, in the province of Albacete, and 34 miles west-north-west from Albacete. Pop. (1877) 4500.

BONI'N, or ARCHBI'SHOP I'SLANDS, in the Pacific, stretching in N. lat. between 26° 30'—27° 44', and in E. long. between 142°—143°. They were discovered in 1827 by Captain Beechey of the *Blossom*, who took formal possession of them for England. They would appear to have been then uninhabited, though at one time a Japanese colony. In 1830, however, Peel Island, near the center of the group, was settled, in connection with the whaling business, by a motley colony—an Englishman, an Italian, a Dane, 2 Americans, and 15 Sandwich Islanders (5 men and 10 women)—under the auspices of a 'union-jack.' The inhabitants adopted a constitution in 1853. Besides pigs, goats, and fowls, Peel Island produces sweet potatoes, maize, onions, yams, pumpkins, melons, lemons, tobacco, and sugar-cane. Timber also is plentiful, though not of sufficient size for masts.

BONI'TO, a name common to several fishes of the mackerel family, or *Scomberidæ* (q. v.). One of these, *Thynnus pelamys*, sometimes called the Stripe-bellied Tunny, and of the same genus with the Tunny (q. v.), is well known to sailors as an inhabitant of tropical seas, and as one of the fishes most frequently seen pursuing the flying-fish. It is often taken by an imitation flying-fish made to skim along and touch the waves. Its flesh, although relished by those who have been previously confined to salt provisions, is dry. It is occasionally but rarely caught on the British coasts. It is a very beautiful fish, seldom exceeding thirty inches in length, of a beautiful steel-blue color, darker on the back, and whitish below. Four dark lines extend along each side



Bonito, or Stripe-bellied Tunny.

of the belly. The general form resembles that of the mackerel, but is less compressed.—The B. of the Mediterranean (*Pelamys Sarda*) is a fish very similar to this, but of an allied genus, distinguished by its comparatively large and strong teeth. It has dark transverse bars reaching from the ridge of the back to the lateral line. It is plentiful in the Black Sea.—The Plain B. (*Auxis vulgaris* or *A. Rocheanus*) may be distinguished at once from both of these by its more uniform blue color, without stripes or bands, and by the widely separated dorsal fins. It has only one row of minute teeth in each jaw. It is found in the Mediterranean, and in some places seems to bear, in common with the last-mentioned species, the name bonito. Its flesh is little esteemed when fresh; it is generally used either salted or pickled. Like mackerel, it putrefies rapidly, unless means are used for its preservation. This fish has been occasionally caught on the coast of England, and one was taken in summer 1859, in a herring-net, off the coast of Banffshire.—Another species of *Auxis*, a native of the West Indian seas, equals the tunny in size.

BONN, a town of Rheinish Prussia, beautifully situated on the left bank of the Rhine, 15 miles above Cologne. Population (1880), inclusive of the military, 31,514. B. is connected with the right bank of the Rhine only by a ferry, and with Cologne by the railway as well as the river. The Cathedral Church is a fine specimen of the last period of the Romanesque style, and exhibits the transition to the Gothic already begun. B. has considerable manufactures of cotton goods, earthen-ware, vitriol, and soap. The neighborhood is very romantic. B. is the seat of a number of learned associations and institutions. The Leopoldine Academy of Physical Science, founded at Vienna in 1652, was transferred to B. in 1818. It obtained a university in 1786, which, however, was suppressed during the sway of France; and the present university was founded in 1818, receiving from government the former electoral palace and other buildings, with an annual revenue of nearly £15,000 sterling. There are two theological faculties, the one Protestant, and the other Roman Catholic. The university had, in 1881, 102 professors and lecturers, and 1070 students; and among its professors have been numbered some men of high distinction, as Niebuhr and A. W. Schlegel. Albert, the late Prince Consort, was a student here. Its clinical establishments are of unusual extent, and admirably arranged. It has a library of above 200,000 volumes, archæological and other collections, a botanic-garden, an observatory, an agricultural school, a riding-school, &c. B. derives its origin from *Bonna*, one of the castles erected by the Romans in Germany. It was long the residence of the electors of Cologne; it was taken from the French in 1689, after a severe bombardment by the Elector Frederick III. of Brandenburg; and in 1703 it surrendered, after a siege, to the

English and Dutch army under Marlborough. It returned again into the possession of the Elector of Cologne in 1715, and in 1717 its fortifications were razed. It was acquired by France in 1802, and assigned to Prussia in 1814. Beethoven was a native of Bonn.

BONNER, Edmund, Bishop of London, was born of obscure and doubtful parentage, about the end of the 15th century. The reputation he gained at Oxford by his knowledge of the canon law, recommended him to the notice of Wolsey, who promoted him to several offices in the church. After the fall of Wolsey, B. took an active share in the work of reformation, and received due promotion from Henry VIII. In 1533, he was deputed to appear before the pope at Marseille, to appeal for the excommunicated monarch to a general council. The violence of his threats on this occasion suggested to his holiness the fitness of having him burned alive, or thrown into a caldron of melted lead, so that B. judged it prudent to leave Marseille without notice. In 1540, he was made Bishop of London. The death of Henry cooled his Protestant zeal; and having given proofs of his lukewarmness in the cause of reformation, he was at length, in 1549, committed to the Marshalsea, and deprived of his bishopric. The accession of Queen Mary restored him to office, and gave him the opportunity of revenge, which he now took without delay or stint. As vicegerent and president of the convocation, he was the principal agent in that bloody persecution which has made the reign of Mary infamous. On the accession of Elizabeth in 1558, B. accompanied his episcopal brethren to salute her at Highgate, but was excepted from the honor of kissing her hand. In May 1559, he was summoned before the privy council, and refused, with a consistency worthy of due respect, to take the oath of supremacy. He was accordingly deposed from his bishopric, and shut up in the Marshalsea, where he died in 1569. While it is right to remember with detestation the multitude of B.'s cruelties, one also ought not to forget that he was strict in castigating the lax morality of his clergy; that after his return to popery, he remained steadfast to his principles; and that he bore his final misfortunes with manly resignation.

BO'NNET, in Fortification, is a small defence-work constructed at the salient angles of the glacis or larger works. It consists of two faces only, with a parapet 3 feet high by 10 or 12 broad. There is no ditch. A larger kind, with three salient angles, is called a priest's B., or *bonnet à prêtre*. The use of the B. is to check the besiegers when they are attempting to make a lodgment.

BONNET, Charles, an eminent naturalist and philosopher, born at Geneva, 13th March 1720. He was educated for the profession of the law, but devoted himself at a very early age to the study of natural history. A dissertation on aphides obtained for him, in 1740, the honor of being made a corresponding member of the Academy of Sciences in Paris. He was soon afterwards occupied in researches concerning polypi, the respiration of insects, the structure of the tapeworm, &c. He published his *Traité d' Insectologie* (2 vols., Par.) in 1745. His *Recherches sur l' Usage des Feuilles des Plantes*, published in 1754, contained the result of much observation on important points of vegetable physiology. A severe inflammation of the eyes, putting a stop for two years to his researches in natural history, gave another direction to his studies, and he published several works on psychology, in which materialistic views decidedly prevail; the body is represented as the original source of all the inclinations of the soul, and all ideas are referred to movements of the nervous fibres; but his religious convictions remained always strong and unshaken, and in his *Idées sur l'Etat Futur des Etres Vivants, ou Palingénésie Philosophique* (2 vols., Gen. 1769), he endeavored to demonstrate the reasonableness of the Christian revelation. In this work he also maintained the future life of all living creatures, and the perfection of their faculties in a future state. Lavater translated the last part of it, and it helped to effect a change in the religious tendencies of Mendelssohn. His *Considérations sur les Corps Organisés* (2 vols., Gen. 1762) is very much devoted to an examination of the theories of generation. B. was for some years a member of the Great Council of his native city. He died on the 20th May 1793. In the latter part of his life, he superintended a collective edition of his own works (8 vols. and 18 vols., Neuch. 1779—1788).

BO'NNET, a covering for the head, of which there are many varieties. The French, from whom we have the word, apply it as we do to male as well as female head-dress. A kind of nightcap is called by them a B., as, for example, the *bonnet rouge*, or infamous 'cap of liberty' of the revolutionary leaders. The English B. of former times was made of cloth, silk, or velvet, less or more ornamented, according to the means or taste of the wearer. This species of headgear was generally superseded by the hat, in the early part of the 16th c.; but in Scotland, bonnets were universally worn for a century to two centuries later, and they still remain to a certain extent a national characteristic. From the frequent notice of the blue B. in historical records and in song, it would seem that the Scotch were long identified with this kind of head-covering. The genuine old B. of the Lowland Scottish peasantry was of a broad, round, and flat shape, overshadowing the face and neck, and of a dark-blue color, excepting a red tuft like a cherry on the top. The fabric was of thick milled woollen, without seam or lining, and so exceedingly durable that, with reasonable care, a single B. worth about 2s. would have served a man his whole life. No head-dress ever invented could stand so much rough usage. It might be folded up and put in the pocket, or laid flat and sat upon, with equal impunity; it might be exposed to a heavy drenching rain without the head being wetted, and when dried, it was as good as ever. Besides, it could be worn on the top of the head, or slouched in front, behind, or sidewise, as a protective against a cold blast; and from its softness and elasticity, it very fairly saved the head from the effects of a blow. In short, there was no end to the adaptability of the old 'braid bannet,' as the Scotch termed it; and one almost feels a degree of regret that, in the progress of fashion, it should have gone so much out of use. From having been worn, till comparatively late times, by small rural proprietors—such as owners of a cottage and an acre or two of land—it gave to these local notabilities the distinctive appellation of *Bonnet Lairds*. A lesser and not so broad a variety of the B. was worn by the boys. The Highlanders have long worn bonnets of the same fabric, but these rise to a point in front, and are without any rim. Such is the cap now known as the *Glengarry Bonnet*. From time immemorial, these various kinds of Scots bonnets have been manufactured at Stewarton, a small town in Ayrshire. Formerly, the Stewarton B.-makers formed a corporation, which, like other old guilds, was governed by regulations conceived in a narrow and often amusingly absurd spirit; one of the rules of the fraternity, however, can be spoken of only with commendation, for it enforced a certain weight of material in each B., as well as durability in the color. An account of this ancient corporation will be found in *Chambers's Journal*, first series, vol. v., p. 142. The bonnets used in the Highland regiments are made at Stewarton and Kilmarnock; they are usually distinguished by a chequered fillet, being the *jess-chequé* of the House of Stuart. Latterly, although hats and caps have, to a great extent, superseded bonnets of the old varieties, the bonnet manufactories of Stewarton have much increased, and are still increasing. Of the many and ever-shifting varieties of ladies' bonnets of straw, silk, and other materials, we need not attempt any account.

BO'NNET-PIECE, a gold coin of James V. of Scotland, so called on account of the king's head being decorated with a bonnet instead of a crown, as was usual. We give a representation of the obverse side of this elegant coin, which shows the 'king's head regarding the right, with a cap or bonnet, having a circle of gems; round the neck a collar of thistle-heads, and SS.' Inscription, 'Jacobvs 5. Dei G. R. Scotorv. 1539.' Weight of the coin, 72 grains. Adam de Cardonnel, from whose work, *Numismata Scotiæ* (Edin. 1786), we extract these particulars, observes that James V. was the first Scottish sovereign who placed dates on his money, and was the first who diminished the size of the gold coins 'by increasing their thickness. The most remarkable are those commonly called the bonnet-pieces, which were struck of native gold; in beauty and elegance of workmanship, they approach the nearest to the Roman coins, and very much surpass all the coinage at that period, or ever since.' These bonnet-pieces are among the most valued curiosities of the antiquary.

Bonnet-piece.

BO'NNEVAL, Claude Alexandre, Count de, also called Achmed Pasha, a French adventurer, whose history is very extraordinary. He was born of a noble family at Coussac, in Limousin, in 1675; proved unmanageable at the Jesuit College; and was placed in the Royal Marine Corps in his 13th year. He was transferred to the Guards; served with great distinction in Italy and the Netherlands; but having been refused promotion, upon account of some excesses of which he had been guilty, he behaved with great insolence to the minister at war, and was therefore condemned to death by a court-martial. Foreseeing this result, he fled to Germany, where, upon the recommendation of Prince Eugene, he obtained employment in the Austrian service. He now fought against his native country, distinguished himself by many daring exploits, was raised to the rank of lieutenant field-marshal, and bore a principal part under Prince Eugene in the war between Turkey and Austria. But when residing at Vienna, after the peace of Passarowitz, he made himself very disagreeable to the prince, and was therefore sent, in 1723, as master-general of ordnance, to the Netherlands, where he soon got into a scandalous quarrel with the governor, and was brought to trial, and condemned to death by a court-martial. The emperor commuted the sentence to one year's imprison-

ment; and upon condition of never again setting foot upon German soil, he was conveyed across the Tyrolese frontier. He went to Constantinople, was cordially welcomed, became a Mohammedan, took the name of Achmed, was made a pasha of three tails, was employed in organizing the Turkish artillery after the European manner, achieved successes as general of a division of 20,000 men, in the war of the Porte with Russia, and arrested the victorious career of the Persian usurper, Thamasp Kuli Khan. For this service, the sultan appointed him governor of Chios; but his own imprudence, and the envy of others, caused his removal from this office. He now thought of leaving Turkey, but died at Constantinople on 27th March 1747. The memoirs published as his are spurious.

BONNYCASTLE, JOHN, long Professor of Mathematics at the Royal Military Academy, Woolwich, is well known as the author of many excellent elementary works chiefly mathematical. He was born at Whitchurch, Buckinghamshire, and died at Woolwich in 1821. His *Elements of Algebra* (2 vols. 8vo, 1813) is selected by a capable critic, from among his other works, as especially deserving commendation.

BO'NNY RI'VER, a river of Guinea, West Africa, forming the eastern debouchure of the Niger, and falling into the Bight of Biafra, in about lat. 4° 30′ N., and long. 7° 10′ E. It is accessible at all times of the tide to vessels drawing as much as 18 feet of water, and safe anchorage at all seasons of the year is found within its bar. Its banks are low, swampy, and uncultivated. On the east side, near its mouth, is the town of B., long notorious as the rendezvous of slave-trading ships. It exports considerable quantities of palm-oil.

BONPLAND, AIME, an eminent botanist, was born at La Rochelle, France, August 22, 1773. Having studied medicine and botany at Paris, he accompanied Alexander von Humboldt in 1799 to America, where they traveled nearly five years, mostly in Mexico and the Andes, during which time B. collected 6000 new species of plants. After his return, he was appointed, in 1804, director of the gardens at Navarre and Malmaison, and published several splendid and valuable botanical works, *Plantes Équinoxiales Recueillies au Mexique*, &c. (2 vols., Par. 1808—1816, with 140 copper-plates); *Monographie des Mélastomées*, &c. (2 vols., Par. 1809—1816, with 120 copper-plates); and *Description des Plantes rares de Navarre et de la Malmaison* (11 numbers, Par. 1813—1817, with 64 copper-plates). He went to Buenos Ayres in 1816, with a collection of European plants and fruit-trees, was favorably received by the government, and named Professor of Natural History.

After remaining at Buenos Ayres about five years, B. undertook an expedition of scientific discovery up the Paraña, with the view of prosecuting his investigations to the Andes, across the Gran Chaco Desert; but Dr. Francia, then dictator of Paraguay, instead of giving him permission to cross the country, arrested him, after killing some of his men, and kept him prisoner for about nine years, notwithstanding the efforts of the British government, at the instigation of Humboldt, to obtain his release. While detained by Dr. Francia, he acted as physician of a garrison. On the 2d of February 1831, he obtained his liberty, and traveling southward, settled on the southern boundary of Brazil, near the eastern bank of the river Uruguay, and in the vicinity of the small town of San Borja. Here he resided until 1853, taking great interest in cultivating and promoting the cultivation of Paraguay tea, and with no desire to return to Europe. In 1853, he removed to a larger estate at Santa Anna, where he busied himself in cultivating orange-trees of his own planting. In 1857 he wrote to Humboldt that he was about to carry his collections and manuscripts to Paris, to deposit them in the Museum there, and that after a short stay in France, he intended to return to Santa Anna. That voyage, his death in 1858 prevented him from accomplishing. His remarks on the herbarium collected in his travels with Humboldt, have been given to the world by Kunth in his *Nova Genera et Species Plantarum* (12 vols., Par. 1815—1825, with 700 plates).

BO'NUS, a special allowance, or extra dividend, to the shareholders of a company. If the previous dividend has been 4 per cent. on the capital, and if the profits of the current year admit of 5 per cent., a formal dividend of that amount would commit the company to a like dividend in future; and to prevent such a precedent, 4 per cent. is declared, and a B. of 1 per cent.

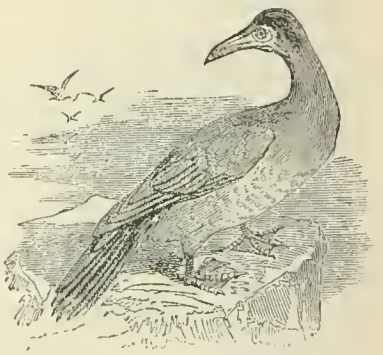
BO'NYHAD, or BONHARD, a market-town of Hungary, in the county of Tolna, 20 miles north-east from Fünfkirchen. Pop. (1880) 5970.

BONY PIKE (*Lepidosteus*), an interesting genus of fishes, being one of the few existing genera belonging to an order *Ganoid Fishes* (q. v.), of which the fossil forms are extremely numerous, and the only existing genus, which, upon account of the number and arrangement of the bones of the head and other peculiarities of the skeleton exhibiting a resemblance to reptiles, is reckoned among *Sauroid Fishes* (q. v.). The body is covered with a case of dense bony square scales, so fitted together as to form a complete coat of mail. The vertebræ are articulated by ball and socket, and the head is capable of a degree of motion upon the trunk very remarkable among fishes, and compensating for the general stiffness of the mailed body, the skeleton of which is also bony, and not cartilaginous. The snout is elongated, and the edges of the jaws are furnished with long teeth, the breadth of the snout in some of the species giving it a resemblance to that of the pike. The tail is *heterocercal*, or unsymmetrical, the caudal rays being inserted not equally above and beneath the termination of the vertical column, but only at and beneath it, a character much more common in fishes of the old red sandstone than in those of the present period. —The species of this genus are pretty numerous, attain a large size, and are found in the rivers and lakes of the warm parts of America. They are much esteemed for the table.

BONZES, the Japanese priests of Fo or Buddha. The name is from the Japanese *Busso*. It was extended by the Portuguese to Buddhist priests in other countries, but particularly to the Chinese. See JAPAN and BUDDHISM.

BOO'BY (*Sula fusca*), a species of Gannet (q. v.), which has received this name from its apparent stupidity in allowing itself to be knocked down with a stick or taken by the hand. Accounts differ very much, however, as to this character of the B., some representing it as singular in not taking alarm or becoming more wary even when it has had reason to apprehend danger from man; others, as Audubon, asserting in such a manner as apparently to place it beyond dispute, that it does learn to be upon its guard, and even becomes difficult to approach within reach of shot. The B. is not quite so large as its congener, the common gannet or solan-goose, and, like it, is a bird of powerful wing, and feeds on fish, which it takes by diving in the sea, observing its prey as it sweeps along in graceful and varying flight, sometimes at a height of only a foot or two from the surface of the water, sometimes twenty yards above it, and plunging suddenly to seize it.

It is sometimes taken, like the gannet, by means of a fish fast



Booby.

ened to a board, through which it drives its bill, as it dashes at the bait. The B. is of a blackish-brown color, whitish beneath; its colors are subject to some variation, and in young birds a general brown color prevails; the sexes differ very little, except that the female is not quite so large as the male. It is found on almost all tropical and sub-tropical shores, and sometimes even 200 miles from land. On the east coast of North America, it reaches about as far north as Cape Hatteras, but is much more abundant further south, great numbers breeding on the low islands off the coast of Florida. The nest is often placed upon a low bush, and 'is large and flat, formed of a few dry sticks, covered and matted with seaweeds in great quantity.' It contains only one egg or young one at a time. The expansibility of the gullet enables the B. to swallow fishes of considerable size. The bill, which is straight, conical and longer than the head, opens beyond the eyes, as in the rest of this genus. The B. is much persecuted by the Frigate Bird (q. v.) and Man-of-war Bird (q. v.), more powerful birds and of swifter flight than itself, which often compel it to disgorge for their use the prey which it has swallowed. The flesh of the B., although sometimes eaten by sailors, is dark colored, and not very agreeable. Bligh and his companions, in his long boat-voyage, found one or two which they captured a providential supply of food.

BOO'BY I'SLAND, a level rock in Torres Strait, in lat. 10° 36′ S., and long. 141° 53′ E., 3 feet in height, and ¼ mile in diameter. Being, of course, highly dangerous to navigators, and destitute of resources of its own, it is said to be pretty regularly supplied with provisions and water by passing vessels, for the benefit of such as may be cast ashore on it.

BOODROOM, BOUDROUM, or BODRUN, a seaport town of Asiatic Turkey, in the pashalic of Anatolia, finely situated on the north shore of the Gulf of Kos, about 96 miles south of Smyrna, in

lat. 37° 2′ N., and long 27° 25′ E. It is an uninviting place, its streets being narrow and dirty, and its bazaars of the worst class; but as the site of the ancient *Halicarnassus*, the birthplace of Herodotus and Dionysius, it possesses great interest for the traveler. Many remains of the old city, which was 'the largest and strongest in all Caria,' bear witness to its former magnificence. A fortress, built by the Knights of Rhodes in 1402, occupies a projecting rock on the east side of the harbor, which is shallow but well sheltered, and resorted to by Turkish cruisers. Some ship-building is carried on. Pop. stated at about 11,000.

BOOK, a distinct literary production in one or more volumes; but the term book is also applied to a treatise, or group of chapters, forming a part of a volume, and traditionally it signifies a narrative, or record of some kind in the form of a roll: 'Lo, a roll of a book was therein; and he spread it before me; and it was written within and without.'—*Ezek.* ii. 9, 10. The term has a similar meaning in English law phraseology. 'In the Court of Exchequer, a roll was anciently denominated a book, and so continues in some instances till this day. An oath as old as the time of Edward I. runs in this form: "And you shall deliver into the Exchequer a book fairly written," &c., but the book delivered into the court in fulfilment of this oath has always been a roll of parchment.'—Godson and Burke *On the Law of Patents and Copyrights* (Lond. 1581, p. 323).

The word book is from the Angl.-Sax. *boc*, and, with some modifications of spelling, is common to all the Teutonic and Scandinavian languages (Ger. *buch;* Dutch, *boek*). It is believed to be derived from the same root as *beech* (Angl.-Sax. *boc;* Ger. *buche;* Icel. *beyke;* Dutch, *beuke*), the earliest writings among those nations having been executed on the inner bark of the beech-tree, or perhaps carved on beech-boards. The Greek word for a book, *biblos*, or more commonly *biblion*, is derived from the Egyptian appellation for the plant papyrus (q. v.). The Latin word *liber*, a book, is derived from the name of the cellular tissue of the papyrus, instead of the plant itself. By the Greeks, a collection of books was called *bibliotheca* and by the Romans, *libraria;* hence the French term *bibliotheque*, and the English word *library;* hence, also the *librarii*, or book-writers, *bibliopolæ*, book-sellers, of the Romans.

Book Scroll.

Properly prepared in long strips, the papyrus was wound round small cylinders, or rollers, which in Latin was styled *volumina;* hence the English word volume. As the papyrus has also given the term paper to the moderns, it has played an important part in the naming of what concerns books. Besides papyrus, however, the ancients used parchment and other materials for the fabrication of their books; and when, by the capture of Egypt by the Arabs in the 7th c., the papyrus plant could no longer be procured, parchment was the material generally employed.

By the Romans after the Augustan age, the art of fabricating books reached a degree of proficiency, along with the advancement in literature. The papyrus was carefully prepared; one side was reserved for the writing, and the other was colored with saffron or cedar oil. The writing was effected by a pen made of a reed (*calamus*), of which the best kinds were supposed to be found in Egypt. The ink (*atramentum*) was very durable. In several rolls found at Herculaneum, the Roman ink, after being interred many centuries, is still in good preservation. When a Roman author wished to give his book to the world, a copy was put into the hands of transcribers (*librarii*), by whom a certain number of copies were produced. From these transcribers, who were equivalent to our modern printers, the copies passed to a class of artists (*librarioli*), who ornamented them with fanciful titles, margins, and terminations. The rolls were finished for use by the *bibliopegi*, or bookbinders; and last of all, they were offered for sale by the *bibliopolæ*, or booksellers. A copy of one of the esteemed productions of a Roman author—as, for example, a copy of Virgil or Horace—was an elegantly done-up roll, about thirteen inches in depth, wound round a cylinder, the two ends of which were decorated with ivory or metal knobs. Outside, it bore various decorations along with the title, and for safety was put in a neat case of parchment or wood, which also bore sundry ornamental devices, including perhaps a portrait of the author. A bookseller's shop in ancient Rome would probably show a collection of scrolls, less or more ornamented, not unlike in appearance to modern small maps mounted on rollers; and in this form books would be handed about and read. Prized for their rarity and costliness, these scroll-books were kept with great care in cases, or round-shaped boxes with lids, made of cedar; the odor of that wood being a preservative against moths and other destructive insects. Romans with a literary taste carried one of these boxes of scrolls with them as a portable library. A public library comprised a large variety of these boxes, and must have had the appearance of a collection of round canisters. Yet the Romans did not invariably make their books in rolls; in some instances, they used leaves of lead, which had been beaten thin with a hammer, and also leaves of wood covered with wax; these loosely connected at the back with rings, may be viewed as the rude original of the modern book. At Herculaneum, books of this kind, called tablets, have been discovered in perfect preservation.

In producing books during the middle ages, the plan of rolls was dismissed, and that of leaves sewed together and enclosed in boards came generally into use. The material employed was still parchment, prepared from the skins of goats, sheep, deer, and other animals; for although the art of making paper was known in the 9th c., this new material came slowly into use. The fabricator of the books were for the most part different orders of monks, more particularly by Benedictines (q. v.), a learned and industrious body of men, whose peaceful establishments were long the great centers whence literature was dispersed in ages of intellectual darkness and social disorder. At the head of the book-manufacturing department in the monastery was the *armarian*, who besides taking charge of the library, gave out books to be copied, along with the pens, ink, and parchment required by the transcribers. Some of the monks were allowed to transcribe in the solitude of their cells, but the business of transcription was conducted chiefly in an apartment called the *scriptorium*, which was provided with ranges of desks and forms. There, the scribes or copyists, who were under strict regulations as to keeping silence, carried on their tedious but useful labors. The writing was effected in distinctly formed letters in an old character; regularity in the lines and pages being secured by previous ruling. There was an injunction that no one should on any account alter a single letter or word, without the sanction of the superior. With all the care that was bestowed, however, errors crept in, and were repeated from copy to copy, some of which mistakes have sorely puzzled the scholarly inquirers of later times. There was a division of labors in the monasteries. To some of the monks was assigned the duty of throwing in embellishments. With leaf-gold and brilliant water-colors, they adorned the devotional works, lives of saints, and copies of the Scriptures with pictorial illustrations and fancifully illuminated letters at the beginning of chapters. By another class of these monkish artists, the books were bound in styles suitable to the quality of the works. In many instances, the binding was superb. The boards of wood, covered with leather or velvet, were decorated with precious stones and devices in metal; and in front, the volume was held together with clasps of gold or silver-gilt. Skelton, the poet-laureate, in his *Garland of Laurel*, written about the year 1510, rapturously alludes to the splendid bindings of those old times:

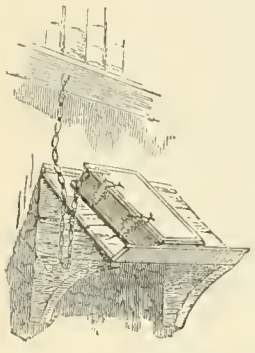
> With that of the boke losende were the claspis:
> The margent was illumynid all with golden railles
> And byse, enpicturid with gressoppes and waspis,
> With butterflyis and fresshe pecoke taylis,
> Enflorid with flowris and slymy snaylis;
> Envivid [enniuid] picturis well towchid and quikly;
> It would have made a man hole that had be right sekely,
> To beholde how it was garnisshyd and bounde,
> Encouerde ouer with golde of tissew fyne;
> The claspis and bullyons were worth a thousande pounde;
> With balassis* and charbuncles the borders did shyne;
> With *aurum musicum*† euery other lyne
> Was wrytin: . . . . .

'A book, usually known by the name of *Textus Sanctus Cuthberti*, preserved in the Cottonian Library, is a fine specimen of Saxon caligraphy and decoration of the 7th c. It was written by Eadfrid, Bishop of Durham; and Ethelwold, his successor, executed the illuminations, the capitals, and other illustrations, with infinite labor and elegance. Bilfrid, a monk of Durham, covered the book, and adorned it with gold and silver plates set with precious stones. We find also that Dageus, a monk who flourished in Ireland in the early part of the 6th c., was a skilful caligraphist, and manufactured and ornamented binding in gold, silver, and precious stones.'—*Hannett's Inquiry into the Books of the Ancients* (Lond. 1843). Books of a common quality were plainly bound in parchment, and instead of clasps, they were tied in front with thongs. In order to enable monasteries to sustain the expense incurred by their book-fabricating establishments, they were occasionally endowed with lands by pious laymen, the bequests being expressly for 'the making and mending of books.' Among the works produced were copies of the Scriptures, in whole or in part; breviaries, or books of prayers used in the church-services; missals, psalters, books in philosophy, and copies of the Greek and Latin classics and fathers; also legends of the saints. Books of history, poetry, romance, &c., were less commonly transcribed; though, from the extent of some of the medieval libraries, these and various other subjects were not neglected. Indeed, but for the monks we should have possessed scarcely any chronicles of the middle ages; nor are we less indebted to them for the preservation of those classics which are now habitually used in our colleges and academies.

The method of dispersing the books was not less remarkable than that of their transcription. Some of the books were sold at

* Balassis—rubies.
† *Aurum musicum*—mosaic gold.

exorbitant prices; some were executed to the order of kings, nobles, and church dignitaries; some were exchanged; and some found their way into the hands of the *stationarii*, or dealers of books in the principal cities. It was customary to lend books for transcription, under an agreement to receive an additional copy on their return. In all cases of lending books, penalties were stipulated to be paid in the event of their not being restored. Latterly, there sprang up a practice among the *stationarii* of Paris, and some other cities, of lending out books at certain rates, on the principle of a circulating library (q. v.), by which means the poorer class of students and others were accommodated. In these later times also, as we approach the period when printing superseded transcription, the process of copying books began to be undertaken by lay scribes for a livelihood, of which there were examples in London. To the monks, however, and also to some orders of nuns, belongs the unspeakable merit of having not only supplied the religious orders with the books which were in daily use, but those which replenished the libraries of the learned and wealthy, until their ingenious craft was supplanted by that of the printer and bookseller. In the higher-class monasteries, there were libraries of from 500 to 1000 volumes; but many of the poorer conventual establishments could boast of no more than from 20 to 30 books. In the list of effects which belonged to a monastery in Scotland—St. Serf, on an island in Loch Leven—there appear only 16 books; and yet, in this poorly provided insular establishment, the prior, Andrew Wintoun (1420), completed his *Orygynale Cronykil of Scotland*, a work in verse, which is not less valuable as a picture of ancient manners, than as a specimen of the attainments of the old monkish writers. But there are said to have been instances of a greater scarcity of books than in St. Serf's. Often only two or three breviaries and missals, a psalter, and a copy of the Gospels, were all the books owned by a religious house. The possession of an entire copy of the Scriptures (the Latin version of St. Jerome) gave immense importance to a monastery or church. Nor was this surprising, when the enormous labor of transcribing a Bible, letter by letter, is considered. Alcuin, a native of England, and one of the most industrious and ingenious monks of his time, occupied himself from about 778 to 800 A.D., a space of 22 years, in making the copy of the Bible for the Emperor Charlemagne. This ancient and extremely interesting monument of piety and labor is now in the Brisish Museum, which became possessed of it for the sum of £750. The Museum is also enriched with a variety of missals and other works executed by the monks. In the present day, it is scarcely possible to form a correct idea of the value put upon books, even of a common order, or of the prodigious care which was taken of them, during the middle ages. To preserve them from embezzlement, they were in some cases chained to shelves and reading-desks; and in the dwellings of nobles, a volume might be seen chained to a table in the hall, for the use of such members of the family as were able to read.



Chained Book.

The establishment of universities in the 12th c. greatly stimulated the manufacture of books by transcription, more particularly those classics and philosophical treatises that were required by students in the colleges. The anxiety of the authorities in these schools of learning to insure accuracy in the text-books, as well as to prevent the use of books of an improper kind, led to the establishment of censorships and privileges which interfered with the preparation of, and traffic in, books, long after the invention of printing. Unfortunately, while this art was superseding the ancient process of transcription, the convulsions consequent on the Reformation caused an enormous destruction of books. In England, the libraries of monasteries, representing the labor of a thousand years, were mercilessly destroyed on the spot, or carried off and consumed in base purposes, without a thought as to their value. In Scotland, the monastic libraries which had escaped the ravages of Danish and other invaders, were similarly destroyed. The same fate overtook the ancient monastic libraries of France at the Revolution. See LIBRARIES.

In consequence of these deplorable events, as well as the perishableness of books, copies of works prior to the invention of printing exist only as rare and valuable curiosities. Even of the early printed books, there are comparatively few copies extant. In England, books of improved typography and binding, adapted for ordinary libraries, date no further back than the reign of Queen Anne. In proportion as literature has been popularized, books have diminished in bulk and costliness. In the 16th and 17th centuries, the ordinary sizes of books were folio and quarto; and as works of these huge dimensions embraced light as well as much ponderous literature, a popular poet uses no metaphor, when he observes that ladies 'read the books they could not lift.' The dignified quarto survived in imaginative literature even till our own times; for it was in this costly form that the early editions of the poetry of Scott, Byron, and others made their appearance. Excepting for special purposes, all such large sizes are happily superseded by octavos and still lesser-sized books. Forms and prices are no longer for the few, but for 'the million.' And copies of the Bible, instead of being chained to shelves and desks, and being valued at hundreds of pounds, are now scattered in myriads at the easy charge of a shilling.

The dimensions of printed books are regulated by the size and form of the sheets of paper of which they are composed. A sheet, being folded in the middle, forms two leaves, or four pages; and a book of this size is called a folio. When the sheet is again folded, so as to make four leaves, or eight pages, it forms a quarto. The quarto, being folded across, so as to make eight leaves, or sixteen pages, forms an octavo. By folding the sheet into twelve leaves, or twenty-four pages, we make a duodecimo; and if into eighteen leaves, or thirty-six pages, we form an octodecimo. Below this there are small books of different denominations, and which are spoken of as pocket editions. Booksellers are accustomed, in speech, to Anglicise the terms for the sizes of books, with little regard for the proper terminations—as 4to, 8vo, 12mo, 18mo, 24mo, 32mo, 48mo, &c. For a long period printing-paper was made chiefly of three sizes, respectively called royal, demy, and crown; and, according as any one of these was employed, the size of the book was large or small. Demy, however, was the most commonly used, and the demy 8vo may be said to have become the established form of standard editions of books. As by means of the paper-making machine, paper is made in webs, and can be put into every imaginable size of sheet, and as printing machines can print very large surfaces, the sizes of books are now comparatively arbitrary; though, for convenience, the old names remain, with the difference, that instead of the 12mo, a not very dissimilar size, called the post-8vo, has come extensively into use. The size of the present work is a 4to, or quarto.

A thin kind of book, consisting of a few sheets sewed or stitched together, without boards, is called a pamphlet—a term supposed to be derived from the French words *par filet*, 'by a thread.' The French term *brochure* (from *brocher*, to stitch), signifying pamphlet, is coming into use; as also the French word *livraison*, signifying a portion of a book (group of volumes) published separately. For an account of the modern traffic in books, we refer to the article BOOK-TRADE.

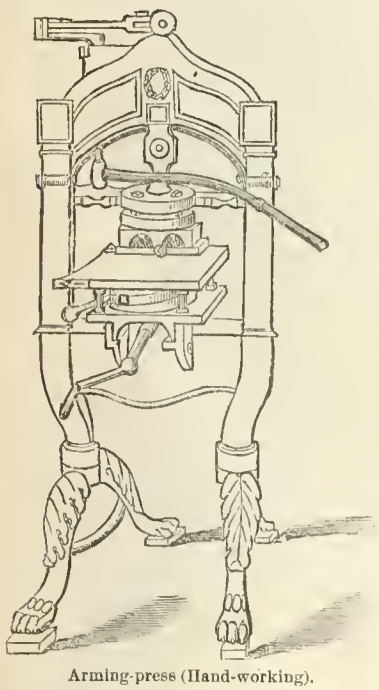
BOOKBINDING, the art of connecting together in a durable and convenient manner the several parts of a book. The craft of the bookbinder is older than that of the printer. As noticed in the preceding article, the Romans had their *bibliopegi* for doing up their books in rolls; and during the middle ages, the binding of books in a square form was executed by certain orders of monks. As the first style of typography was an imitation of the penmanship employed in Bibles and Missals, so was the binding of the first printed books only a copy of what had been usual in doing up volumes of manuscript. But as printing greatly multiplied books, binding got out of the hands of the monks and other ingenious men who had hitherto carried it on, and assumed the character of a widely dispersed mechanical art, which, like other useful arts, has gone on improving till the present day. It says little for the taste or tact of the Germans, that they, the inventors of printing, should have long since been left behind, not alone as regards typography, but binding, and everything else connected with the preparation of books. The French have exerted their fine artistic taste in binding, and take the lead in this branch of art among continental nations. In the French language, the term *relieur*, used for bookbinder, has oddly enough the same root as *religion* (religo, to bind again). To the English belongs the merit of carrying the art to a high degree of perfection; for no bookbinding in the world excels that of London in solidity, elasticity, and elegance—the three great requisites of a well-bound book—which have been arrived at, not less from skill in manipulation, than the excellence of tools, and the prices which are ungrudgingly paid by wealthy book-fanciers. Reaching this advanced stage, bookbinding forms a regular craft, distinct from printing and bookselling, though in country towns it is sometimes united with these professions. Properly conducted, it is divided into the three departments of preparing, forwarding, and finishing; but in these there are many subdivisions of labor, a few of which may be referred to.

On coming from the press, sheets are first dried by being hung on poles for a length of time, and then smoothed by pressure, singly, between glazed mill-boards in a powerful hydraulic press. They are next collated or arranged in distinct books in quires, in which form they are delivered to the publisher. If, however, for immediate sale in 'cloth boards,' the sheets are transferred in masses from the printer to the binder, and treated as follows: The first operation is to fold the sheets, by means of a small in-

strument called a folder. The object is to fold down the different pages so as to fall on one another; and on the perfect accuracy with which this is performed depends the proper binding of the book. Though machines for folding have been invented, and for some kinds of work prove satisfactory, much of this operation is still performed by hand; usually the work is done by girls. After being folded, the sheets of the book are gathered and collated according to the 'signatures,' A, B, &c., which are printed at the bottom of the first page of each sheet. The books so made up and completed, are now pressed to a proper solidity, by being placed in quantities in a hydraulic press. The next process is to saw indentations in the back of the book, preparatory to sewing. If only a few volumes are to be sawed, the operation is executed with a tenon saw; when, however, there are large numbers, the books are placed on a machine with revolving saws, which instantaneously effect all the indentations. The books are next sewed on a frame, each sheet being attached by a thread to cords across the back. The sewing, though sometimes done by a machine, is chiefly executed by girls. On being removed from the sewing-frame, the book receives its 'waste papers,' which are pasted to the back on each side. The book is now 'trimmed,' by being cut on the edges with a knife-apparatus. In some instances, this is effected by the plough-machine on the screw lying bench; in others, the books are piled on a machine, beneath a broad knife, which descends like a guillotine, and a large number are cut with amazing expedition. The books are next glued on the back, to impart a certain degree of firmness. After this, they are 'backed' by means of a machine, which imparts a certain roundness to the back, and at the same time gives a seat for the boards. The book, with a slip of canvas pasted on the back, is now ready for receiving the boards, which are previously cut in large quantities by a machine.

The preparing and attaching of the cover forms the final stage of the process. For the whole of the class of boarded books we have been describing, there is a method of making 'cases.' A case consists of cloth or paper pasted on two boards, the distance of the boards from each other being equal to the thickness of the book. The case being finished, receives the book, to which it is attached chiefly by pasting it to the canvas of the back and the blank or waste paper on each side. When the cases are in paper, they are at once applied in this manner, and the books may be said to be finished and ready for sale. Such is the mode of doing up that prodigious host of flashily covered volumes which forms a leading product of the cheap press. If the cases are in cloth, there are additional manipulations, in all of which machinery is employed.

Formerly, the ornamental and other work on the outsides of books was executed in a tedious and expensive way by hand. Now, the operation, at least as regards cloth boards, is done by two or three impressions in a steam-wrought arming press; not more than half a minute being employed to do what in the olden time would have occupied a week. This improvement, the greatest in the art of book-binding, has been facilitated by an advance in the artistic skill of designers, by advancements in the art of die-sinking, and by corresponding adaptations of machinery—the whole unitedly working towards an end. When it is deemed necessary, for the sake of attractiveness, to stamp a peculiar device on the covers of a book, of which thousands are required, the design is referred to an artist, who, devoting himself to this branch of his profession, devises something appropriate and original. His design, drawn on paper, is cut in brass or steel; and this, in the form of a metal block, gives the stamp at a blow by the arming-press. When the design is to be gilt, leaf-gold is previously applied. The block being heated, gives a firm and clear impression. Such is the expeditious method of titling and ornamenting with blank and gold tooling the cloth-covered books that are now generally in use.



Arming-press (Hand-working).

Books bound in leather, of course, go through a more slow and careful process of forwarding and finishing. Formerly, the folded sheets were beaten with a broad-faced hammer on a stone, but now they are squeezed between steel rollers, to give them the required solidity. The sewing, gluing of the back, backing singly with a hammer, and the other manipulations which follow, are all effected with great deliberation and nicety; and in this department of binding the highest class of operatives are employed. At one time, the titling of bound books was executed letter by letter, and comparatively few men had sufficient skill and steadiness of hand to produce good work. Now, lettering is sometimes done by means of metal types put together in a small case; though, when numbers are to be executed, the title is cut in block. It is usual also, to apply stamps in block to the sides of bound books, and to leave only the finer and smaller tooling to be done by hand. Yet, although greatly assisted by new mechanical contrivances, the finisher must needs be a kind of artist. Coming to his hands flat and solid, and with its joints well formed, through the previous care of the forwarder, he delivers the book a perfect work of art. It opens easily, and lies flat out without any strain; its hinges are finely formed without any crease; and on back, edges, and sides, the tooling claims mathematical precision.

A method of fixing together the leaves of a book by means of caoutchouc, or India rubber, instead of by sewing, has been invented. The sheets are cut into leaves, and the back edges, being laid evenly, receive a solution of this tenacious material. As each leaf is held merely by the caoutchouc which adheres to it, the book can be made to lie very flat; but this plan is employed for maps, or books of plates. Of late, a method largely adopted in the case of magazines and small books, is the use of wire instead of thread in fastening the sheets together. Another novelty in binding is the substitution of wood for pasteboard boards, in imitation of books of ancient date. This plan is applied only to some costly books of a fanciful kind; as wood is liable to warp, it can never serve so well as pasteboards.

In the present day, the binding-trade is pursued in various distinct branches. There are binders who devote themselves entirely to doing up books in cloth or paper; others execute general binding in leather; a third class bind only account-books; a fourth confine their workmanship to Bibles and Prayer-books; and a fifth are known as binders of books in a high style of art. A common defect in provincial binding is a want of taste. Strength is given without elegance; even in the finest kind of books, there is often a vulgarity as regards the colors of the end papers, and the marbling of the edges, as if the binders were unconscious of proper delicacy of effect. The same thing may also be said of the best American binding.

Among celebrated English binders of a past age, the foremost place is usually assigned to Roger Payne, a clever but wayward being who carried on business in the west end of London about the year 1770, and who, from his unfortunate habits, died in great poverty. His reputation as a binder rests principally on his fine tooling and choice of ornaments, in which department he introduced many improvements. The greatest of Payne's successors was Charles Lewis, a London binder (1786—1836), whose talent, according to Dr. Dibdin, 'consists in uniting the taste of Roger Payne with a freedom of forwarding and squareness of finishing peculiarly his own. His books appear to move on silken hinges; his joints are beautifully squared, and wrought upon with studded gold; and in his inside decorations he stands without a compeer.' At present, there are several eminent binders in London, whose forwarding and finishing, as well as artistic decoration, have given them a deservedly high reputation.

BOO'K-CLUB, or BOOK-SOCIETY, an association of individuals for purchasing and reading new books as they issue from the press, which, after being circulated among the members, are sold for the benefit of the concern. In some cases, the used books are disposed of by auction among the members. Book-clubs exist in many of the large towns and rural districts of Great Britain. Although new in name, and mostly composed of persons in the higher ranks of life, they are established on plans similar to the more humble class of reading societies which were common in different parts of the country in the latter part of the 18th century. In some places, the more fashionable book-clubs have been superseded by the late re-invigoration of the system of circulating libraries (q. v.).

BOO'K-KEEPING is the method of recording business transactions in a set of blank-paper books kept for the purpose, by all classes of traders, as well as in various kinds of establishments. Viewed as an art, B. was first brought to comparative perfection by the merchants of Genoa and other cities in the north of Italy; and followed up by the merchants of the Netherlands, it has been brought to England, in which country, as also in the British colonial possessions and the United States, it is now carried on in the best manner by professional accountants and skilled clerks in

counting-houses. The books employed are usually of a folio size, strongly bound. For security against loss, it is customary to remove them every night from the desk and ordinary shelves in the counting-house to a fire-proof safe.

Although reduced to an accurate system, the details of B. necessarily differ according to the extent and the nature of the transactions to be recorded. In all kinds of B., however, there are or ought to be certain pervading principles, to which we shall in a brief way refer. The object is to keep an account of the goods a trader buys and sells, and the money he receives and pays away; also to show, at short and periodic intervals, the exact state of his affairs—what are his *assets* (property and sums of money owing to him), and what are his *liabilities* (debts owing by him, and other pecuniary obligations). On the proper accomplishment of this object may be said to depend the stability and the reputation of the trader. Such is obviously the case, for, unless a person keep an accurate set of books to enable him to ascertain how his affairs stand, he must in a great measure be proceeding upon vague, and possibly erroneous conclusions; the result of which may be insolvency or bankruptcy, and loss of good name. In many instances, bankruptcy is traced to no other cause than the keeping of an insufficient set of books, and even keeping these badly. Viewed as credentials, a merchant's books are invested with a certain sacredness of character.

Such a set of them is to be kept as will at all times admit of a satisfactory statement of affairs being made up. On this account, they require to be kept with great neatness, accuracy, and perspicuity. As a rule, there should be no blotting, no scraping out of words or figures, and no tearing out of leaves—the records are to be beyond suspicion of falsification.

Single Entry.—The simpler kind of accounting is called B. by Single Entry; the principal books used being the Day-book, Invoice-book, Cash-book, and Bill-book, which are employed for recording the transactions as they occur, and a Ledger, to which the entries are afterwards transferred, under the name of the parties concerned. The method is called Single Entry, for the reason that the items are only entered once in the accounts of the ledger.

Day-book.—The purpose of this book is to keep a daily account of all goods sold on credit—that is, goods not paid for at the time of being bought. The book is ruled with a date-line on the left-hand side of the page, and with double money-lines at the right-hand side. The entry of a transaction comprehends the name of the purchaser, and beneath it a note of the articles sold, with the prices extended to the first money-column. The gross amount added up is extended to the second money-column; so that the amount of all sales may easily be summed up. After the name of the purchaser, it is usual to put *Dr.*, and to articles in the entries is prefixed *To*—the meaning of these insertions being that the party named is the *debtor* to the concern for the articles mentioned.

Invoice-book.—This book, which is similarly ruled, is sometimes called the *Credit Day-book*. It is used for keeping an account of all goods bought on credit. When the goods are bought, an invoice, or account of them, accompanies the package, or is received by post, and on being checked off, the items are copied into the book. After the name of the seller of the goods is inscribed the contraction *Cr.*, and to the items entered is prefixed the word *By*—the meaning of which is, that the party named is *creditor by* having sold the articles named. For the sake of brevity, some dealers merely enter the name of the creditor, the date, and the amount; and preserve the invoices, by docketing and tying them up in parcels, or by fastening them into a paper-book prepared for the purpose. In any case, the invoices should always be preserved.

Cash-book.—In this is kept an account of all cash received and paid, and of discount received and allowed. It is ruled for date and double money-columns on each page. Two pages, one opposite the other, are required for the entries; that on the left hand for entering cash received, and the discount allowed *by* the trader; that on the right hand for the cash he pays, and the discount allowed *to* him. The first money-column on each page is for the discount, and the second for the cash. For example, if a person settles his account, amounting to £5, less a discount of 5*s.*, the sum of 5*s.* is entered in the first column, and £4, 15*s.* in the second; by which means a record is kept of accounts settled and the money actuallly received. A similar explanation applies to the 'cash paid' side. At the close of business for the day, the amounts on both sides are summed up and balanced.

Bill-book.—This contains an account of all 'Bills Receivable'—that is, bills of which the trader is to receive payment; and 'Bills Payable'—that is, bills which he has to pay. Sometimes, however, in the case of large concerns, these two classes of bills have each a distinct book. The books are ruled in a particular manner, to admit of an explicit statement of dates, amounts, length of term, and other particulars. See article Bills.

Ledger.—This is the great book of the concern. It comprehends an abstract of the entries in the day-book, invoice-book, cash-book, and bill-book, the whole collected in a methodic form under the names of the various persons, whether standing in the relation of debtors or creditors to the trader; and not only so, but an account of the trader's own private debit and credit. Two sets of columns are assigned to every person's account, one for *Dr.*, and the other for *Cr.* The copying of items from the day-book, &c., into these ledger accounts, is termed posting. According to the ordinary practice, books are posted after short and regular intervals—not longer than a month. Having books at all times well posted up is an acknowledged mark of a good man of business. By means of a well-posted ledger, and an inventory of stock and other assets, drawn up with a prudent regard to a realizable value, the trader is able at the end of a year to make a *Balance Sheet*, or condensed statement of his affairs. A proper balance-sheet ought to show the amount of capital invested in the form of money, stock, debts, &c.; also the amount of liabilities, the expenses at which the business has been conducted, the money drawn on private account, and the profit that is over, after all deductions have been made.

Some other books of a subsidiary kind are kept by large trading houses—as an *Order-book*, in which copies of all orders are entered: a *Memorandum Book;* an *Account Sales-book*, from which particulars are obtained for making out accounts of the sales of goods which may have been sent for disposal on commission; a *Stock-book*, in which an inventory is kept of the stock on hand; an *Account-book*, to contain a list of accounts; a *Warehouse-book*, to contain an account of the quantities of goods; a *Letter-book*, into which letters sent out by the firm are copied; with some others.

With such a set of books, and a few additional memoranda, a trader could doubtless strike a balance at the end of the year. He could see how much was owing to him, how much he was owing to others, how much he had spent, and how much would remain over, or how much would be deficient, after all accounts *pro* and *con* were settled. But by this elementary routine he could establish no satisfactory check on different departments of his business; and for large and complicated concerns, the system, if not absolutely valueless, would prove exceedingly imperfect. What the wholesale-trader wants is a process of checks—one book checking another—the whole thing reduced to such a rigorously methodized system of entries that every fraction is thoroughly accounted for. No doubt, to effect this elaborate and minute system of B., a considerable expense is incurred for clerks; but in large establishments this is of small account in comparison with the advantages that are secured.

Double Entry.—The method of B. which has been so called is only an extension of that already noticed. The distinct peculiarity in double entry chiefly concerns the ledger. Its object is a system of checks, to be effected by entering transactions in the ledger twice—first to the *debtor* of one set of accounts, and then to the *creditor* of another set. In making the two entries, one is posted to an account under the name of the debtor or creditor, and the other is posted to an account under the head of the goods that have been bought or sold. Take, for instance, the article sugar. Say, the trader purchases a hogshead of the article from A. Brown & Co. He first enters it in the regular way to the *Cr.* of A. Brown & Co., and then turning to the folio headed 'sugar,' he enters it on the *Dr.* side of the account as bought from A. Brown & Co. In the same way, when the hogshead is sold to E. Fraser & Co., it is entered first to the *Dr.* of these parties, and then to the *Cr.* side of sugar as sold to E. Fraser & Co. By this system of double entries, one the counterpart of the other, the one set of accounts constantly checks the other set; a trader can also ascertain how, when, and at what prices his property has been disposed of.

In double entry, a book called a *Journal* is frequently used. The entries in the day-book, &c., are abstracted into the journal, and thence posted in a brief form into the ledger; the use of the journal, therefore, is only to save the ledger from being burdened with details.

Acknowledged to be the triumph of accountantship, B. by double entry, or by the Italian method, as it is sometimes called, is not an entire safeguard against frauds and fallacies in the conducting of commercial operations, which, independently of every technical aid, require to be sustained by constant integrity, vigilance, and discretion. Among the fallacies in the method of keeping books which are observed to sap the stability of the most gigantic concerns, are two so conspicuous as to demand our notice. The first consists in including bad or nearly worthless debts in the periodical lists of assets. The second is that of not estimating its stock at its realizable value only. This last may be said to be a common error among traders, many of whom, without any evil intention, and simply from want of prudent consideration in making due allowance for depreciation of property, delusively and gradually slip into a condition of hopeless insolvency.

B. forms a department of school education in connection with penmanship and arithmetic. There are various useful treatises on the subject, with forms for day-book, ledger and other books. Among the larger and more comprehensive of this class of works are, *A Complete System of Book-keeping*, by Benjamin Booth (Lond.

4to), Jone's *Science of Book-keeping Exemplified* (Lond. 4to); *Practical Book-keeping*, by F. H. Carter (Edin.). Among the lesser and more accessible treatises we may specify *Book-keeping by Single and Double Entry*, by W. Inglis (Edin.). It is proper, however, to add, that no method of school instruction can supersede the practical knowledge which is to be procured only in a busy and well-conducted counting-house.

BOO'K-STALLS. See BOOK-TRADE.

BOO'K-TRADE, the business of dealing in books, in which are comprehended two classes of persons—Publishers, who prepare and dispose of books wholesale; and Booksellers, to whom the retailing of books more properly belongs. Although ordinarily distinct, the two professions may conveniently be treated together. While publishing, apart from bookselling, is of modern date, the selling of books is as old as the origin of literature. Copies of the works of authors in manuscript were sold in the cities of ancient Greece and Rome. Horace celebrates 'the brothers Sosii' as eminent booksellers (*bibliopolæ*). With the foundation of several universities in the 12th c., the preparation and sale of books increased; but the trade of bookselling attained to importance only after the invention of printing. The first printers acted also as booksellers, and being mostly learned men, they were generally the editors, and, in some instances, the authors of the works which they produced. See PRINTING. Fust and Schœffer, the partners of Gutenberg (q. v.), carried the productions of the Mainz press to the fair of Frankfurt-on-the-Maine and to Paris. Some instances of division of the two branches, printing and bookselling occurred in the 15th c. John Rynmann, of Augsburg (1497—1522) styled himself at the conclusion of his publications, 'Archibibliopola of Germany.' In consequence of the Reformation, the seats of learning were gradually removed from the southern to the northern states of Germany, and, of course, the booksellers followed their customers.

Migrating from place to place, and also resorting to the great continental fairs for customers, the early booksellers became known as *stationarii*, or statloners, from the practice of stationing themselves at stalls or booths in the streets, as is still customary with dealers in old books. The term stationer was long held to be synonymous with bookseller, but in modern times it is more commonly applied to dealers in paper and other writing materials.

Whether settled or migratory, the early publishers and sellers of books were subject to a number of restrictions, as is still the case in France and Russia. In England, the book-trade was trammelled by royal patents and proclamations, decrees and ordinances of the Star Chamber, licenses of universities, and charters granting monopolies in the sale of particular classes of works. In 1556, in the reign of Mary, the Stationers' Company of London was constituted by royal charter, the professed aim being the 'removal of great and detestable heresies.' The members of the Company were made literary constables to search for books, &c., and it was ordered 'that no man should exercise the mystery of printing, unless he was of the Stationers' Company, or had a license.' The charter, which was confirmed by Elizabeth in $15\frac{58}{60}$, in effect empowered the company to make ordinances as to the printing and sale of books, and to exercise an arbitrary censorship of the press. The Crown, by an act 13 and 14 Car II. c. 23, commonly called the 'Licensing Act,' assumed this species of control over the issue of books. The Licensing Act, and its renewals, ultimately expired in 1694. By the first Copyright Act, 8 Anne, c. 19, the legislature interposed to protect the rights of authors, and to relieve them, as well as publishers, from the thraldom of the Stationers' Company. But by the same act, the Archbishop of Canterbury, the Lord Chancellor, and certain judges in England, and the judges of the Court of Session in Scotland were empowered, on the complaint of any person, to regulate the prices of books, and to fine those who sought higher prices than they enjoined. This provision was in force till 1738, when it was abolished by the act 12 Geo. II. c. 36. From this time the book-trade was free. How it spread and flourished may be best learned from the history of the literature with which it is identified. Subsequent to the reigns of Anne and George I., there was a succession of men of literary repute connected with the metropolitan book-trade; among whom may be mentioned Cave, the conductor and publisher of the *Gentleman's Magazine*, and early patron of Samuel Johnson; Dodsley, a poet and dramatist, who reached the head of the book-selling profession; and three generations of the Nicholses. We might also include Richardson the novelist, a printer, who in 1754 became master of the Stationers' Company. The names of Baldwin, Rivington, Longman, Tonson, Miller, Cadell, Dilly, Lackington, Knight, Bohn, and others, will also be as familiar as are the Macmillians and Murrays of later times.

Now, as formerly, the book-trade is centered in London, though carried on to a considerable extent in Edinburgh, and in a less degree in Oxford, Cambridge, Dublin, Glasgow, and a few other places. There are various reasons for London being the metropolis of English literature. As a center of wealth, taste, and intellect, authors flock towards it as an agreeable and permanent home, and find in the Library of the British Museum the most ample materials for reference and study. By means of its system of railways, and its port, assorted parcels of books can be conveniently despatched to all parts of the United Kingdom, and of the world. It has numerous wholesale stationers, and abounds in printers, bookbinders, artists, and wood-engravers. Stationers' Hall, in which the rights to literary property may be inscribed, is situated in London. Through its channels of literary intelligence and criticism, it possesses the most ample means of making new works known. Through favor of these circumstances, the metropolis becomes the center of the British book-trade; almost every new work floats towards it, either for publication or to be issued wholesale on commission. In 1878, there were connected with the book-trade, within the bounds of the post-office district, 296 booksellers who were also publishers, and 446 booksellers alone. Of these, about 18 confined their business almost exclusively to the sale of foreign books, and 15 to the publication and sale of law-books. Among the booksellers are included commission-houses; and among the publishing establishments are several branches from Edinburgh and other places. The London book-trade is partly carried on in distinct departments; miscellaneous literature, law-books, medical books, educational treatises, periodicals, &c., respectively engage the attention of publishers; and as regards religious books, each sect may be said to have publishers and booksellers of its own. The greater number of the publishing and commission houses are situated in Paternoster Row and the courts adjoining; so that this part of the city has become the great and acknowledged market for literature. In whatever part of the metropolis books are primarily issued, they may be found in one of the establishments in or about 'the Row,' by which means the collecting of books to meet country or foreign orders is effected at once on the spot. Every commission-house has 'collectors,' who, with bags, are seen hurrying about, picking up the works which are entered in their collecting-book. When not so found, books are said to be 'out of print.'

In Scotland, after struggling through an age of similar restrictions, the book-trade was developed about the middle of the 18th c. In Edinburgh, it was followed by Allan Ramsay, who published and sold his own songs, and his still more charming pastoral. Among his successors were Donaldson, Bell, Elliot, and Crêech, each eminent in his way; more lately, the trade was ably sustained by Archibald Constable, the first publisher of the *Edinburgh Review* and *Waverley Novels;* and by William Blackwood, the originator of *Blackwood's Magazine;* still more recently the reputation of the Edinburgh book-trade was maintained by the late Adam Black, publisher of the *Encyclopædia Britannica*, and who, besides rising to the highest civic honors, became M.P. for his native city; by the firm of T. Nelson & Sons; and by that of W. & R. Chambers.

Considering the many advantages possessed by London, it may appear surprising that the business of publishing should be attempted to any extent in Edinburgh—the only place out of the metropolis to which we need specially refer. Yet, the Scottish capital is not devoid of recommendations. Its general society is of a character to invite the residence of men of literary acquirements, and it is fortunate in possessing an extensive collection of books for reference in the Library of the Faculty of Advocates. Edinburgh publishers are able to conduct their enterprises with a degree of calmness and deliberation which can scarcely be realized in London; while, at the same time, they enjoy a certain advantage in comparatively cheap labor. Paper also may be obtained at a somewhat lower price from Scotch makers than from the wholesale stationers of London—this last circumstance being of first importance in producing large impressions of cheap books and periodicals. As Edinburgh books are mostly sent to London, the expense of carriage and loss by commisssion form a drawback on profits. Notwithstanding this and other disadvantages, the book-trade of Edinburgh continues in a thriving condition. It comprehends upwards of thirty firms carrying on the united business of publishers and booksellers, and ninety who carry on business as booksellers alone. In this list are several leading publishing houses, which print the works that they issue, an economical and convenient union of professions which forms a peculiar feature of the Edinburgh book-trade. In the establishment whence the present work is issued, every department connected with the preparation and dispersion of books is included.

The publishers and booksellers of the United Kingdom possess no corporate privileges, nor do they associate for any professional object. No premiums are offered to stimulate improvements in typography, binding, or anything else—the trade being entirely free, members being left to rise through individual exertion. All members of the profession, however, constitute what is *par excellence*, 'the trade,' through which there is a prevading and strong feeling of fellowship.

In the infancy of the trade, authors frequently resorted to the plan of getting friends and patrons to subscribe for copies of their

forthcoming works; the publisher in such cases acting only as commission-agent. Dryden's translation of Virgil's *Æneid* was sold in this way. There were, in the case of that work, two classes of subscribers, one paying five, the other two, guineas for a copy. Those who paid the larger sum obtained the additional value by individually receiving a dedication plate with their arms underneath. There were 101 of the first class of subscribers, and 250 of the second. Pope made a fortune by his *subcription* books. He realized upwards of £5000 from his translation of Homer's *Iliad*, and £3000 from that of the *Odyssey*, both sold by subscription. Johnson, who lived in the transition state between the old and new way of disposing of literary works, perceived that the subscription system was essentially an unsound one, and that booksellers formed a proper and necessary medium between authors and the public. 'He that asks for subscriptions soon finds that he has enemies. All who do not encourage him defame him.' And again: 'Now learning is a trade; a man goes to the bookseller and gets what he can. We have done with patronage.' Literature has now risen above this degrading system. At present, (1) the author sells his work in manuscript to the publisher for a specified sum, giving him an assignment of the copyright, and leaving him to bring out the work according to his own fancy; or (2) the author retains the copyright, pays all expenses, undertakes all risks, and gets a publisher to bring out his work; or (3) the author, retaining the copyright, incurs no risk, and only allows the publisher to print and issue an edition of a certain number of copies for a sum agreed on; or (4) the author and publisher issue the work at their joint risk, and on such other terms as are mutually agreeable.

In some instances, the publisher will not undertake to issue a work, unless the author gets it printed, and delivers copies ready for sale; in others, he will relieve the author of this trouble, and risking outlay, keep an account of charges and sales. Any plan by which an author retains a risk, is seldom satisfactory. Publishing is an exceedingly hazardous profession. Works of which the highest expectations are formed may not pay expenses; and books of a very frivolous and seemingly worthless kind may prove exceedingly remunerative. From a general misapprehension on this point, publishers have frequently been maligned as unjustly living on the brains of authors, who are ever represented as an unfortunate and ill-used race. A knowledge of the hazardous nature of publishing, and of the heavy expenditure ordinarily incurred for making new books known, not to speak of the unreasonable expectations which are sometimes formed by literary men, would do much to dispel the common notions on the subject. For one book that is highly successful, there are numbers that become a dead stock in the warehouse, and barely pay expenses, of which melancholy fact too many authors who undertake the expenses and the risks of publication must be well aware, from dear-bought experience. But with writers of really popoular and successful works, English publishers usually deal in a most liberal spirit; numerous instances, indeed, could be cited in which they have voluntarily and largely added to the remuneration stipulated to be given for copyright. For the celebrated sermon, *Religion in Common Life*, preached before the Queen by the Rev. John Caird (1855), though only a shilling pamphlet, the publishers, Messrs. Blackwood of Edinburgh, gave £100; but the sale having gone far beyond expectations, they afterwards, of their own accord, presented the author with an additional sum of £400. Facts like this, while reflecting honor on the book-trade, show the baselessness of the imputations so inconsiderately cast on publishers as a body.

In publishing new books, the following are the items of outlay which need to be taken into account: Copyright, paper, setting up the types, author's corrections, stereotyping, press-work or printing, embellishments, binding, advertising, presentation copies to editors for review, and to public institutions in terms of the Copyright Act. When the author retains the copyright, the publisher charges, besides the above items for printing, &c., a commission on the sales of the work. New books are issued at a certain selling price to the public, and the publisher allows a percentage off the price to the retail bookseller. In a large proportion of cases, there is interposed the commission-agent. Several London publishers have commission-agents in the principal towns, to whom they consign quantities of each work, to be sold to the retail dealers; and in the same way, provincial publishers having agents in London, it happens that the book-trade is largely and necessarily carried on through middlemen. These individuals, of course, receive a commission adequate to remunerate them, after giving the ordinary publisher's allowance to the retailer.

It is usual, on issuing new books, for publishers or agents to send out the work to be 'subscribed' among the trade. A copy of the new work is shown by way of sample, and the subscription paper bears the selling price, and the price at which copies are offered. Besides making the trade acquainted with the day of publication of works which have been sometime expected, this practice offers an opportunity for speculating. As an encouragement to do so, the work is offered at a somewhat lower rate than is afterwards allowed. By subscribing for books in this manner, and also by means of 'trade sales,' commission-houses in the Row ordinarily put themselves in possession of the works issued by publishers in other parts of London.

Trade sales, which are now less common than formerly, are conducted in the following manner. A publisher, wishing to dispose of his stock, issues a catalogue to the trade, stating the reduced price of each book, as well as the length of credit offered; and that the sale is to take place in a tavern specified, on a certain day, for which an invitation is given. At the appointed time and place, a handsome dinner is on the table, and perhaps from eighty to one hundred and fifty guests are assembled. Nothing is said about business during dinner, but with the wine and glasses afterwards, and amidst no little good humor, the sale begins. Each book being called over, every person has an opportunity of saying how many copies he will take. Occasionally, a toast is proposed, in order to maintain the hilarity of the meeting.

At these sales it is not unusual to dispose of 'remainders of books,' that is, fag-ends of editions which are not moving off with sufficient alacrity in the ordinary course of trade. Remainders are either offered in small quantities at a very reduced price, or they are sold in the lump by auction. Purchased cheaply, these remainders are henceforth known as 'books with broken prices.' Many of the new-looking books ticketed at cheap booksellers are portions of these remainders. In some instances they are sent to the colonies, in the hope of finding a market. At these trade sales it is common to do business to the extent of from £5000 to £10,000; in the case of one publishing house, the amount is usually, at a half-yearly sale, from £12,000 to £15,000; and in another, being an annual sale, it is seldom less than £26,000. To avoid the seemingly useless outlay on a dinner, some publishers rely on the circulation of 'sale catalogues,' comprising offers at tempting prices, provided that orders are given within a certain day. Vast quantities of school-books of good reputation, and other works permanently in demand, are bought by London commission-houses in this manner annually.

Throughout the more respectable part of the trade, there is a constant effort to maintain unbroken prices; for when a book can be obtained by booksellers below trade-price, it is essentially ruined for all regular business. On the other hand, there has sprung up a practice amongst some retail booksellers of selling new books to the public at prices little above cost. This system of underselling has caused much disquietude in the trade. For a long time, resolute attempts were made by the heads of the profession to refuse to deal with undersellers; but these, appealing to the public, ultimately conquered; and now books of all kinds are disposed of at such prices as the bookseller pleases. In one sense, this underselling is unjust to the publisher, who has his wares sold cheap, without the eclat and solid benefit which he might derive from fixing on them such low prices as would induce a large sale. Whether publishers will in time fall on the expedient of lowering nominal selling-prices, at the same time lessening allowances, or whether they will altogether drop the marking of prices, are questions on which we need not enter.

Enough has been said to show that, after making all ordinary deductions, to which losses, &c., may be added, publishers can reckon on receiving little more than half the price at which their books are nominally issued. To limit impressions as nearly as possible to the demand, is always a matter of serious consideration to the publisher; for, unlike most other kinds of goods left on hand, the overplus stock of books are often nearly valueless. On this account, books are seldom sent out on sale or return except to commission-agents.

In one important respect the English publisher differs from the producer of almost every other class of goods. He has not only to manufacture the article, but to make it known to the public. While the retail draper takes upon himself the trouble and cost of advertising his novelties in order to attract customers, the retail bookseller is relieved from any such obligation, and has little else to do than to hand across the counter the book for which a demand has been stimulated by the costly efforts of the publisher. The grand difficulty with the publisher is to excite general attention to his wares. Hence, the stupendous advertising system in newspapers and other channels of intelligence. Some publishers are reported to spend as much as £5000 per annum on advertisements, and an expenditure of from £1000 to £2000 is quite common. The monthly and quarterly periodicals being important advertising channels, it is of consequence for publishers to possess one of these, both for the sake of the revenue it may produce, and for keeping their own books before the public. A well-circulated periodical, therefore, is to be viewed as almost a necessity in the business of the publisher—the thing which gives spring and vitality to what might be otherwise an inert and difficult concern. So grave a matter is advertising to the publisher, that it is very generally the practice to employ one or more clerks to write, arrange, and distribute advertisements, and to conduct the multifarious correspondence connected with them. In consequence of these bur-

densome outlays, and other causes, including the liberal distribution of copies of books for review, the prices affixed to original works are necessarily higher than the actual amount of paper and print would seem to warrant. Books, as has been said, are subscribed for among the booksellers of the principal cities; but booksellers in the country towns either send for supplies by letter, or give their orders to travelers employed by the chief houses. Between the country booksellers and the leading publishers in London, Edinburgh, or Dublin, there is kept up a continual correspondence.

In addition to his daily or weekly parcel, every provincial bookseller makes up a monthly order for magazines, periodicals, and books; and collecting for monthly parcels forms one of the remarkable phenomena of the Row. The day of making up, called 'magazine day,' is the last, or last but one, of the month, when periodicals for the succeeding month are collected and despatched. In receiving and forwarding of enclosures by these monthly parcels, there prevails a spirit of mutual accommodation, which is exceedingly commendable, and without which, indeed, a large portion of the book-trade would be at a stand. By means of enclosures, booksellers in the most distant parts of the country are able to procure small supplies from different publishers at a trifling charge for carriage—with what result of convenience to the public need not be dwelt upon. The execution of foreign orders is, of course, comprehended in the business of the publisher. Publishers formerly took but little account of the demand likely to arise for their books from abroad, but now they frequently print an extra number of copies for export to the United States, Canada, and Australia. Previous to the internecine war in the United States, American publishers were in the constant habit of seizing upon popular English copyright books, and reprinting them in a cheap form suitable for their own market, which included Canada and several other British colonies. As nothing was paid to the author, books so printed were sold at prices against which the English publisher found it impossible to compete; he therefore withdrew in disgust, and left the colonial market to be supplied with 'pirated editions.' The protective system in vogue in the United States largely assists in maintaining the high cost of production in America, of books as well as other things. This, in connection with the greater literary fecundity of the old country, enables a large export trade in books to be done with the Americans. The Canada Copyright Act, too (38 and 39 Vict., c. 83), provides for the republishing or reprinting of English books in Canada; so that, notwithstanding the absence of any international copyright treaty, it is probable that in the course of a few years most modern English books read in any part of America will be such as are either printed here, or reprinted there by arrangement with the English publisher or author.

The plan of issuing neat cheap editions of popular works, was struck out a hundred years ago (1760—1770) by Alexander Donaldson, an Edinburgh bookseller above referred to,* and was followed up by several publishers in London, one of whom C. Cooke of Paternoster Row (1790—1800), issued an extensive series of cheap reprints, of a pocket-size, called *Cooke's Editions*, which for tastefulness of preparation have never been excelled. In the early years of the present century, Suttaby's, Sharpes's, Walker's and Dove's pocket editions, were stock articles in the trade. About 1817—1818 some enterprising booksellers began to break through certain old usages of the trade, by issuing reprints of standard works, in a good style of typography at considerably reduced prices.

At the same time, numerous cheap periodicals made their appearance; but these, for the most part, were of so seditous, irreligious, and libellous a character, that the law interposed to check the growing evil, by the act 60 Geo. III., and 1 Geo. IV. c. 9. See NEWSPAPERS. Those cheap unstamped periodicals which appeared during the next ten years, were only tolerated when eschewing news and politics, they confined themselves strictly to matters of instruction or amusement. The only one that attained to permanent success was the *Mirror*, an illustrated weekly sheet, 8vo size, projected by John Limbird in London, the first number of which appeared November 22, 1822. When, therefore, in 1827, the Society for Diffusing Useful Knowlege began to issue its low-priced scientific treatises—and when, in the same year, Archibald Constable commenced the cheap series of works in original literature, called *Constable's Miscellany*—the public were already in some measure familiar with a certain class of cheap books. Yet, viewing all previous enterprises of this kind as fitful and insufficient, as well as unsupported by any breadth of appreciation, we have to refer to this period (1827—1832) for the true origin of what is now designated the 'cheap press.' Constable's attempt to cheapen literature was happily coincident with a general awakening in the public mind, and proved eminently successful; imitations followed; a variety of serial works, in small volumes, for popular use made their appearance. A similar popularizing of the price of periodicals was the next step in advance. Several cheap sheets of an entertaining nature were issued, similar to Limbird's *Mirror*, though more resembling a newspaper in shape, but for various reasons most of them soon disappeared. At this juncture, taking advantage of the growing demand for cheap literature, and desirous of guiding it in a right direction, William and Robert Chambers of Edinburgh began, on the 4th of February 1832, to issue *Chambers's Edinburgh Journal*, a weekly sheet at 1½*d.*: on the 31st of March following appeared in London the *Penny Magazine* of the Society for the Diffusion of Useful Knowledge; and in July 7, this was followed by the *Saturday Magazine*, which was issued under the direction of a committee of the Society for Promoting Christian Knowledge. So many cheap publications of various kinds followed that it would be impossible to particularize them in this brief sketch. The efforts to establish a cheap press were much facilitated by two great inventions—the paper-making machine, and the printing machine, both of which had been introduced within the preceding twenty years. The continued issue of cheap reprints of popular works out of copyright has greatly changed the aspect of the trade; and, although works at old prices are as numerous as ever, cheap books of an improving tendency are now placed within general reach. By the enterprise of certain publishers, new and copyright works are also now issued in a cheap form, in boards, with colored paper covers—the prices of these neat and handy volumes being from 6*d.* to 2*s.* 6*d.* each. The trade in this class of books, and in cheap periodicals and newspapers, has been largely developed by railways. On the platforms of all the chief termini and stations, there are stalls for the sale of books, periodicals, and newspapers. These stalls, consisting of a counter and some shelving, which can be closed in with shutters at night, are rented from the railway companies by different booksellers, from whose head establishment supplies ceaselessly radiate. One firm, in August 1878, had 645 stalls. A London publisher was recently able to announce that in the twelve months preceding he had printed five millions of books.

The sudden and successful rise of a cheap press was not viewed with complacency by the fathers of the trade, and for a long time it was believed that, like many other novelties, it would have its day, and disappear. Looked at, therefore, as temporary and undignified, the cheap press was left to force its way in the hands of two or three ardent young publishers, who, extending their operations, at length assumed a position which could not fail to command respect, and to excite a spirit of emulation. Latterly, the old established firms have begun, though in a hesitating way, to issue a cheap class of publications, by reprinting and otherwise. At the same time, these firms, besides generally maintaining the old prices, unite to keep a few editions of standard works in print. These 'trade editions,' as they are termed, are printed and supplied in shares; each party concerned taking an interest in their sale. Sixpenny editions have been common for many years, but in 1881 a new departure was made by several leading publishers, in the issue of both copyright and non-copyright works at the price of sixpence each. The first sale of *Tom Brown's School-days* was 150,000.

As circulating libraries, by creating a taste for reading, led to the establishment of the cheap press, so, as might be expected, has the cheap press extended the sphere of literature, and given rise to public libraries and book-clubs; and even circulating libraries, which for a time suffered from the deluge of minor publications, have begun not only to revive, but to assume dimensions beyond precedent. Mr. Mudie, in the year 1842, introduced a new system of subscription lending library, which in 1873 contained a

* According to the act, 8 Anne, c. 19, the copyright of a book was for 14 years, with a second term of 14 years contingent on the author being alive at the expiration of the first term. While such was the law, publishers who bought a copyright were usually allowed, by courtesy of the trade, to continue to publish their works unmolested during the second term, even if the author was dead when the first term expired. Notwithstanding this act, there was long so little precision as to questions of literary property, that works issued by London publishers were freely reprinted in Edinburgh, while those belonging to Edinburgh publishers were similarly dealt with in London—for example, Ramsay's Poems, which were issued by the author at Edinburgh in 1725, were reprinted in London, and also in Dublin, in 1731. Alexander Donaldson, of Edinburgh, is said to have taken the lead in this kind of trade, though from any evidence on the subject, it does not appear that he went beyond the bounds of the law. In order to extend his sale of cheap reprints, he opened a shop in the Strand; a step which brought him into collision with certain publishers in London. It will be recollected that Boswell, in his Life of Johnson, under date 1763, alludes to this case of Donaldson, who is spoken of by Johnson as 'a fellow who takes advantage of the state of the law to injure his brethren'—one who, supposing he did reduce the price of books, 'is no better than Robin Hood, who robbed the rich to give to the poor.' To judge from the litigation which ensued, Donaldson scarcely merited these strictures. In 1771, certain parties in London procured an injunction from the Court of Chancery to restrain Alexander Donaldson from printing and selling *Thomson's Seasons*, on the ground that it was their property. Donaldson, appealing to the House of Lords, showed that the work in question was first printed in 1729, that its author died in 1748, and that the copyright expired in 1757. The Lords decided in favor of Donaldson; thereby settling the point, that copyright depended entirely on the statute, and was not an inherent and interminable right of property, as many seem to have believed it to have been. Some details of this curious and important case will be found in the article COPYRIGHT. Donaldson, whose enterprises are spoken of approvingly by Boswell, left a fortune, which was greatly augmented by his son, a newspaper publisher in Edinburgh; and the total sum, amounting to nearly a quarter of a million sterling, was bequeathed to found an educational hospital for poor children. This building adorns the environs of Edinburgh, and is one of the most magnificent in Scotland. See DONALDSON'S HOSPITAL. This is not the only hospital for which the world is indebted to the book-trade. Thomas Guy, a bookseller in Cornhill, London, founded during his life the hospital which bears his name; he died in 1724. See GUY'S HOSPITAL.

million volumes, employing 80 clerks, and having no fewer than 18,000 subscribers to the London establishment alone. As many as 2000 copies of a single work at eighteen shillings or a guinea are sometimes added; so that in many cases what would formerly have been considered to be large editions are absorbed by one purchaser. After being used for several months, the overplus copies belonging to these libraries are disposed of at from a half to one quarter of the original price; and the readiness with which they find customers among the lesser libraries throughout the country is alone an evidence of the increasing demand for books. Mudie's library now contains more than two million volumes, having absorbed the largest of the older circulating libraries, which was said to contain half a million volumes.

The selling of second-hand books from open stalls, and from Booths (q. v.), is a practice so ancient as to be connected with the trade of the stationarii of the middle ages. Some men of considerable note in the book-trade began in the humble quality of stall-keepers. The most celebrated instance of this kind is perhaps that of James Lackington. He commenced his remarkable career by keeping a small stall of old books, which, while working as a shoemaker, he placed at his door in one of the obscure streets of the metropolis; and from his ultimate success, was able to inscribe the proud boast, *Sutor ultra crepidam feliciter ausus*, on his very entertaining memoirs. Though more common formerly than now, book-stalls are still seen in every large European city. They particularly abound in Paris—chiefly on the quays near the Pont-Neuf; and at all the great continental fairs, stalls of new and second-hand books are conspicuous. Booksellers at one time took their place among the stall-keepers on market-days in English provincial towns, nor have they altogether disappeared.

Michael Johnson, bookseller in Lichfield, was in the habit of setting up a stall for the sale of his wares, every market-day, in Uttoxeter. On one occasion, confined to bed by indisposition, he requested his son Samuel to visit the market, and attend the stall in his place, which he refused to do. How this act of criminal pride and filial disobedience preyed in after-years on the mind of the great lexicographer; and how, in his old age, to expiate this juvenile delinquency, he went to Uttoxeter on a market-day, and stood on the site of his father's stall for the space of an hour bareheaded in the rain, exposed to the jeers of the by-standers, are among the most characteristic circumstances narrated in the life of this extraordinary man (see Boswell, Croker's post 8vo edition, vol. x. p. 103). The flood of cheap publications forty years ago, which has been already referred to, greatly damaged the stall-trade in old books. Nevertheless, there remain in London a few book-stalls and booths, and in Edinburgh, though fallen from their high estate, book-stalls are still visible. In Paris the stall-trade still flourishes, and no book-hunter in that city loses the opportunity of a ramble along the Quais. It must be admitted, however, that the business is losing its picturesque character; it is getting into a regular shop-trade, and attaining to dimensions far beyond the notions of the old class of stall-keepers. London, of course, is the chief seat of the second-hand book-trade; but it is also conducted on a respectable scale in Edinburgh, Glasgow, Manchester, Liverpool, Oxford, Cambridge, Dublin, Bristol, and some other centers of wealth and intelligence. The dealers procure supplies chiefly at public auctions of the libraries of deceased clergymen, professors, and private gentlemen, of which sales there is a constant succession in London, Edinburgh, and elsewhere. At these auctions, good editions of standard books may usually be obtained at moderate prices; but rare and curious works, prized by the 'bibliomaniac,' frequently bring very high sums. See BIBLIOMANIA. Dealers in second-hand books send catalogues to their customers throughout the country; and from this source not a few gentlemen's libraries are mainly made up. During the past twenty years, there has been a growing scarcity of second-hand high-class works, in consequence of the purchase of large quantities for public libraries forming in the United States. From France, Italy, and Germany, there has been a similar export-trade in splendid old editions to North America.

At one period, it was usual to limit editions to from 500 to 1000, or 1250 copies, and impressions of 2000 were considered excessive. Now, large editions are more frequently the rule than the exception, particularly as regards the works of standard authors published in a cheap form. As the cost of composition (setting the types) is the same for a large as for a small edition, and as the charge for press-work is only a little more for a larger than a smaller impression, the profit on a book rises rapidly in proportion as the quantity put to press increases. In the case of cheap books, it is absolutely necessary that large impressions be sold, in order that they may realize any profit to the publisher. In preparing this class of books, therefore, to the extent of from 20,000 to 50,000 impressions, the element of composition dwindles into insignificance. The chief things taken into account are paper, machine-printing, and boarding. Paper, however, being the matter of most serious concern, the weight is rigorously computed beforehand by putting a sample volume into the scales. To avoid delay, and also to save outlay in preparing future impressions, it is customary to stereotype cheap books and periodicals. Although, like composition, stereotyping forms a minor charge, the accumulation of stereotype-plates at length becomes considerable, and, as in the case of overplus stock, forms a burden on the capital of the publisher.

The changes produced in the English book-trade by the cheap press, are not more remarkable than that improvement in taste which has subdued the traffic in books of a politically objectionable, and of a demoralizing character. Contrary to fears entertained on the subject, the cheapening of books, periodicals, and newspapers has in no perceptible degree deteriorated literature. The sale of books of a grossly demoralizing tendency has been driven into obscurity, and in other ways circumscribed by an act of parliament (21 and 22 Vict., cap. 83); and it is demonstrable, as regards periodicals, that those of an objectionable kind form but a small proportion—not one hundredth part of the whole. Little dependence can be placed upon the statements given of the circulation of weekly and monthly magazines, as there is a general disinclination on the part of respectable publishers to state their actual sales; while the numbers mentioned by the less reputable members of the trade are almost without exception fictitious, and are generally mentioned for the sole purpose of attracting advertisements. Cases have been brought before our notice in which hundreds have been magnified into thousands, and in very rare instances indeed is the *bonâ-fide* circulation honestly stated. The aggregate monthly circulation of periodicals of all descriptions, excluding newspapers, may be stated at about 10,000,000, of which not more than 90,000 are actually immoral or anti-religious. The circulation of some of the religious magazines is very large; of two published at sixpence monthly by the Religious Tract Society, one sells to the extent of 160,000, and the other 85,000. Including newspapers, the total number of separate weekly and monthly publications issued in London is nearly 800.

Obviously, the sale of such an enormous mass of cheap sheets would be overwhelming to the ordinary trade; in point of fact, the writing and publishing and also the retailing of the more widely circulated penny papers are conducted as a separate business. The sales are effected chiefly by means of small shops in back-streets, the purchasers being, besides domestic servants, all varieties of persons, old and young, who reside in these humble localities. The rise of these cheap periodical and newspaper shops, in adaptation to new social wants, is not the least remarkable of the 'signs of the times.' Nor can it be spoken of with regret. With other commodities the huxter dispenses the weekly pennyworth of literary amusement, which, enjoyed in the poorest family circle, enlivens the most dreary fate, and if not directly elevating in its tendency, may be presumed to do at least some good as a substitute for more exceptional means of excitement. On general grounds there is cause for congratulation. Considering the preponderatingly large proportion of cheap periodicals of an unobjectionable, and not uninstructive kind, and looking also at the perfect freedom now enjoyed by every department of the press, we have a striking illustration of the vastly improved state of public feeling, with which cheap literature has steadily kept pace, since the reign of George IV. Not even in the most objectionable of the irreligious prints is there anything at all resembling the scurrilities which were at one time prevalent. The classes of books and periodicals which a number of years ago consisted of coarsely offensive attacks on the government, church, law, &c., have entirely disappeared, and at no time in its whole history has the book trade of Great Britain been on a more healthy footing than it is at present.

Limited by the general imperfect state of education and inaptitude for reading, the ordinary book-trade is also obstructed on account of large sections of the people still speaking some form of the Celtic language, and being unable to understand English. The Scottish Highlanders, Welsh, Manx, and aboriginal Irish, are less or more in this condition. In Wales, there exists a press especially devoted to those who, in remote parts of the Principality, still hold to the ancient vernacular; and the publishing of books and periodicals in the native tongue is conducted with remarkable activity. Some are translations from English works of a useful and popular kind, occasionally illustrated with wood-engravings; and the circumstance of there being a taste and demand for such productions, affords a favorable view of the intellectual advancement of the Principality. In Ireland, on the contrary, almost the only works printed in the ancient tongue are for the use of scholars, and not, as in Wales, for the poor. The Highlands and Western Islands of Scotland produce no literature, native or translated; and the Gaelic books in the hands of the people are extremely limited in variety and number.

Entirely separated from the general book-trade, there flourishes a system of publishing of a peculiar kind. We allude to the *Canvassing Trade*, which consists in the plan of disposing of books mostly in weekly and monthly numbers or parts. The business is conducted by only a few houses in London, Edinburgh, Glas-

gow, and one or two other places. Canvassers are employed to go from door to door, to procure subscribers; and the numbers are delivered periodically, till the work is completed. On account of the expense of canvassing and delivery, books sold in this manner are necessarily much dearer than if disposed of through the ordinary channels of trade. The method, however, of buying books in small portions at a time, accommodates certain classes of customers, and has been the means of disseminating an improving literature—Bibles, with notes and illustrations, and works of piety in particular—in quarters not reached by the operations of the bookseller. During the past twenty years, the canvassing trade has largely been engaged in selling books, and especially Bibles, in the complete form. On giving an order, the book or Bible is left, and as mall sum is paid, and a similar sum weekly or monthly. It is said that but few bad debts are made amongst working-men, a fact that speaks well for their honesty.

Apart, likewise, from the general trade, the publication of small books, tracts, and periodicals is carried on to a large extent by associations for religious purposes, the funds for which are raised by voluntary subscriptions. As far as concerns the distribution of purely religious tracts among the unfortunate and less instructed members of the community, no fault is found with the operations of these societies. But when such associations address themselves to the publication of volumes and illustrated periodicals, differing in no material respect from the ordinary products of private enterprise, and intended not for gratuitous distribution but for sale, a certain injury is felt to be unbecomingly inflicted on the trade, which can no more be justified than the damage done to free competition by the giving of bounties on particular manufactures. Notice has been taken of two periodicals of the Religious Tract Society of London, the circulation of which must be allowed to be fostered in this manner, and other works could be pointed out as being so greatly cheapened by the same objectionable method as to be placed completely beyond the reach of fair commercial competition. See RELIGIOUS TRACT SOCIETY.

Another distinct kind of trade is that of printing and publishing authorized versions of the Bible, New Testament, and Book of Common Prayer. The preparation of these works has always been a prerogative of the crown, which grants exclusive privileges or patent rights to certain parties for the purpose. From old usage, England, Ireland, and Scotland are treated separately. The last patent for England was granted by George IV. to Andrew Strahan, George Eyre, and Andrew Spottiswoode, for a term of thirty years; and having commenced on the 21st of January 1830, it expired on the 21st January 1860, and was then renewed during pleasure. The universities of Oxford and Cambridge have enjoyed the right of printing Bibles, &c., in common with the patentees; but they have no power to prosecute. In the case of the Revised New Testament, issued in 1881, the university authorities had the sole right of publication; over one million copies were sold on its first appearance. See PATENT.

In Ireland, George III., in 1766, granted a Bible patent to Boulton Grierson for forty years. He was succeeded by his son, George Grierson, who in 1811, obtained a renewal. Trinity College, Dublin, had also a concurrent right; but the English patentees, and both Oxford and Cambridge, are permitted to import their Bibles into Ireland.

In Scotland, the last patent expired in 1839, and was not renewed in consequence of remonstrances from that country, to the effect that if its printing were left free, the Bible would be sold at a considerably lower price than it had hitherto been. Such has proved to be the case. The crown appoints a Board with authority to grant licenses to parties desirous to print editions of the Bible and other books falling within the royal prerogative, such as the Confession of Faith of the Presbyterian Churches of Scotland, but the importation of English printed editions is not prohibited.

The modification of the patent having tended to lower prices, the possibility of any further material reduction seems doubtful. One noticeable feature in the trade in Bibles is, that the publishers in England sell large numbers in sheets. They are bought by bookbinders, who do them up in various styles; some very neatly with gilt edges, which they sell to retailers at about 11*d*. per copy. Other copies, costing, perhaps, not more than 1*s*. or 1*s*. 6*d*. in sheets, are bound in velvet, morocco, tortoiseshell, or other ornamental bindings, and retailed as high as three guineas each. It is computed that in London alone, nearly 1000 persons are employed in binding Bibles, Prayer-books, and other books of devotion. From their cheapness, but more particularly from their accuracy, English-printed Bibles and New Testaments are purchased in large quantities by the United States. Other large purchasers are the British and Foreign Bible Society. The Society for promoting Christian Knowledge makes large purchases of Prayer-books and Church Services in addition.

Although the printing of the authorized version of the Bible, the New Testament, and the Book of Common Prayer, with as well as without notes, seems to be reserved to the nominees of the crown, practically no objection is taken to the printing of these works by others, nor has any objection ever been raised to those printed with notes and comments. Many such editions are accordingly prepared and issued by publishers, often in a style of great elegance. Translations of the Bible, other than the authorized version, are also issued freely by Roman Catholic and other bodies; and at the present time a committee of learned divines is engaged upon a revised version of the English Bible, the copyright of which has been secured by the universities of Oxford and Cambridge; the New Testament was published in 1881.

The universities of Oxford and Cambridge; also of Trinity College, Dublin; the four Scotch universities; and the colleges of Eton, Winchester, and Westminster, were so much alarmed by the decision of the House of Lords in 1772, in favor of Donaldson's right to reprint works not protected by the copyright law of 8 Anne, c. 19, that they applied for and obtained an act of parliament, 15 Geo. III. c. 53, giving them a perpetual copyright of all works belonging to them, or which might afterwards be bequeathed to or acquired by them. The only work in existence older than the present century, claimed by any of the above institutions, to which any value can be attached, is Clarendon's *History of the Rebellion*, with his life and continuation. The right to this and other works possessed by the university of Oxford, was confirmed by the last Copyright Act, 5 and 6 Vict. c. 45. It will therefore be understood that the printing and publishing of Lord Clarendon's *History of the Rebellion* remains an absolute and perpetual monopoly in the university of Oxford—a curious exemption from the ordinary and terminable claim of copyright, and singularly at variance with modern notions of free-trade. It should be added that the profits of the first edition were very great, and were applied by the university towards the erection of the 'Clarendon Press,' which was for a long time the university press; but, its business increasing, the 'Clarendon' has been superseded by the 'University Printing-house;' the former building, a very handsome one, being used for other purposes. (Besides Godson's *Law of Patents and Copyrights*, and *Supplements*, see Dr. Ingram's *Memorials of Public Buildings of Oxford*, new edition, 1848, p. 11.)

Publishers are under the legal obligation to deliver, free, a copy of every book they issue (new editions without alterations excepted) to the five following public institutions: Library of the British Museum; Bodleian Library, Oxford; University Library, Cambridge; Trinity College Library, Dublin; and Library of Faculty of Advocates, Edinburgh. This obligation, imposed by a clause in the Copyright Act (see COPYRIGHT), is usually spoken of as an unjustifiable burden, and no doubt it is so; but it is chiefly from causing trouble that it becomes matter for complaint. In comparison with the immense benefits conferred on literature by the public libraries mentioned, the value of the books (with some exceptions) claimed by them is insignificant. In practice, not a hundredth part of the cheap books and sheets issued are given or claimed; which is perhaps unimportant, for if they were no ordinary building could contain them.

The English book-trade has been lately much indebted to certain liberal Post-office arrangements. Manuscripts, proof-sheets, books, periodicals and catalogues, if left open at the ends, may now be transmitted by post at an exceedingly small charge. See POST-OFFICE.

Unitedly, the whole trade of publishing and bookselling forms an important staple of national industry—inferior to some other manufactures and trades, yet great when viewed in relation to its past history, and to the still imperfect state of education among large masses of the people, and respectable from the number of men of high character who are connected with it. In reckoning the number of new works issued from the press annually, we may take the number of entries of distinct books, volumes, sheets, maps, &c., lodged by publishers at the British Museum, in terms of the Copyright Act. The following is an abstract of the return for 1880: Books—complete works, 9975; parts of volumes, works in progress, and periodicals, 39,873; single articles, including playbills, songs, broadsides, &c., 9358—total, 59,206. Music—complete works, volumes and pieces, 5553. Newspapers—number of sets issued in the United Kingdom, 1913. Twenty years ago the number was only about half as great. In 1882, 5124 new books and new editions were published. In 1880, the books imported into the United Kingdom were valued at £176,029. Of these, the value from Germany was £12,265; France, £63,040; Holland, £45,301; the United States, £35,296; other countries, £9502. The value of English printed books exported in 1880 was £970,263. The United States purchased to the amount of £276,387; Australia, £317,039; Canada, £58,188; British India, £83,617. France, Germany, Holland, and Belgium unitedly took to the value of £97,272; our next largest customer being South Africa, for £56,883. In 1874, the value of books exported was £904,792; of imports, £178,936.

It is seen that the exports are five or six fold more than the imports; also that we export to Australia alone more than twice as much as we import from all countries, and to the United States almost a third more than our total imports. A system of more

free and untaxed import of foreign-printed English works would, in various ways, introduce changes into the book-trade, and have a tendency to alter some of its traditional usages.

In Germany, where printing originated, the book-trade became also first established, and the principal mart was Frankfurt, to the fairs of which the early booksellers and printers resorted. Leipsic, also, became a great mart for books as early as 1680; yet this ancient city is only one of many places of book preparation in Germany. Among them Stuttgart has taken a front rank, since about 1830, as an agency place for the South German book-trade, whilst Frankfurt has now entirely lost its ancient prestige. Throughout the different states of the German empire, more particularly Prussia and Saxony, printing and publishing are largely carried on; and from the various places of publication a great proportion of entire editions of works is transferred to Leipsic agents, who disperse the books throughout Germany, and all those countries for the book-trade of which the city of Leipsic forms the nucleus. Hence arises the important peculiarity of German literature, that literary, artistic, and scientific activity is not limited to, or monopolized by any single city, and that, consequently, authors do not need to resort to a metropolis for encouragement or any professional labor. Formerly, the booksellers from the various parts of Germany, and those countries which are dependent, in some measure, upon Germany, on account of affinity of language and identity of aspirations—such as Holland, Belgium, Denmark, Sweden, Norway, &c. —used to meet at Leipsic twice a year, at Easter and Michaelmas, with a view to exchange their respective publications, and arrange for settlement of mutual accounts. At present, business is done at Leipsic through a system of agencies by commissioners there established. Every bookseller in Germany and the adjacent countries has his commissioner at Leipsic, and to him he forwards packages containing copies of his new publication or publications, on sale or return, for all the booksellers with whom he has an account. The commissioner then distributes the packages among the Leipsic commissioners, every one of whom is thus enabled, out of the many packages flowing in every week, to make up a case for each of his correspondents.

At the end of the year, unsold books are returned to the various senders by means of the Leipsic agency. At Easter, during the fair, the balances are now mostly paid by commissioner to commissioner, the German publishers not resorting as much as formerly to the fair; the extension of railway communication, and other circumstances facilitating business, having somewhat changed the nature of the trade. The method of sending parcels of new works, on sale or return, may not be satisfactory according to English notions, but the advantages of the plan are obvious in various points of view. There is no country in the world where literary and scientific novelties are so regularly made known and become noticed as in Germany. Let the book be what it may, within six weeks after its first publication it is known all over Germany, and through the personal vigilance of the retailers, is brought everywhere under the notice of those individuals to whom the subject treated of may be of interest. This method of publication has the merit of great simplicity, and secures an exemption from the frightful expenditure on advertisements to make books known, which presses on the English publisher. On this account, as well as from the cheapness of paper and printing, and the simple way that books are for the most part done up, the selling-prices of every variety of production are very moderate. The only drawback on the German publisher is, the liability to heavy returns of unsold books; but this he doubtless endeavors to avert by professional tact in his speculations, and a good knowledge of the market. It is, at all events, the belief of those who are well acquainted with the German book-trade, that the method pursued not only furnishes books cheaper, but is more productive to author and publisher than that in England; and that, in point of good management and prosperity, it exceeds, or at least equals, the book-trade in any other country. From the teeming press of Baron Bernhard Tauchnitz of Leipsic, had been issued by 1882 a series of 2000 volumes of cheap reprints of English popular works in a pocket size, which are sold largely in Germany and all other continental countries. It is proper, however, to say that, as there is an international copyright law between Germany and the United Kingdom, these *Tauchnitz Editions*, as they are termed, are issued in virtue of an honorable arrangement with English publishers and authors, and are accordingly not to be ranked with the piratical issues of the New York trade. Latterly, the sale of German books in England, France, and North America has rapidly increased.

In France, publishing is carried on chiefly in Paris, where there are many extensive printing establishments, including the *Imprimerie Nationale*, provided with machinery equal, if not superior, to anything of the kind in London. As regards substantiality and elegance, French books occupy a place between those of Germany and England. They are, with few exceptions, done up simply in colored paper covers, for temporary service; but the ink is generally better than that used in England; and works, when of a superior class, are executed with a high degree of taste—the excellence of pictorial embellishments being always conspicuous. Certain voluminous and most expensive works in French, and also in the classical languages, occasionally issue from the Parisian press, and command a large sale; orders of copies for university and public libraries all over the continent tending to promote these gigantic enterprises. Although confined mainly to Paris, the business of publishing, or at least of preparing books for the Parisian market, and for exportation, is carried on to a considerable extent in several provincial towns. Tours, in particular, is the seat of a large book-factory—that of Messrs. Mame—in which printing, designing, engraving, and binding are all executed on the premises.

The French book-trade was virtually suspended during the war with Germany, 1870—1871, but it may now be said to have fairly recovered, if not surpassed its former condition. The exports are to Italy, Germany, Russia, Holland, Belgium, North America, and other countries, and a portion also comes to England. Between France and the United Kingdom there is now an international law of copyright, by which translations of works are, under certain limitations, protected in either country, when the title-page indicates that 'the right of translation is reserved.'

In the 17th c., various cities in the Dutch Netherlands bore a prominent place in the book-trade. At Amsterdam, some of the most beautiful editions of the classics, and large numbers of illustrated books, were executed; while from Leyden, and other seats of learning, exports of works in law, theology, &c., formed at one time a prosperous commerce. In this as in other trades, it has been the fate of Holland to lose its former reputation: it now produces few books in any other language than its own; but the demand for books in the Protestant parts of the country, and the number of booksellers, is perhaps larger than in any other part of the world. That part of the Netherlands now known as Belgium possesses a flourishing book-trade, mainly, we believe, on account of French being the language generally spoken. Brussels, as a kind of minor Paris, is the seat of some extensive printing and publishing concerns; and at Malines, missals, breviaries, and other religious works are produced in large numbers. According to a return of the minister of finances of Belgium, the following was the import and export trade in books for 1872: Value of imports, 3,460,000 francs, of which 70 per cent. was from France; value of exports, 3,000,000 francs, of which 40 per cent. was to France, and 60 to all other countries.

In Spain, book selling is almost defunct; even in Madrid it can scarcely be said to have an existence. In Italy there are signs of revival, but the most active booksellers there are natives of Germany, who, during the last thirty years, have established bookselling houses in the principal cities, Rome, Naples, Turin, Milan, Bologna, Florence, Venice, and Verona, also Triest; and under their auspices, the trade may be expected to assume an organized form. Already these intelligent foreigners have done much to keep alive a knowledge of Italian literature.

The book-trade of the United States, which is daily assuming greater proportions, has sprung up from small beginnings within the present century. As in Germany, the business of publishing is monopolized by no particular city, but is carried on successfully in various towns throughout the Union. The chief centers are New York, Boston, and Philadelphia; but many books are published at Albany, Buffalo, Baltimore, Washington, New Orleans, Charleston, Cincinnati, Chicago, St. Louis, and San Francisco; and a few in other places. The great distributing houses are located at New York and Philadelphia; and throughout the United States and Canada there are about 6200 booksellers, two-thirds of whom unite an exceedingly miscellaneous collection of trades with that of book-selling. A few of the larger publishing houses in New York and Philadelphia, like some in Edinburgh and Glasgow, print, bind, and manufacture the books they sell. Harper's building in New York, and Lippincott's in Philadelphia, each cover nearly half an acre of ground, and cost above £50,000. The annual value of books produced in the United States is unknown. In 1871, upon very uncertain data, it was estimated at £7,000,000, this amount probably being the full selling-price of every volume printed. In consequence of the protectionist policy pursued since the war, the present state of the book-trade is far from satisfactory, and will probably remain so till wiser counsels prevail. English publishers and authors are naturally indignant at the conduct of American publishers persisting in reprinting British copyright works, a practice which has been carried on to an enormous extent (and cannot be said to be decreasing) by a number of the publishers in the United States, in defiance of remonstrance, and even in disregard to the claims of those more scrupulous American publishers who pay for and import early sheets from England. The present state of matters is regretted by the more high-minded Americans as much as it is in Britain.

American books are now executed with neatness and taste; their wood cut embellishments, notably those in *Scribner's* (now the *Century*) and *Harper's Magazine*, have of late been brought to a pitch of remarkable beauty both in design and in printing. On

account of the prevalence of education, and also the aspiring habits of the people, book-buyers of a humble position in life are greatly more numerous than they are in the United Kingdom. Few books are purchased by the Irish immigrants, but the Germans are buyers, and many of the colored people are eager in their thirst for knowledge, and their children are all amply provided with schools. The American trade, after all yet but partially developed, may be expected to progress in a vastly accelerated ratio. Latterly, several English publishers have established branches of their business in New York; and there are now some extensive American commission-houses in London—from which intercommunion happy results may be anticipated. Books are sold wholesale by written orders, trade sales, auctions, and otherwise. Country dealers are in the habit of visiting the great book-dépôts of Boston, New York, and Philadelphia, and there personally making their selections. As previously stated, there is a large export of American books to Canada and other British possessions, in which, as yet, native literature is on a poor scale, but where there is a large and increasing number of readers.

In doing up books in cloth boards, the American binders invariably cut off the outer folds of the sheets, so as to smooth the edges of the leaves, as in English leather binding; by which process, the first readers of new books are spared the trouble of cutting open the leaves. Many persons have wished to see this improvement, for such it is, introduced into England. There are still, however, prejudices to be overcome on the subject. Strange as it may appear, numbers of purchasers like to cut up the leaves with a folder as they advance through a new book or periodical, from an idea that the repeated slight interruptions heighten the pleasure of perusal. In our experience, we have known gentlemen who would not sit down to read a cut-up new book. Besides, there is a notion among buyers in England, that books with smooth-cut leaves may be second-hand, and not worth the price of new. Undoubtedly, the Americans are ahead of Europeans generally in this particular.

Notice has been taken of the constant export from Europe to the United States of quantities of high-class books to stock the great public libraries that are everywhere springing into existence through the liberality of state legislatures, or the munificence of private individuals. There is, however, a traffic of a similar kind, more especially from England, in execution of orders for second-hand books from dealers who have establishments in the principal cities in the Union, and through whose agency persons of refined tastes are becoming acquainted with the aspect of our older literary treasures.

One of these second-hand book-stores in Philadelphia, which we visited some years ago, was on as extensive a scale as anything of the kind in London or Edinburgh, while the choice which it presented would have come quite up to the delicate perceptions of the bibliomaniac.

For a variety of particulars bearing on the book-trade in general, we refer to the articles, BIBLIOGRAPHY, BOOK, BOOKBINDING, CENSORSHIP, CIRCULATING LIBRARY, COPYRIGHT, NEWSPAPERS, PAPER, PERIODICALS, PRESS, PRINTING, STATIONER, STEREOTYPING, WOOD-ENGRAVING. See also BOOK-TRADE in AM. SUPP.

BOOLE, GEORGE, a very distinguished mathematician, was born at Lincoln, 2d November 1815, and received his education mainly from his father, an intelligent tradesman. He successfully started a school at Lincoln in 1835; and in 1849, he became professor of mathematics in Queen's College, Cork, a post he held till his death, 8th December 1864. He had long been one of the foremost mathematical thinkers of his time. Among his publications are one on *Analytical Transformations* (1839); on a *General Method in Analysis* (1844); *Mathematical Analysis of Logic* (1847); and on *Probabilities* (1854).

BOOLUNDSHU'HUR, a British district in the North-west Provinces of India, with an area of 1910 sq. miles and a pop. (1872) of 936,593. It is bounded on the N. and W. by the districts of Meerut and Delhi. Its chief town of the same name, otherwise called Unchuganj, is on the route between Bareilly and Delhi, being 40 miles to the south-east of the latter. Its population amounts to 14,804; and its distance from Calcutta is 780 miles, its elevation above the level of the sea being almost precisely the same number of feet.

BOOM, in a ship, is a general name for the long poles which jut out from certain supports or uprights, to stretch or extend the bottoms of sails. Some taper regularly from the middle towards both ends; while others have the thickest part at about one-third of the length from one end. According to their particular modes and places of application, they receive the names of *jib-B.*, *flying jib-B.*, *studding-sail B.*, *lower studding-sail B.*, *main B.*, *square-sail B.*, *driver-B.*, *spanker-B.*, *ring-tail B.*, *main-topmast B.*, *fore-topmast B.*, *fire-B.*, &c. In the old 110-gun ships of Nelson's days, these booms varied from 57 to 32 feet in length, and from 15 to 6 inches in thickness. The war-steamers of the present day require a somewhat different equipment of booms. The immense spread of canvas in some of the clipper merchant-ships now built requires the use of booms of very considerable length. A seaman speaks of 'booming' when he applies a B. to a sail; he employs *B.-irons*, shaped like the figure 8, to connect booms and other spars together end to end.

Besides the booms on board ship, the same name is also given to a strong iron chain employed in barring the passage of the mouth of a harbor or river, or to cut off the retreat of an enemy if he has actually entered. Such a B. should be protected by a battery or batteries. The chains are moored, and are floated by logs. There should be two such chains, one to afford resistance if the enemy has penetrated the other; they need not extend all across the passage, seeing that shallow spots are self-defended. A modern war-steamer would cut through a chain-B., unless made of very thick and strong iron. Sometimes hempen cable booms are used to resist small-craft. The Russians effectually boomed the harbor of Sebastopol in September 1854, thereby preventing the entrance of English and French ships; this was done partly by sinking some of their own ships, and partly by the laying of booms.

BOOM, a town of Belgium, in the province of Antwerp, about 10 miles south of the city of that name. Its situation at the junction of the Brussels Canal with the river Rupel makes it a place of considerable trade. It has numerous and extensive brick and tile works, breweries, tanneries, rope-walks, sail-cloth manufactures, salt-works, &c. Pop. 7464.

BOO'MERANG, a missile instrument for war, sport, or the chase, in use by the aborigines of Australia. It is of hard wood, of a bent form; the shape is parabolic, as represented in the adjoining cut. It is about two and a half inches broad, a third of an inch thick, and two feet long, the extremities being rounded. One side is flat, the other rounded; and it is brought to a bluntish edge.

Boomerang.

The method of using this remarkable weapon consists in throwing it in a particular manner. It is taken by one end, with the bulged side downwards, and the convex edge forward, and thrown directly onward, as if to hit some one thirty yards in advance. Instead of going directly forward, as might be expected, and there falling to the ground, it slowly ascends in the air, whirling round and round, and describing a curved line of progress till it reaches a considerable height, when it begins to retrograde, and finally it sweeps over the head of the projector, and falls behind him. This surprising motion is produced by the bulged side of the missile. The air impinging thereon, lifts the instrument in the air, exactly as by hitting the oblique bars in a windmill, it forces it to go round. The ingenuity of the contrivance, which is worthy of the highest scientific calculation, is very extraordinary as coming from almost the lowest race of mankind. The B. is one of the ancient instruments of war of the natives of Australia. They are said to be very dexterous in hitting birds with it, the animals being of course behind them, and perhaps not aware that they are objects of attack. This curiosity, as it must be called, was first made known by being brought before the Royal Irish Academy by Professor M'Cullagh in May 1837.

BOONE, DANIEL, a famous backwoodsman and trapper, was born in Virginia, United States. At an early period of his life, he emigrated to North Carolina; but his love of the wilderness not being sufficiently gratified there, he planned an expedition into Kentucky, then almost unknown. On the 7th of June 1769, along with five companions, he reached the Red River, north of the Kentucky. B., however, was captured by the Indians, but escaped, and accidentally falling in with his brother, who had pursued his track, they lived together in a cabin during the whole winter. In May 1770, B.'s brother went home, and B. himself was left alone in the perilous forest. In July, his brother returned, and after exploring a considerable portion of country, they returned in 1771 to Carolina, determined to emigrate with their families to Kentucky; but the attempt proved unsuccessful. Shortly after, B. was engaged as the agent of a Carolina company, in purchasing the lands on the south side of the Kentucky river, where, in 1775, he built a fort on the site now occupied by the town of Boonesborough. In 1777, the place was twice attacked by a swarm of Indians, who, however, failed to capture it. On the 8th of August 1778, a third attempt was made by 450 savages, officered by Canadian Frenchmen. In spite of repeated assaults, the little garrison of fifty men set at defiance its enemies, who were at length obliged to retire, and never afterwards ventured to besiege the place. After many skirmishes and encounters with the Indians, B. removed in 1798 to Upper Louisiana, where the Spanish authorities gave him a grant of 2000 acres of land. He settled with his children and followers at Charette, on the Missouri River, beyond the inhabited limits of the country, where he followed his favorite occupation of hunting and trapping bears till his death,

which occurred in 1822. B. was one of the most adventurous of all those 'pioneers of civilization' to whose courage, endurance, and skill America owes so much.

BOO'NESBOROUGH, one of at least thirty localities in the United States, which take their name from the first pioneer of the great valley of the Mississippi. It stands on the Kentucky, about 18 miles to the south-east of Lexington. Though now an insignificant village, yet it deserves a prominent place in the history of the mighty west. It was founded in 1775 by Daniel Boone (q. v.), as his first fort; and within three or four years thereafter, it was the seat of the first legislature beyond the Alleghanies.

BOORGHA'S. See BURGAS.

BOO'RO an island of the Malay Archipelago, about 60 miles to the west-north-west of Amboyna, extending between S. lat. 3° and 4°, and between E. long. 126° and 127°. With an area of 2000 sq. m., it is estimated to contain from 20,000 to 100,000 inhabitants. Though it is mountainous, having Mount Dome and Tomahoo, respectively 10,400 and 6528 feet high; yet it is, on the whole, very fertile, its productions being rice, sago, fruits, dye-woods, and cajeput oil. At the east end of the island, the Dutch have a station named Fort Defence; but the best anchorage is on the north side in Cajeli Bay.

BOOROJI'RD, or BOOROOGI'RD, a town in the province of Irak-Ajemi, Persia, situated in a fertile valley about 190 miles north-west of Ispahan. Lat. 33° 43' N., long. 48° 45' E. It has a castle and several mosques. Pop. about 12,000, who are chiefly engaged in agricultural pursuits.

BOO'SA. See BOUSSA.

BOOT, BOOTS, or BOO'TIKIN, an instrument of judicial torture, formerly used in Scotland to force confessions from persons accused of crimes, or answers from unwilling or suspected witnesses. Bishop Burnet in the *History of his Own Time*, and Sir Walter Scott in his *Old Mortality*, speak of the B. as made of iron; but the Rev. Thomas Morer in his *Short Account of Scotland*, written from personal observation of the country at a time when the B. was still in use, describes it as 'made of four pieces of narrow boards nailed together, of a competent length for the leg, not unlike those short cases we use to guard young trees from the rabbits.' One or both legs of the person to be tortured having been placed in this case, wedges were inserted between the limb and the sides of the case, and these wedges were driven down by the executioner with a mall or hammer, questions being at intervals put to the sufferer, until either he gave the desired information, or fainted away, or showed such endurance as satisfied the judges that no answer could be extorted from him. The wedges were commonly placed against the calf of the leg, but Bishop Burnet says he had heard that they were sometimes placed against the shin-bone. In one case—that of a lad in Orkney, in 1596—it is recorded that they were struck home as many as fifty-seven times. In another—that of John Fian, schoolmaster at Prestonpans, burned for sorcery in 1591—it is said that the victim 'did abide so many blows, that his legs were crushed and beaten together as small as might be, and the bones and flesh so bruised that the blood and marrow spouted forth in great abundance, whereby they were made unserviceable for ever.' 'Still,' it is added, 'he would not confess;' and, indeed, it is remarkable in how many cases we are told that the torture, agonizing as it was, failed in its purpose, even where the sufferer 'shrieked for pain in terrible manner, so as to have moved a heart of stone.'

A writer of 1591, after speaking of the 'pilniewinks,' 'pilliwinks,' thumb-screws, or thumbikins (q. v.) as 'a grievous torture,' and of compression of the skull by a twisted cord as 'a most cruel torment also,' describes the B. as 'the most severe and cruel pain in the world.' Yet there are instances in which it was not thought enough. When the boots were first used in Scotland is not known. In a case where a deed of conveyance of land was challenged as a forgery, in 1579, two witnesses, a clergyman and a notary, both of Forfarshire, were ordered to be 'put in the boots, gins, or any other torments, to urge them to declare the truth.' In a letter, still preserved in the State Paper Office at London, Sir Francis Walsingham writes to the English ambassador at Edinburgh, in 1583, that Queen Elizabeth desires that Father William Holt, an English Jesuit then in Scotland, may be 'put to the boots.' The B. was subject of allusion on the English stage in 1604; in Marston's *Malcontent*, printed in that year, one of the characters is made to say: 'All your impirics could never do the like cure upon the gout the rack did in England, or your Scotch boots.' A young gentlewoman of Aberdeenshire was tortured by the B. in 1630. Soon afterwards, it is said to have fallen into desuetude for about thirty years. It was revived after insurrection of the westland Covenanters in 1666, and continued to be used throughout the reigns of King Charles II., and King James II., and during the first years of King William III. 'The genius of our nation,' writes Sir J. Lauder of Fountainhall in 1681, 'looks upon the torture of the boots as a barbarous remedy, and yet of late it hath been frequently used among us.' The Claim of Right brought forward by the Scottish Convention in 1689, denounced 'the use of torture, without evidence, and in ordinary crimes, as contrary to law.' Notwithstanding this declaration, the B. was used at least once again. In 1690, Neville Payne, an English gentleman who was supposed to have entered Scotland on a treasonable mission, was put to the torture under a warrant superscribed by King William, and still shown in the Register House at Edinburgh. The B. was applied to one leg, the thumb-screws to both hands, but without any effect, although in the words of one of the privy-councillors, the torture, which lasted for two hours, was inflicted 'with all the severity that was consistent with humanity, even unto that pitch that we could not preserve life and have gone further.' This is believed to be the last time that the B. was used. But it was not until Scotland had ceased to be an independent kingdom, that the British parliament enacted—by the statute 7 Anne c. 21—that in future 'no person accused of any crime in Scotland shall be subject or liable to any torture.' Torture is believed not to have been used in England after 1640. It was abolished in France in 1789, and in Russia in 1801.

BOO'TAN. See BHOTAN.

BOO'TÉS, in ancient mythology, the son of Ceres and Iasion, who, being plundered of all his possessions by his brother Pluto, invented the plough, to which he yoked two oxen, and cultivated the soil to procure subsistence for himself. As a reward for this discovery, he was translated to heaven by his mother with the plough and yoke of oxen, under the name of B., i. e., the Ox-driver, which is still borne by one of the constellations. According to others, B. was the son of Lycaon and Callisto, whom his father slew, and set before Jupiter for a repast, to try his omniscience. Jupiter restored him to life, and placed him amongst the stars.

BOOTH. Throughout all Europe, in early times, trade was carried on chiefly by fairs, as indeed is still the case in some parts of it, and in many parts of Asia. The tents, huts, or other temporary or movable structures in which the traders exposed their goods for sale, were calle *booths*. Though the corresponding German *bude* is generally referred to *bauen*, to build, our *booth* is traced by some to the Gaelic *both* or *bothag*, a bothy or hut; by others to the Greek *apotheke*, through the Latin *apotheca*, the Italian *boteca*, and the French *boutique*—all signifying an office, shop, store-house, or tavern. From this, its primary sense, B. gradually came to mean a fixed shop or warehouse. As towns sprang up, the yearly fair was more or less supplanted by the weekly market. The slight B. which was set up in the same spot every week, had an irresistible tendency to become substantial and permanent; and the records of the 12th and some following centuries are full of unavailing complaints against the encroachments which were in this way made upon the market-places and streets. Thus, Joceline of Brakelond chronicles the ineffectual efforts of his great and wealthy abbey, in 1192, to dislodge the burgesses of Bury St. Edmunds from the shops, sheds, and stalls, which they had erected on the market-place without leave of the monks.

So in the Winton *Domesday Book*, compiled in 1148, notice is taken of 'houses' in Winchester which had been 'stalls.' So, also, Stow relates that the houses in Old Fish Street, in London, 'were at the first but movable boards set out on market-days to show their fish there to be sold; but procuring license to set up sheds, they grew to shops, and by little and little, to tall houses.' So, again, the same chronicler tells us that 'in Cheapside, from the great conduit west, were many fair and large houses, which houses in former times were but sheds or shops, with solars (that is, lofts or upper chambers) over them.' So in Edinburgh the range called at first 'the Booth-raw,' and afterwards 'the Luckenbooths,' arose in the very center of the High Street. So, likewise, in Edinburgh and elsewhere, the trader who for years had spread his stall under the shelter of the same buttress of the church or town-hall, began to rest a fixed wooden B. against it, gradually transforming the timber beams into lath and plaster, or even into brick or stone, until at length the basement of the stately cathedral, or *hôtel de ville*, was incrusted all over with unseemly little booths (or *krames*, as they were called in Scotland), like limpets on a rock. The B. which thus arose had often but

Merchants' Booths:
From an illuminated MS representing Venice in the 14th century.

one apartment, which opened on the street by a narrow door, and a broad unglazed window, closed at night by a wooden shutter, dividing in the middle, and hinged at top and bottom, so that the upper half formed a sort of awning, while the lower half served as a table for the display of the trader's wares. It was at this window that business was conducted, the trader standing within, the buyer without. Occasionally a flight of steps led down to a cellar under the B., which served as a store-room. In other cases, a chamber behind was the warehouse of the merchant's B., or the workshop of the craftsman's B., or the sleeping-place of either. As civilization advanced, a 'solar' or chamber was raised above the B. for the dwelling-house of the trader, occasionally with a store-room in the roof, to which goods were hoisted by a crane. There is mention of a goldsmith's B., with a 'solar' above it, at Perth, about 1220. Traces of the middle-age B. still remain in this country. There are many perfect examples in France, some of them believed to be of the 12th century.

BOOTHS, UNLICENSED, are, by the law of England, public nuisances, and may, upon indictment, be suppressed, and the keepers of them fined. But by the 6 and 7 Vict. c. 68, s. 23, theatrical representations in booths or shows at fairs, feasts, or customary meetings of the like kind, when allowed by the justice of the peace of the district, or other local authorities, are lawful. See THEATERS, LAWS AS TO.

BOOTH, BARTON, a celebrated actor of the 18th c., was born in 1681, his father being nearly related to Henry Booth, Earl of Warrington. Having received a good education at Westminster, he was sent at the age of 17 to Cambridge University, from which he ran away to join a company of strolling-players, who were shortly after dispersed by the law. B. next performed at Bartholomew Fair with such success that Betterton would have engaged him for Drury Lane had he not been afraid of offending his family by doing so. After a successful engagement in Dublin, he returned to London, and was now engaged at Drury Lane, where he appeared in 1701, and made a great 'sensation.' He became quite the rage among the nobility, who vied with each other in placing their carriages at his disposal; and he frequently stayed overnight at Windsor, where the court was then held. His greatest character was the ghost in *Hamlet*, in which he is said never to have had an equal; and his Othello, according to Cibber, was also a very masterly performance. He died May 10, 1733.

BOOTHAU'K, a fortified pass of Afghanistan, 12 miles to the east of Cabul. It runs for 5 miles between cliffs 500 feet high, and is in some places only 50 yards wide.

BOO'THIA FE'LIX, a peninsula forming the most northerly part of the American continent. Towards the south, it is terminated by an isthmus, while, to the north, it is bounded by Bellot Strait (q. v.). It was discovered by Sir John Ross during the most famous of his voyages, and named after his friend Sir Felix Booth, being supposed at the time to reach as far north as Barrow Strait.

BOO'THIA GULF separates Boothia Felix on the west from Cockburn Island on the east, and is, in fact, a continuation of Prince Regent's Inlet towards the south.

BOO'TON, an island near the S. E. of Celebes, between 4° 25'—5° 45' S. lat., and in 123° 4' E. long. Area, 1807 miles. It is mountainous and thickly wooded, produces fine timber, rice, maize, sago, &c. There are buffalo, swine, horses, and goats. The people are Malays. The chief town, Booton, is walled, and there fine cottons and other stuffs are made. The sultan is in alliance with the Dutch. Pop. 17,000.

BOOTS, which are only a lengthened variety of shoes, are among the most ancient articles of attire. Shoes, extended a certain height up the leg, laced, ornamented, and of fanciful colors, were in use by the ancient Egyptians, Greeks, and Romans, as is seen by existing relics and drawings. Leaving an account of these and other varieties of shoes, as well as an account of the trade and manufacture of shoes and boots generally, to the article SHOE-TRADE, we here confine attention to a few historical particulars respecting what are properly called B., meaning by the term leather coverings for the legs and feet. Different kinds of half-boots were worn by the Anglo-Saxons and Anglo-Normans; and in the reign of Edward IV., if not earlier, the boot-proper, with tops and spurs, was established as an article of knightly dress. (See *Book of the Feet*, by J. Sparkes Hall, London.) In the reign of Charles I., a species of boot, exceedingly wide at the top, made of Spanish leather, came into use; and with Charles II. the highly decorated French boot was introduced as an article of gay courtly attire. Meanwhile, the jack-boot, as it is called (see JACK), had become indispensable in the costume of cavalry soldiers and horsemen generally; and by William III. and his followers it was regularly naturalized in England. Strongly made, the jack-boot extended in length above the knee, was capacious at top, had a very high heel, and round the ankle it had a flat leather band bearing a powerful spur. In the adjoining cut is offered a representation of this highly characteristic boot, which we readily associate with the civil and foreign wars that distracted the 17th century. This huge species of boot remained in use in British cavalry regiments until comparatively recent times, and was dismissed as being too cumbrous in the case of men being dismounted. It is, nevertheless, in a somewhat polished and improved form, still worn by the Horse-guards, with whose stalwart appearance, doing duty in their tall B. at Whitehall, most people are familiar.

Jack-boot.

As an improved jack, the Horse-guards boot bears a remarkably close resemblance to the boot of the French postilion, well known to the older class of continental tourists. French postilion B., however, it is proper to understand, are made of that capacity that will suit any ordinary foot and leg. Kept economically as part of the equipment of a posting-house, they are ready for all legs, with or without stockings, as the case may be; and looking at the strength of their materials, they may very fairly be supposed to accommodate all the post-boys of an establishment during half a century.

The jack-boot is almost entitled to be called the parent of the top and some other varieties. B. with tops of a yellow color were so commonly worn by gentlemen in the 18th c., as to become a peculiarity in the national costume of the English. When Philip, Duke of Orleans, and other revolutionists of note, affected to imitate the sentiments and manners of the English, they ostentatiously wore top-boots. In the early years of the present century, a number of members of the House of Commons, among whom may be specified the late Sir Francis Burdett, habitually wore top-boots; nor have they yet entirely disappeared. By jockeys and fox-hunters, they are likely to remain in permanent use. What perhaps contributed to break up the general use of top-boots, was the introduction of the Hessian boot, as an article of walking-dress. Worn over tight pantaloons, the Hessian boot was a handsome piece of attire, giving, undoubtedly, an elegant appearance to the nether costume. A representation of a Hessian boot, with its tassel, is annexed. B. of this shape, as is seen by engravings, were worn by English general officers in the early part of the French war, and somewhat later. At length they were superseded by the well-known Wellington boot, which, as its name imports, was introduced by the great Duke, as a simplification, under the loose military trouser. This species of boot has, in its turn, been almost entirely abandoned in England, in consequence of the universal use of short ankle B.; but it is still generally used by some classes of persons in the United States, though in an odd fashion, with the trousers stuffed loosely in at the top.

Hessian Boot.

BOO'TY is the victors' share in property captured from the vanquished. It is generally a military term, the word *prize* being more frequently used in the navy. The regulations concerning B. in the British army were collected and consolidated in 1831, and have only been slightly altered since. All military B. is apportioned as the sovereign from time to time may direct. Deserters, and those who do not claim their share within six years, receive none. The officers appoint two B. or prize agents, by letters of attorney; the field-officers naming one, and the subordinate officers another. The officer commanding the successful expedition sends to the military authorities a list of the persons entitled to booty. The agents collect the property, convert it into money at the best advantage, and hand over the proceeds to the authorities, receiving a small percentage for their trouble. A scale of distribution is then made out, and the money is paid after a certain interval. When an army and a fleet join in a capture, the Admiralty calculates the army share, and sends the amount to the military authorities. Prize and B. originally belonged to the sovereign, and are only distributed to the captors as an act of grace; for, if the sovereign pleases, the property can be given back again to the enemy. See further, under PRIZE.

BOPP, FRANZ, Ordinary Professor of Oriental Languages at Berlin, was born at Mainz, on the 14th of September 1791. Devoting himself exclusively to the study of oriental literature, he spent some years in Paris, where he was encouraged in his labors by Chezy, Silvestre de Sacy, and August Wilhelm Schlegel, and afterwards visited London, to prosecute his favorite studies more thoroughly, being partly supported by a small pension from the king of Bavaria. His first publication was on the Sanscrit verb; he afterwards produced a Sanscrit grammar, a *Glossarium Sanscritum*, and editions of several fragments of the great Indian epic, the *Mahabharata*, in the original text, with a translation. He helped much to facilitate the study of Sanscrit in Europe. But his most important labors centered in the analysis of the grammatical forms of the different languages of the Indo-Germanic family, by which he may be said to have founded a new science

of Comparative Grammar. His great work in this department is a Comparative Grammar of the Sanscrit, Zend, Greek, Latin, Lithuanian, Old Slavonian, Gothic, and German (*Vergleichende Grammatik*, &c., Berl. 1833, &c.; a second edition, entirely recast, was published in 1857). An English translation by Lieutenant Eastwick, and conducted through the press by Mr. Wilson, Boden professor of Sanscrit in Oxford University, was published in three vols. 1845—1850. In recognition of his splendid services to philology, he was, in 1842, made a knight of the newly erected French *Ordre du Mérite*, and in 1857, foreign associate of the French Institute. He died in 1867.

BO'PPARD, or BO'PPART (ancient *Baudobriga*), a walled town of Rhenish Prussia, situated on the left bank of the Rhine, about 9 m. S. of Coblenz. B. is a very ancient place, with dark, narrow streets, and chiefly built of wood. Its appearance, however, is picturesque, and it has several buildings architecturally remarkable. The church of the Carmelites contains some fine specimens of 16th c. sculpture. During the middle ages, B. was an imperial city, and many councils were held in it. Remains of the Roman fortress built by Drusus still exist in the town. Near B. is Marienberg, the famous hydropathic resort. Pop. (1880) 5524.

BORA, KATHARINA VON, or CATHARINE DE BORA, the wife of Luther, was born, it is supposed, at Löben near Schweinitz, in Saxony, on 29th January 1499. At a very early age, she entered the Cistercian convent of Nimptschen, near Grimma. Becoming acquainted with Luther's doctrines, she found herself very unhappy in her monastic life; and finally, along with eight other nuns, whose relatives, like her own, refused to listen to them, she applied for assistance to Luther. Luther obtained the services of Leonhard Koppe, a citizen of Torgau, and by him and a few associates the nine nuns were liberated from the convent in April 1523. They were brought to Wittenberg, where Luther had suitably provided for their reception. Catharine became an inmate in the house of the burgomaster Reichenbach. Luther, through his friend, Nicholas von Amsdorf, minister in Wittenberg, offered her the hand of Doctor Kaspar Glaz, who became pastor in Orlamünde. She declined this proposal, but declared herself ready to marry Von Amsdorf, or Luther himself, who had already laid aside his monastic dress. Her marriage with Luther took place on 13th June 1525, and was made the occasion of much unjust reproach by his enemies, which has not ceased to be repeated to this day. In his will, he left her all that he had, so long as she should remain a widow, because, as he says, she had always been an affectionate and true wife to him. After Luther's death, the Elector of Saxony and Christian III. of Denmark contributed from time to time to her support. She died at Torgau on 20th December 1552.

BORA'CIC A'CID is found native (1) in the steam or vapor which rises from certain volcanic rocks in Tuscany, and (2) as a saline incrustation in the crater of a mountain in the island Volcano, which is situated 12 miles north of Sicily. This crater is about 700 feet deep, the sides lined with a crust of B. A. about half an inch thick, and is sufficient to yield an annual supply of 2000 tons. B. A. also occurs in combination in Borax (q. v.), Datholite (q. v), Boracite, and other minerals, and to a very minute extent in trap rocks generally. The Tuscan supply of B. A. may be regarded as the most important, and its collection takes place over an area of about 30 miles. The plan pursued is to form a series of caldrons—100 to 1000 feet in diameter, and 7 to 20 feet deep—partly by excavation, and partly by building, in the side of the volcanic mountain where the steam and B. A. vapors are issuing from fissures, and divert the course of a mountain stream, so that at pleasure the caldrons, or *lagoons*, may be supplied with water. As the volcanic vapors—called *suffioni*—gurgle through the water contained in the lagoons, the B. A. is arrested by the water, which becomes impregnated with it. The liquid is passed from one lagoon to another, then on to settling vats and flat-bottomed evaporating pans, till it becomes so concentrated that on cooling, impure crystals of B. A. separate. In this condition it is sent to England and other countries.

The appearance of the surface of the ground, from which thousands of jets of steam are constantly issuing, is very striking; and the name given to one of the principal mountains, *Monte Cerboli* (*Mons Cerberi*), denotes the feeling of awe with which the peasantry regard the district as the entrance to the lower regions. Native B. A. is employed as a source of borax (q. v.), and contains about three-fourths of its weight of true B. A., accompanied by one-fourth of water and impurities. In a pure condition, B. A. may be prepared by dissolving 40 parts of borax ($NaO,2BO_3$) in 100 of water, and acting thereon by 25 parts of hydrochloric acid (HCl), which removes the soda, forming chloride of sodium (NaCl) and water (HO), and on cooling the mixture, the B. A. (BO_3) crystallizes out. On re-solution in water and re-crystallization, it is obtained in pure white feathery crystals. B. A. is used in the arts as a flux, as an ingredient in the glaze employed in pottery; and the wicks of stearine and composite candles are treated with it, so that when the candle is burning, the end of the wick when it gets long, may fuse and fall to the side, where it can be burned away. —*Boro-glyceride*, prepared by heating B. A. with glycerine, possesses very valuable antiseptic properties.

BO'RAGE (*Borago*), a genus of plants of the natural order *Borragineæ* (q. v.), having a wheel-shaped corolla, the mouth of which is closed with five teeth, and forked filaments, of which the inner arm bears the anther, the anthers connivent around the style, in the form of a cone. The species are few, chiefly natives of the countries around the Mediterranean Sea. The COMMON BORAGE (*B. officinalis*) is found in waste places in many parts of Europe, and is pretty frequent—perhaps naturalized—in Britain. It is a plant of rather coarse appearance, with a stout erect herbaceous stem, 1—2 feet high, somewhat branched; the lower leaves elliptical, obtuse, tapering to the base; the stem, leaves, flower, stalks, and calyx rough with hairs. The flowers are more than half an inch broad, of a beautiful blue color. B. was formerly much cultivated and highly esteemed, being reckoned amongst the *cordial* flowers, and supposed to possess exhilarating qualities, for which it no longer receives credit. The belief in its virtues was at one time extremely prevalent in England, and its use accordingly universal. The flowers were put into salads, Gerarde tells us (1597), 'to make the mind glad;' and he adds: 'There be also many things made of them, used everywhere for the comfort of the heart, for the driving away of sorrow, and increasing the joy of the mind.' Like some other plants of the same order, B. contains nitrate of potash (nitre), and is slightly febrifuge. It is mucilaginous and emollient, and has been used in pectoral affections: its leaves impart a coolness to beverages in which they are steeped; and with wine, water, lemon, and sugar, enter into the composition of an English drink called a *cool tankard*. The young leaves and tender tops are pickled, and occasionally boiled for the table.

Borage (*B. officinalis*): *a*, flowering branch; *b*, the cone of stamens, &c.

BORAGI'NEÆ, or BORAGINA'CEÆ, a natural order of the dicotyledonous plants, consisting chiefly of herbaceous plants, but also containing shrubs and even trees, the leaves generally rough with hairs which proceed from a thick hard base, and the whole plant mucilaginous and emollient. The leaves are alternate and without stipules. The flowers are in spikes, racemes, or panicles which are almost always coiled up, and gradually uncoil and elongate themselves, the flowers expanding in succession. The calyx is 4—5 partite, and remains till the fruit is ripe; the corolla is generally regular, 4—5-cleft, imbricated in bud; the stamens rise from the corolla, and are equal in number to its divisions—generally five—and alternate with them. The ovary is 4-partite, 4-celled; the style simple, arising from the base of the lobes of the ovary. The fruit consists of 4—or sometimes of 2—distinct achenia. See ACHENIUM.—The order *Ehretiaceæ* of some botanists differs chiefly in the fruit, which in the more typical species is a succulent drupe; and in the Heliotropes consists of four dry achenia more or less consolidated.—There are about 600 known species of the proper *Borragineæ*, and about 300 of *Ehretiaceæ*. The former are natives principally of temperate climates, and are particularly abundant in the south of Europe and in the temperate parts of Asia; the latter are more tropical, but not exclusively so. BORAGE (q. v.), ALKANET (q. v.), COMFREY (q. v.), and FORGET-ME-NOT (q. v.), are familiar examples of the former; the exquisitely fragrant HELIOTROPE (q. v.) is the best known of the latter. The drupes of some species of *Ehretia* are eatable.

BO'RA SA'MBA, a curious little half-independent state, or raj, in India, within the jurisdiction of the political agent for the south-west frontier of Bengal. Its central point is in N. lat. 20° 55', E. long. 83° 10'; its area is about 622 sq. m.; the pop. is estimated at 28,000. The country is rugged, and the people savage. Outlaws from other parts of India have too often found refuge here. The revenue is about £400 a year. A tribute of £16 is paid to the British government.

BORA'SSUS. See PALMYRA PALM.

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